

INTRODUCTION TO ALTIBASE HDB

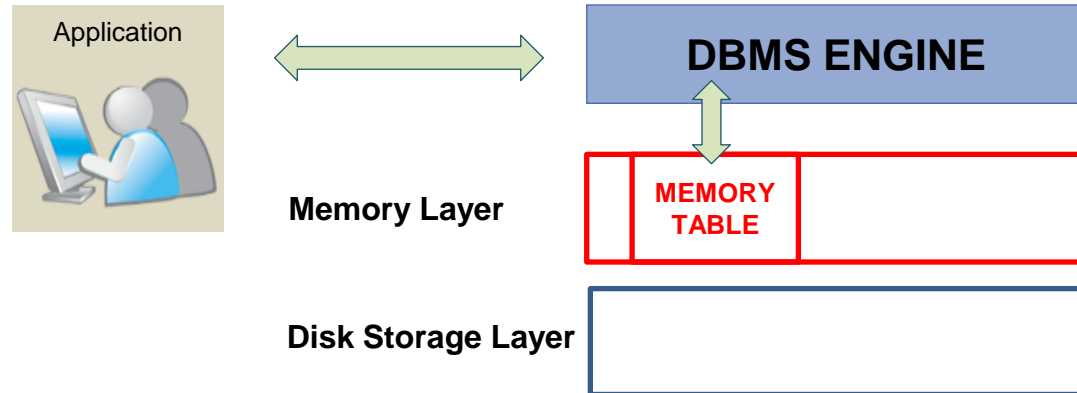
1. ALTIBASE HDB CONCEPT
2. ALTIBASE HDB FEATURES
3. ARCHITECTURE

1. ALTIBASE HDB CONCEPT

DBMS CONCEPT

❖ Memory DBMS

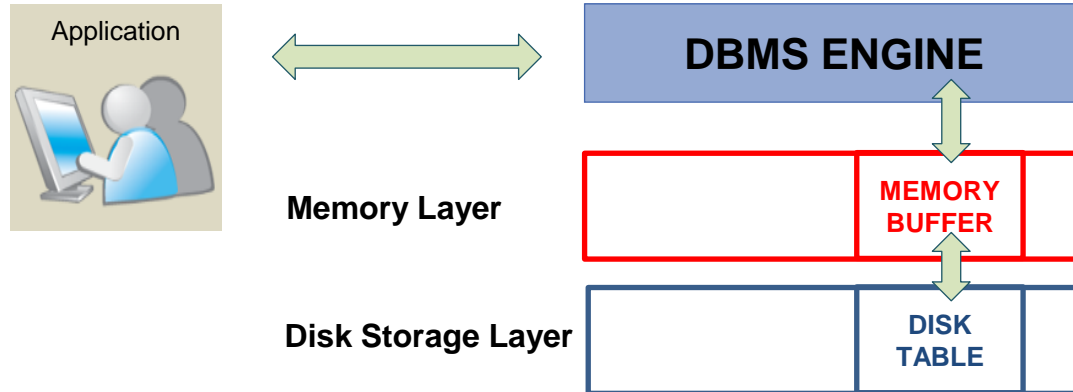
- Fast Data Processing Performance
 - Fast data processing is available as all the data and indexes are saved in memory
 - Fast access as memory index is managed by physical pointer not RID
 - The performance reduction by disk I/O is unlikely to be occurred
 - Suitable for the OLTP type
- There is a restriction that the data can only be loaded as much as the size of physical memory



DBMS CONCEPT

❖ Disk DBMS

- Large capacity of data processing
 - Unlike Memory DBMS, there is no size restriction of storing data
 - Suitable for history type of data and DW
- Limitation of processing performance
 - Performance reduced by Disk I/O
 - Index is created in the disk even the data is loaded into buffer



ALTIBASE HDB

❖ Hybrid DBMS

Business Change

- New business model announced
- Customer focused environment
- Acceleration of information flow
- The age of global competition

IT Infra Change

- Continuous reduction of memory price
 - Large capacity of memory loaded server announced
- Constant development of communication device speed
 - M Byte → G Byte transmission speed
 - Enabling large capacity of transaction
- Supply rates of Mobile Device expands

