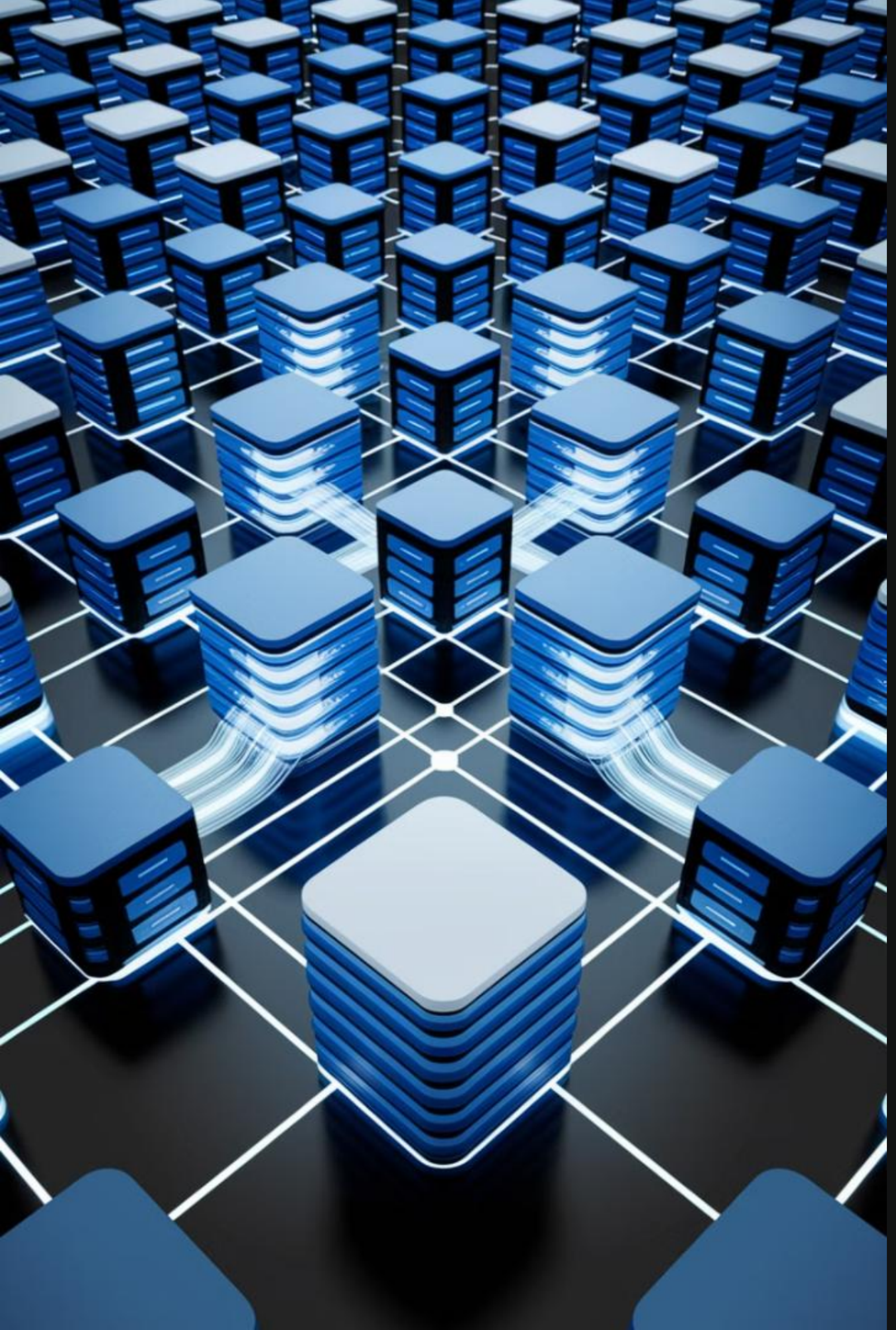


Memory structures in Oracle Database 23c

por Mayko Silva

Introduction to Oracle 23c Memory Structures

1 **Efficient Memory Management**

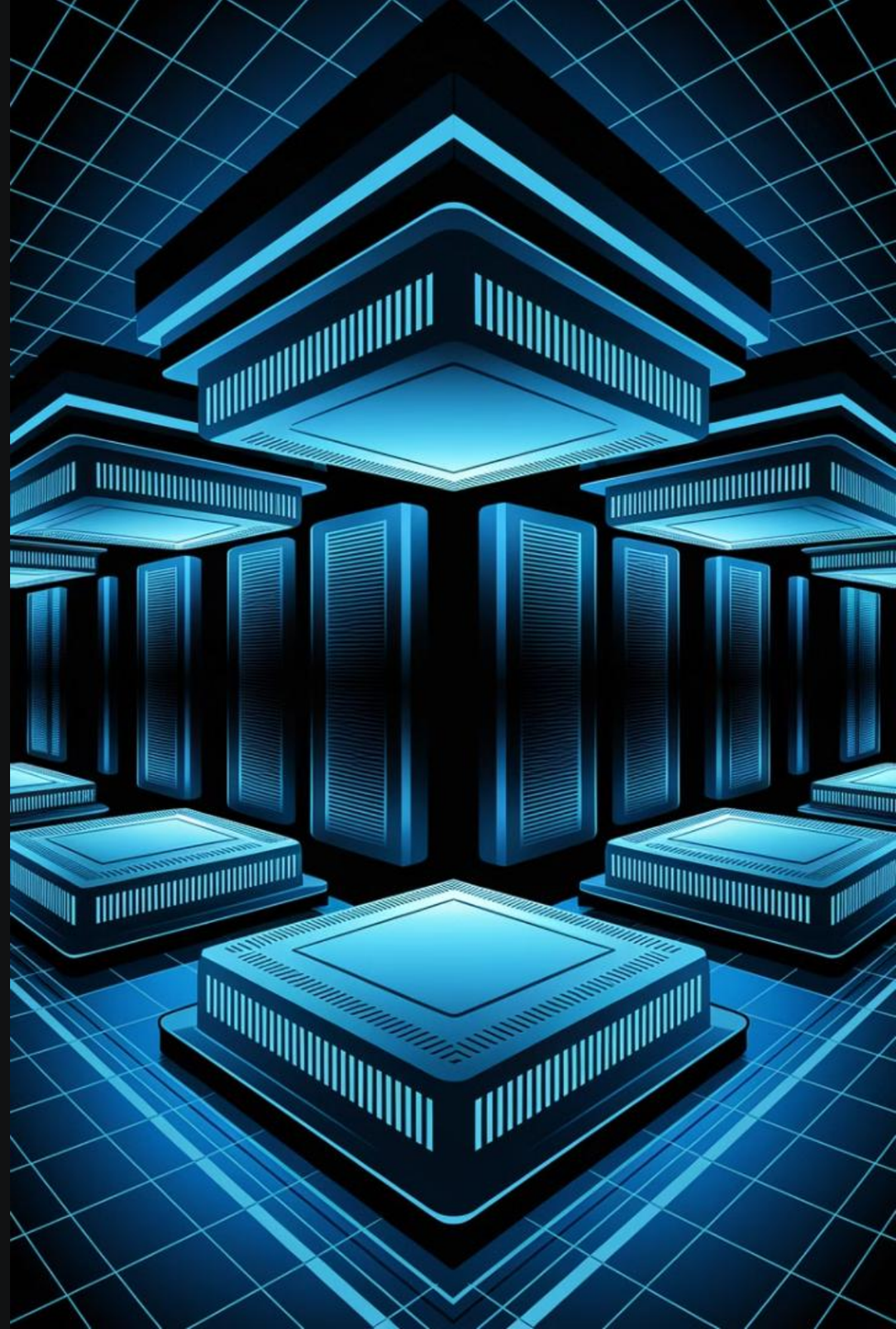
Crucial for optimal database performance

2 **Oracle 23c Enhancements**

Significant improvements in memory management

3 **Focus Areas**

System Global Area (SGA) and Program Global Area (PGA)



