

REAL-TIME DATABASE PERFORMANCE TUNING IN ORACLE 19C

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ABSTRACT:

In the ever-evolving landscape of data management, real-time database performance tuning has become critical for enterprises leveraging Oracle 19c. As organizations increasingly rely on data-driven decision-making, the demand for optimized database performance in real-time environments is paramount. This paper explores various strategies and techniques for enhancing the performance of Oracle 19c databases, focusing on key aspects such as resource management, query optimization, indexing, and monitoring.

The research begins by identifying the common performance bottlenecks faced by Oracle database administrators (DBAs) and application developers in real-time applications. By analyzing factors such as workload patterns, data distribution, and hardware configurations, we provide insights into the performance challenges specific to Oracle 19c. The paper emphasizes the importance of proactive performance tuning, which involves continuous monitoring and adjustment of database parameters to ensure optimal operation under varying workloads.

We delve into the significance of the Automatic Database Diagnostic Monitor (ADDM) in Oracle 19c, showcasing how it can help identify performance issues and recommend actionable solutions. The integration of machine learning and artificial intelligence in Oracle's performance tuning features is also discussed, highlighting how these advancements facilitate automated performance optimization and predictive analysis.

The paper further examines the role of SQL query optimization in enhancing database performance. We present best practices for writing efficient SQL statements, including the use of execution plans, avoiding unnecessary complexity, and leveraging advanced features like the Oracle SQL Plan Management (SPM) to ensure stable performance across different execution environments.

Additionally, we address the critical aspect of indexing strategies in Oracle 19c. By evaluating the trade-offs between various indexing methods—such as B-tree, bitmap, and function-based indexes—we outline how proper indexing can dramatically improve query response times and overall system throughput.

Monitoring and diagnostics are pivotal in the performance tuning process. We explore the use of Oracle Enterprise Manager (OEM) and other monitoring tools to provide real-time insights into database performance metrics. The ability to visualize performance trends and quickly identify anomalies is essential for maintaining database health and ensuring uninterrupted service delivery.

Lastly, we conclude by discussing the importance of regular performance reviews and tuning cycles. As workloads evolve and data volumes grow, DBAs must adapt their tuning strategies to meet the changing demands of real-time applications. This paper serves as a comprehensive guide for professionals seeking to enhance their understanding and implementation of performance tuning in Oracle 19c, equipping them with practical tools and methodologies to optimize their database environments effectively.

KEYWORDS: Oracle 19c, Database Performance Tuning, Real-Time Applications, Query Optimization, Indexing Strategies, Automatic Database Diagnostic Monitor, SQL Plan Management, Performance Monitoring

Article History

Received: 07 May 2022 | Revised: 10 May 2022 | Accepted: 16 Mar 2022
