Oracle Diagnostics Pack For Oracle Database

Oracle Enterprise Manager is Oracle's integrated enterprise IT management product line, and provides the industry's first complete cloud lifecycle management solution. Oracle Diagnostics Pack offers a comprehensive set of real time and automatic performance diagnostics and monitoring functionality built into the 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 of your Oracle Database environment. When used with 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 or a hung system is a time-consuming task and often the activity where database administrators (DBA) spend most of their time. A number of third-party tuning tools are available in the market but seldom do these tools provide an accurate root cause analysis. Instead the DBA has to manually look through multiple charts trying to guess the root cause of the problem. Oracle Diagnostics Pack takes the guesswork out of performance diagnostics. It includes a performance-diagnostics engine built right into the Oracle Database kernel, called the Automatic Database Diagnostic Monitor (ADDM) that completely simplifies the complex and arduous task of diagnosing performance problems for database and IT administrators.

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 that make it much superior to any other Oracle Database performance management tool or utility. Each ADDM finding has an associated impact and benefit measure to enable prioritized handling of the most critical issues. To better understand the impact of the findings over time, each finding has a descriptive name that allows the application of filters and easy searching, and a link to the previous occurrences of the finding in the last 24 hours. To enable performance diagnostics for pluggable databases (PDB), ADDM lists the affected PDB along with the details of the finding for quick and easy diagnosis.

For Oracle Real Application Cluster (RAC) environments, ADDM has a special mode for cluster-wide performance analysis. 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.

REAL-TIME PERFORMANCE DIAGNOSTICS

Diagnosing extremely slow databases or hung databases have been a big challenge for most database administrators. With no way to connect to the hung database the administrator is often left with no option but to bounce the entire system. This restart of the database not only causes an unplanned outage but also gets rid of diagnostic information collected before the hung state. Without a proper mechanism to find the root cause of the hang, the database application incurs the risk that the problem may recur in the near future.

Real-Time ADDM provides an innovative way to analyze problems in unresponsive or hung databases. Using a normal and a diagnostic mode connection Real-Time ADDM runs through a set of predefined criteria to analyze the current performance and helps the DBA to resolve deadlocks, hangs, shared pool contentions and many other exception situations that today forces the administrator to bounce their databases, causing significant loss of revenue. Real-Time ADDM is the only tool available in the market today that can log into a hung database, analyze the problem and recommend a resolution.

Real Time ADDM has been enhanced to handle additional issues beyond hung and unresponsive databases. This enhanced Real Time ADDM proactively detects transient performance issues by running in the database automatically every 3 seconds. It uses in-memory performance data to diagnose any performance spikes in CPU, memory, I/O etc. utilization. With this feature, Oracle Database can proactively inform an administrator about a performance issue and its associated root cause even when the system is not actively monitored.

FEATURES

- Automatic Performance Diagnostics
- Real-Time Performance Diagnostics
- Automatic Workload Repository (AWR)
- AWR Warehouse
- Comparing Performance Periods
- Active Session History (ASH)
- Exadata Management
- Comprehensive System Monitoring and Notification

KEY BENEFITS

- Automatic performance diagnostics simplifies diagnosing performance issues for administrators and ensures quicker resolution of performance bottlenecks. Performance for all pages

KEY BENEFITS

- Ability to perform real time performance analysis

AUTOMATIC WORKLOAD REPOSITORY (AWR)

Oracle Diagnostics Pack includes a built-in repository within Oracle Database, called Automatic Workload Repository (AWR), which contains operational statistics captured into snapshots at regular intervals about that particular database and other relevant information. 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. 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. 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. The AWR report generated to analyze a period of poor performance is really useful to look at the overall performance of the database and is the go-to tool for most database administrators.

Automatic Workload Repository (AWR) supports PDB-level snapshots in a Multitenant environment. This feature enables better performance diagnosis and tuning in a Multitenant environment. The AWR data provides container-specific data that represents individual PDB's contribution to the whole database instance; therefore this data is useful for both the CDB and the PDB administrators. AWR Multitenant support allows reporting the top SQL per PDB which helps a PDB administrator tune his specific container.

AWR also automatically saves Real-Time SQL Monitoring, Database Operations Monitoring and Real-Time ADDM reports inside the database, which allows the administrator to go back in time and review a monitored execution of a query in the past. This is very useful in determining performance inconsistencies across executions of a particular SQL query.

AWR WAREHOUSE

Beyond ongoing performance management, enterprises are also interested in analyzing their database performance data over a longer time periods for tasks such as capacity planning or identifying trends or patterns affecting performance in their mission critical databases. Oracle Enterprise Manager now provides the ability to transfer the performance data in from Automatic Workload Repository across all enterprise databases into a central performance warehouse called AWR Warehouse.