Primary Memory Structures: SGA Overview

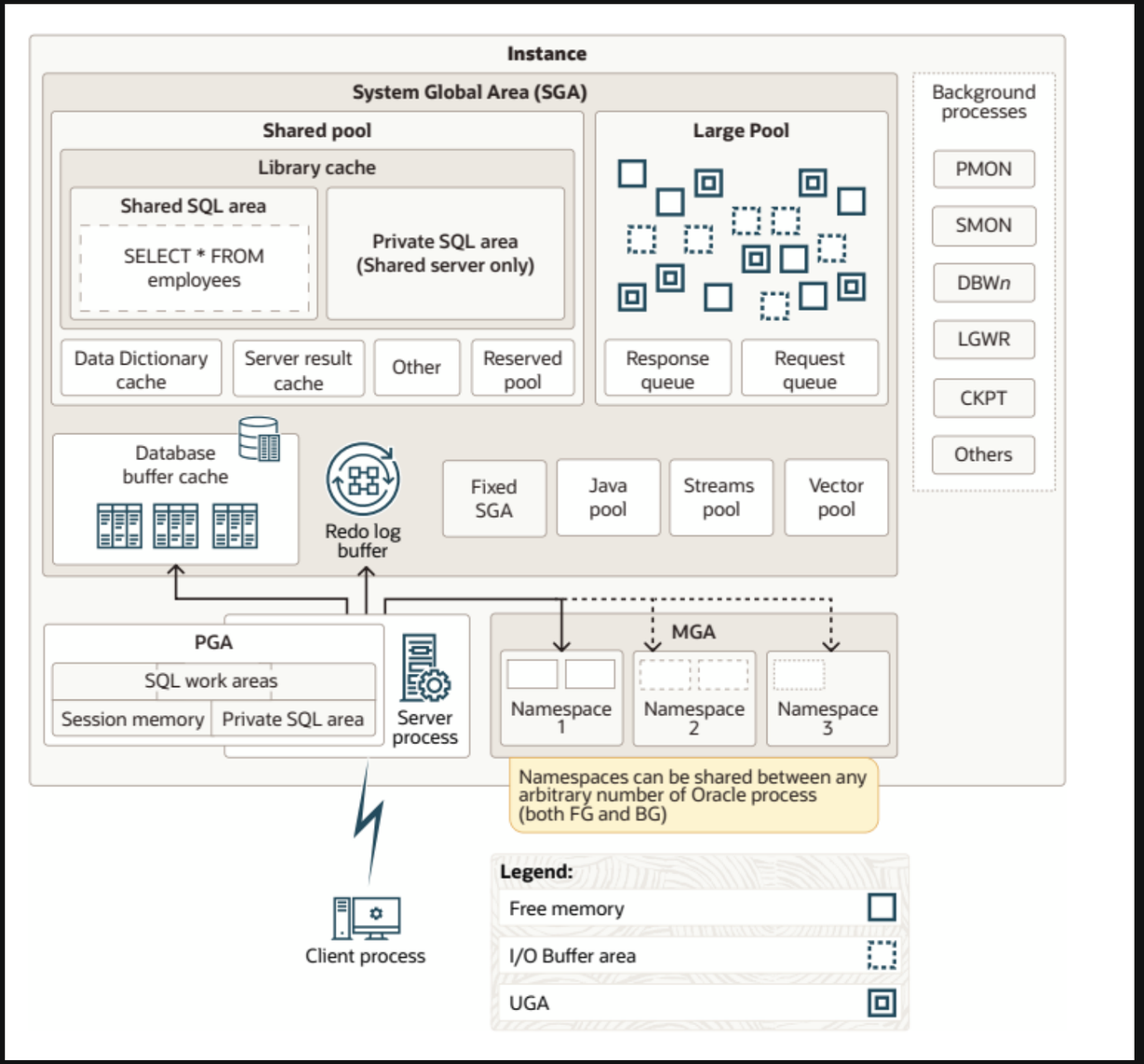
System Global Area (SGA)

A group of shared memory structures containing data and control information for one Oracle Database instance. Oracle 23c has optimized the SGA for improved performance and scalability.

Key Characteristics

Shared memory structures, optimized performance, enhanced scalability in Oracle 23c

SGA


Instance
System Global Area (SGA)
Shared pool
Library cache
Shared SQL area
SELECT * FROM employees
Private SQL area (Shared server only)
Data Dictionary cache
Server result cache
Other
Reserved pool
Large Pool
Response queue
Request queue
Database buffer cache
Redo log buffer
Fixed SGA
Java pool
Streams pool
Vector pool
Background processes
PMON
SMON
DBWn
LGWR
CKPT
Others
PGA
SQL work areas
Session memory
Private SQL area
Server process
MGA
Namespace 1
Namespace 2
Namespace 3
Namespaces can be shared between any arbitrary number of Oracle process (both FG and BG)
Client process
Legend:
Free memory
I/O Buffer area
UGA

Key Components of the SGA

Database Buffer Cache

Stores copies of data blocks. Enhanced buffer management algorithms in 23c for more efficient data caching and retrieval.

Shared Pool

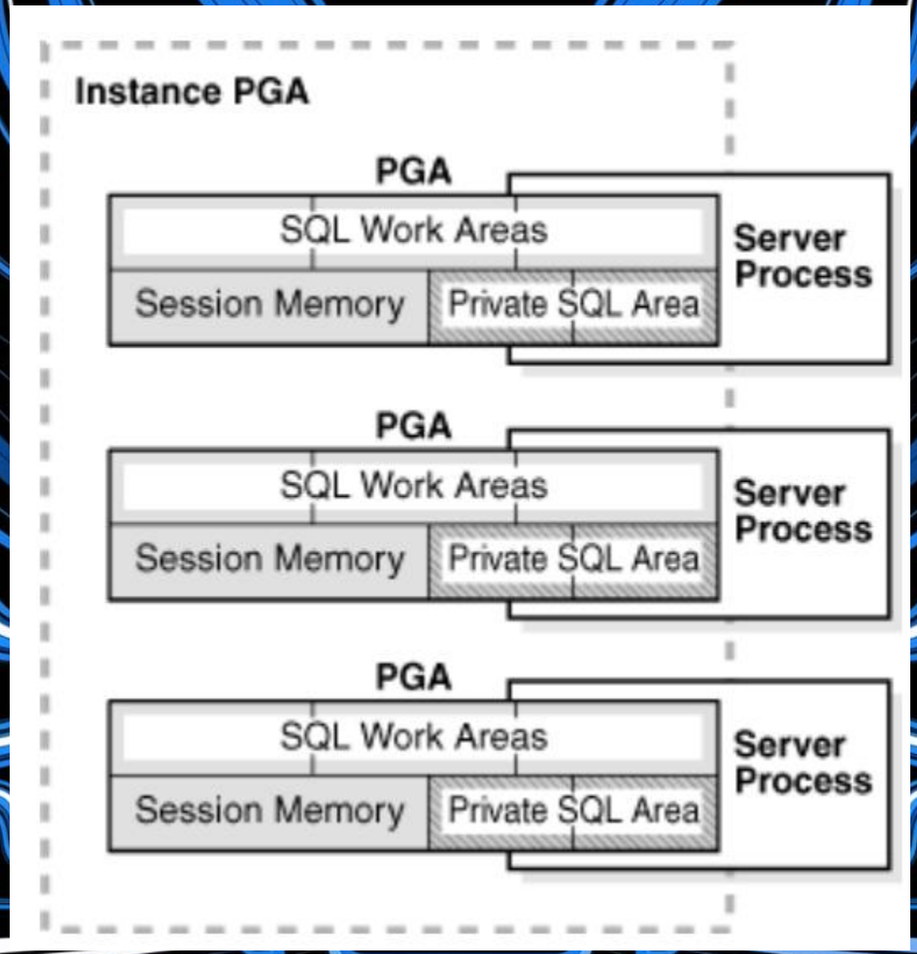
Holds shared SQL and PL/SQL code. Improved ability to adapt to varying workloads, dynamically adjusting size based on system demands.

Large Pool

Used for large memory allocations. Optimized for parallel execution and backup operations in 23c.

Java Pool

For Java code in the database. Better integration and memory management for Java applications in 23c.



Program Global Area (PGA) Enhancements

PGA Overview

Memory region containing data and control information for a server process. Significant improvements in PGA management in Oracle 23c.

Granular Control

More granular control over PGA memory allocation, allowing better optimization of memory usage, especially in environments with many concurrent users.

Adaptive PGA Management

New feature in 23c that dynamically adjusts PGA memory allocation based on workload characteristics, ensuring optimal performance while preventing excessive memory consumption.