AWR Warehouse allows DBAs and capacity planners to get answers to questions such as what was the performance of the database this quarter compared the same quarter last year or whether database servers in the next 6 months could support the growth in resource utilization of the databases running on the servers. Enterprise Manager completely automates the extraction, transfer and load of the performance data into the AWR warehouse so that the critical source databases can keep operating at optimal performance without incurring additional storage overhead. And, the DBAs now have all the performance data they need for analysis at their fingertips for all their critical databases for all time.

ACTIVE SESSION HISTORY (ASH)

A key component of AWR is Active Session History or 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. Like AWR, ASH is also RAC-
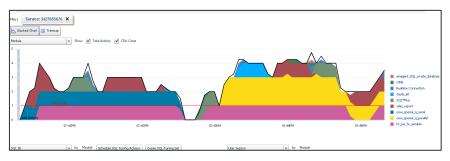
KEY BENEFITS

- Automatically maintained workload history facilitates historical performance analysis

KEY BENEFITS

- Enhanced ability to proactively detect and identify the root cause of performance issues

aware and the information obtained on session activity in the cluster wait class gives visibility into potential RAC-specific issues. ASH has also been extended to run on standby databases to assist in analysis of Oracle Data Guard performance.

The in-memory ASH data can be used to understand the database workload profile and proactively diagnose any transient performance issue that occurs for a very short duration. To enable proactive diagnosis of database performance Oracle Enterprise Manager includes ASH Analytics, a tool to explore the ASH data that allows the administrator to rollup, drilldown, and slice or dice performance data across various performance dimensions. With the ability to create filters on various dimensions, identifying performance issues has never been easier. The built-in treemap view allows administrators to explore performance data using predefined performance dimension hierarchies.

COMPARING PERFORMANCE PERIODS

Oracle Diagnostics Pack also provides a performance diagnostics capability called Compare Period ADDM that allows the administrator to answer the age-old question of why the performance today is slower than yesterday. The administrator can compare performance between two different time periods by choosing from either an AWR baseline or the previous AWR snapshot period or any calendar period of choice to check why a particular period is slower than the other. Compare Period ADDM checks both the base and compare period and generates findings that pinpoint the root cause for the difference in performance. Examples of the types of differences identified include the commonality of SQL statements in the base versus compare periods, regression in query performance due to higher utilization of system resources or a runaway ad-hoc query adversely impacting normal transaction processing.

EXADATA MANAGEMENT

Oracle Diagnostics Pack uses a holistic approach to manage the Exadata Database Machine and provides comprehensive monitoring and management for the entire engineered system. It provides a unified view of hardware and software where you can view hardware components such as compute nodes, Exadata cells, and Infiniband switches and see the placement of software running on them along with their resource utilization. DBAs can also drilldown from the database to the storage layer of Exadata to identify and diagnose problems such as performance bottlenecks or hardware faults. The lights-out monitoring capability of Enterprise Manager is optimized for Exadata where metrics and thresholds are predefined so that administrators can get timely notifications when issues arise. In Oracle Exadata Database Machine, management is engineered together with hardware and software to provide not just high performance and availability but also ease of management and consolidation.

COMPREHENSIVE SYSTEM MONITORING AND NOTIFICATION

Oracle Diagnostics Pack includes a comprehensive set of monitoring and notification features to enable administrators to proactively detect and respond to IT problems across their entire application stack. While Enterprise Manager continues to provide out-of-the-box monitoring for newly discovered targets, administrators can customize these monitoring settings to fit their datacenter needs. For database targets, this includes the use of adaptive thresholds which can automatically alert on statistically unusual values of performance metrics based on the database's own performance history. For other target types, easy access to a target's metric history is provided, enabling administrators to determine appropriate threshold values based on the range of typical metric values. If there are conditions specific to the datacenter those needs to be monitored, administrators can define new metrics for any monitored target using metric extensions. If an alert has a well-known remediation solution, then administrators can setup corrective action scripts that will automatically execute and resolve the alert when it is detected, thereby minimizing the need for manual intervention. In addition, alert history is also easily accessible to enable administrators to see what actions have been taken in previous occurrences of the alert.

The desired monitoring settings for a target can be defined in a monitoring template, one template per target type. When a set of monitoring templates for different target types are bundled together into a template collection and associated with an administration group, then the deployment of monitoring settings across targets is fully automated by Enterprise Manager. Specifically, when a target is added to an administration group, the monitoring settings associated with the group are automatically applied to the target, thereby streamlining and simplifying the process of monitoring setup for targets.

Once monitoring is in place and events are detected and raised on monitored targets, notifications for these events can be sent to the appropriate administrators. Notifications include email / page notifications, the execution of custom scripts and PL/SQL procedures, and the sending of SNMP traps. In addition, management connectors can also be used to open helpdesk tickets for incidents (based on important events) and/or send event information to other third-party management systems. Finally, to support planned maintenance periods on targets, a blackout capability is provided to enable administrators to temporarily suspend monitoring of targets and prevent false alerts from being raised during the maintenance period.

KEY BENEFITS

- Enhanced Comprehensive system monitoring and event notification reduce management cost and deliver better quality of service

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