In-Memory Column Store

Real-time Analytics

Allows for real-time analytics on transactional data

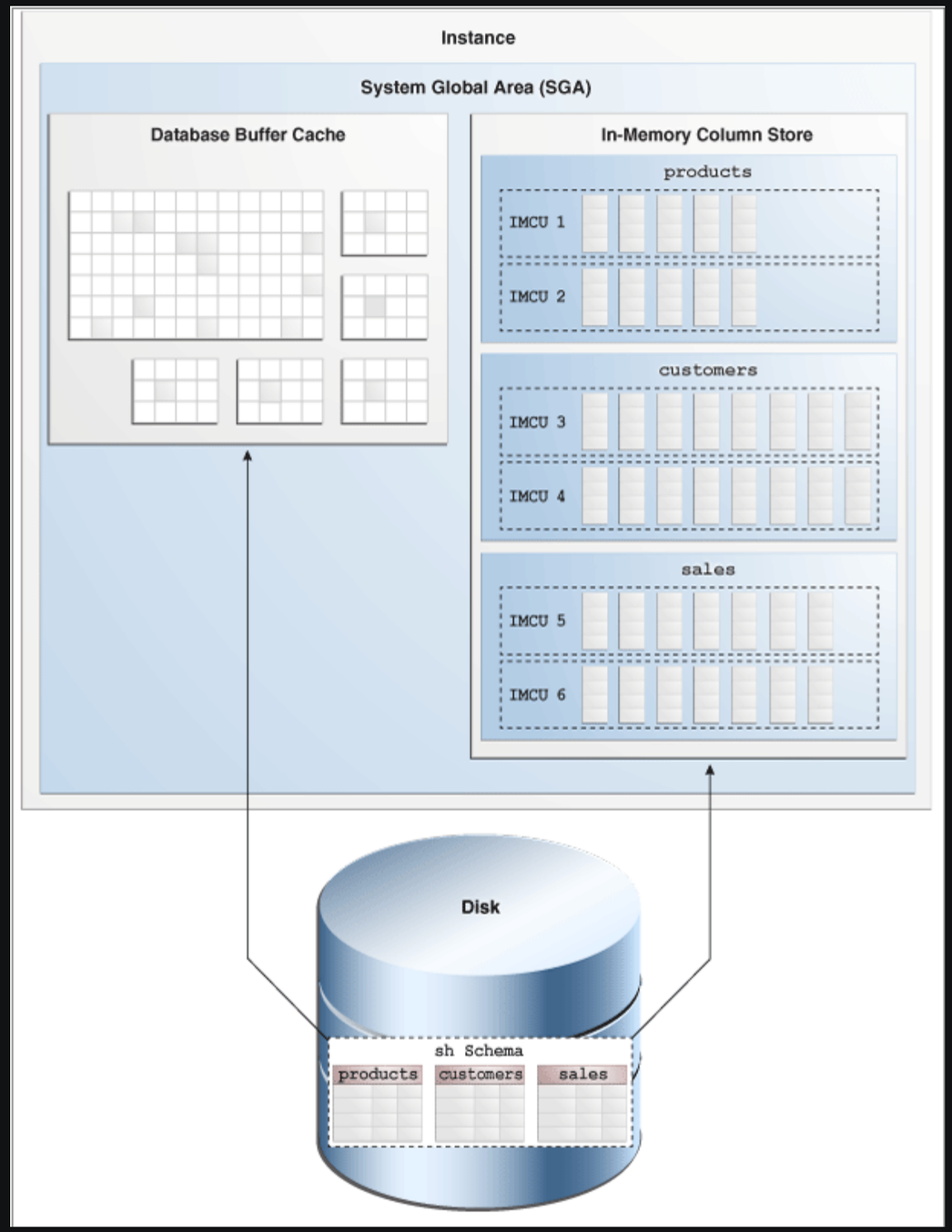
Columnar Format

Stores copies of tables and partitions in a columnar format in memory

Enhanced Performance

Further improved in Oracle 23c for better analytical capabilities

In-Memory Column Store



Advanced Memory Management Techniques

1

Automatic Tuning

Oracle 23c employs sophisticated algorithms to automatically tune and optimize memory allocation across the SGA and PGA.

2

Improved ASMM

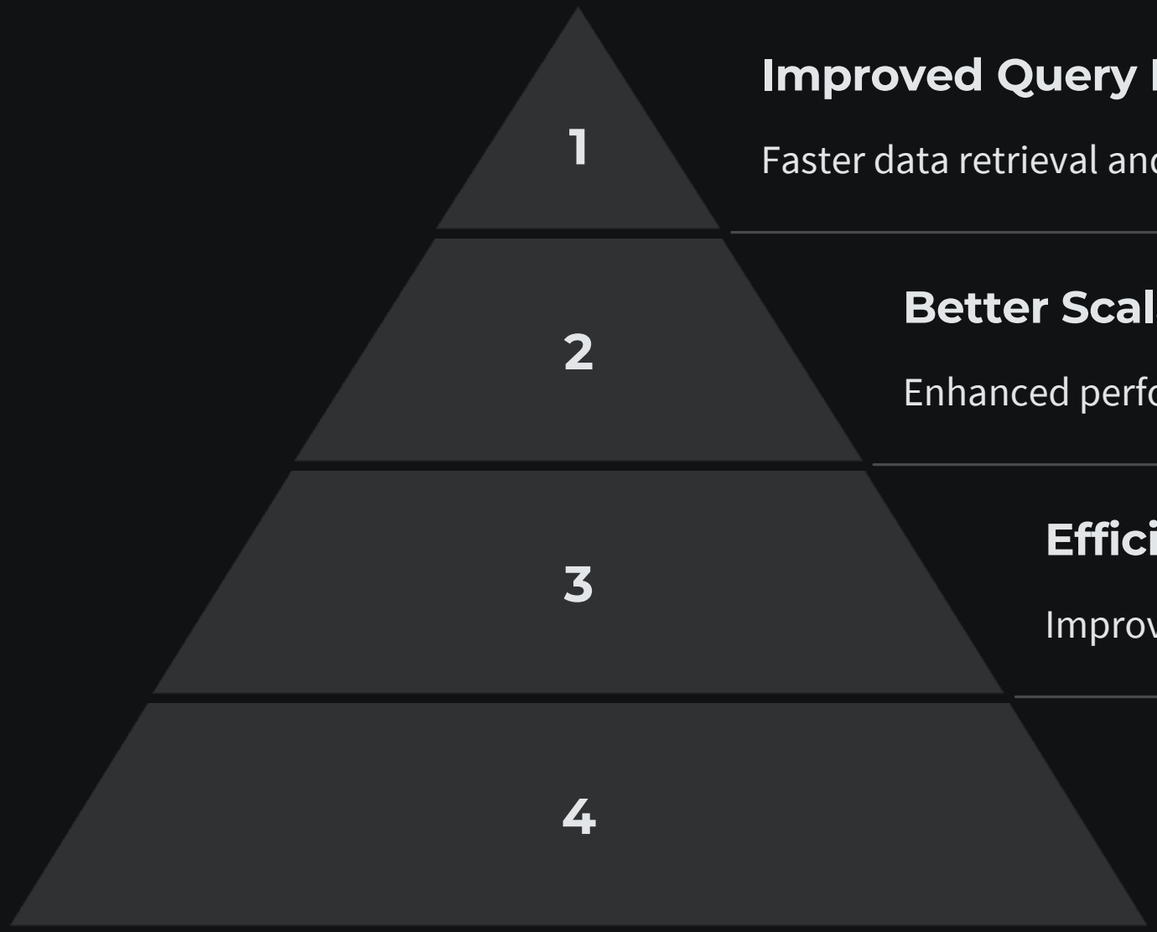
Automatic Shared Memory Management (ASMM) feature provides more accurate predictions of memory requirements, resulting in better overall system performance.

3

Enhanced Memory Advisors

Oracle 23c introduces improved memory advisors, offering detailed recommendations for optimal memory configuration based on specific workload and system resources.

Real-World Benefits of Memory Enhancements



Improved Query Performance

Faster data retrieval and processing

Better Scalability

Enhanced performance in high-concurrency environments

Efficient Mixed Workloads

Improved handling of OLTP and analytics

Reduced Tuning Efforts

Less memory-related tuning required from DBAs

Conclusion: A Leap Forward in Memory Management

1 **Significant Advancement**

Memory structures in Oracle 23c represent a major improvement in database memory management

2 **Performance Boost**

Organizations can achieve better performance from their Oracle databases

3 **Resource Optimization**

Improved resource utilization through advanced memory features

Next Steps: Exploring Background Processes

1. **Current Session**

   Covered memory structures in Oracle 23c

2. **Next Session**

   Will delve into background processes in Oracle 23c

3. **Future Topics**

   Exploration of how background processes interact with memory structures

Thank you for your attention. In our next session, we'll explore the background processes in Oracle 23c, examining how they interact with these memory structures to keep your database running smoothly. We look forward to continuing our discussion.