IT Environment Analysis

- Digitalization
- Ubiquitous computer environment
- Data overflows

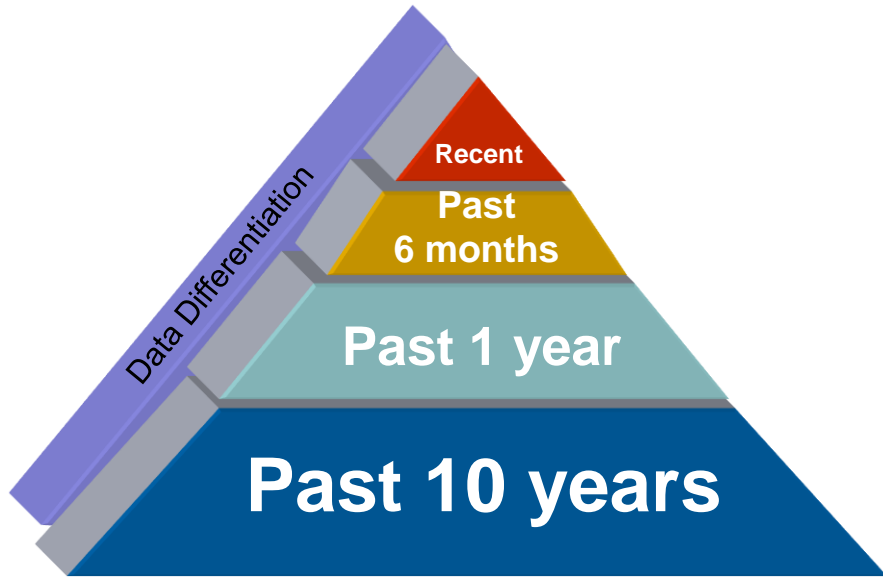
Change of requirements

High performance data processing

Large capacity of data processing

DATA DIFFERENTIATION

❖ Changes in data properties by time



IDC : Worldwide Disk Storage System Forecast 2006-2010

Data properties change

System requirements

HOT DATA, real-time processing, data access rate 80%

WARM DATA, moderate real-time processing, data access rate 10%

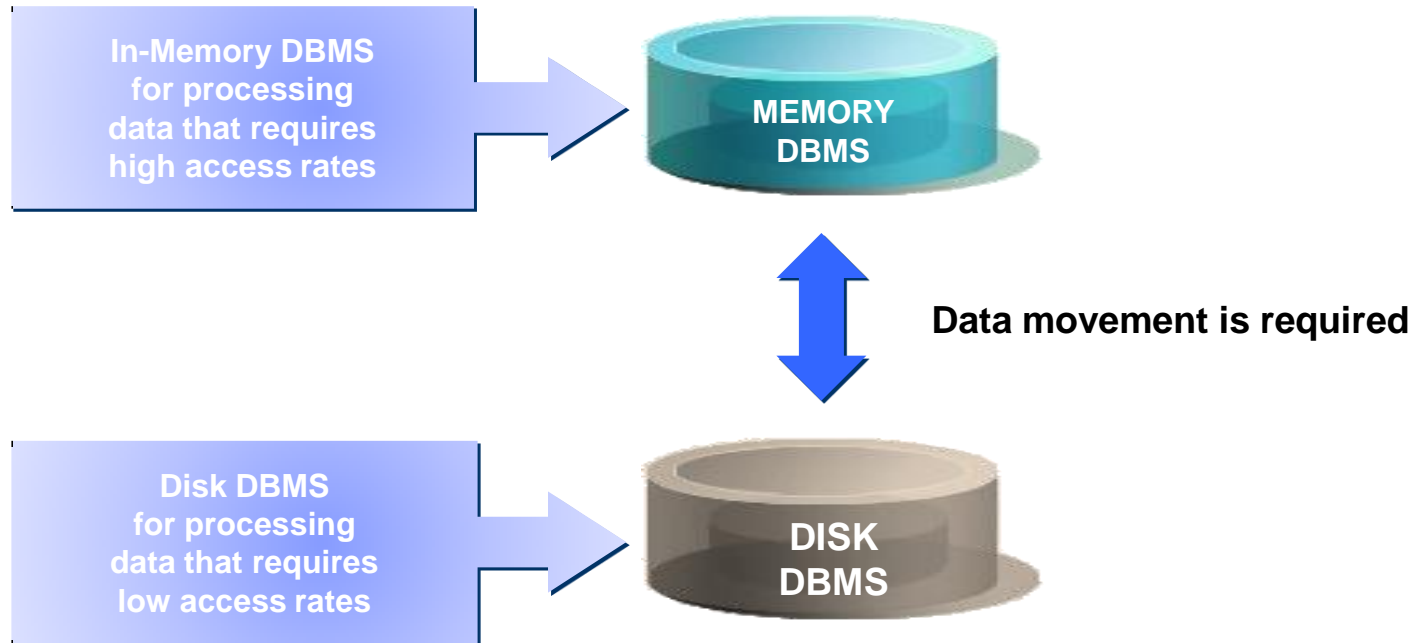
TEPID DATA, large-capacity processing, data access rate 7%

COLD DATA, storing historical data, data access rate 3%

It is necessary to separate Hot Data and Cold Data for Optimized processing

DATA DIFFERENTIATION

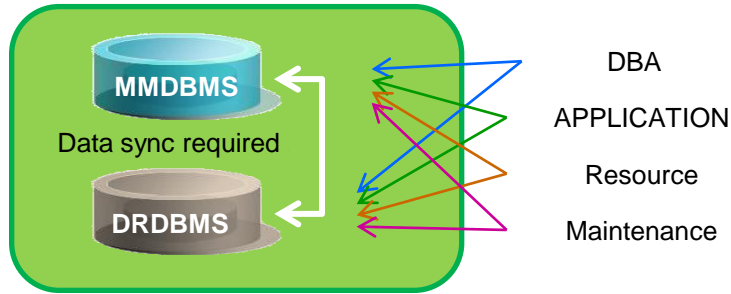
❖ Implementation of data differentiation using DBMS technologies



DATA DIFFERENTIATION

❖ Increase of efficiency by Hybrid DBMS

● General MMDBMS(With disk DBMS)



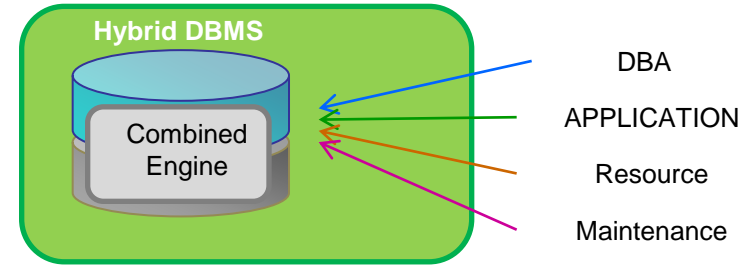
The cost of administration, management, contents and all the other efforts are doubled

Administration cost: DRDBMS + MMDBMS

Management cost: DRDBMS + MMDBMS

Contents cost: DRDBMS + MMDBMS

● Hybrid DBMS



Optimized efficiency as memory and disk are combined into one engine

Administration cost : One Hybrid DBMS(Cost reduced by $\frac{1}{2}$)

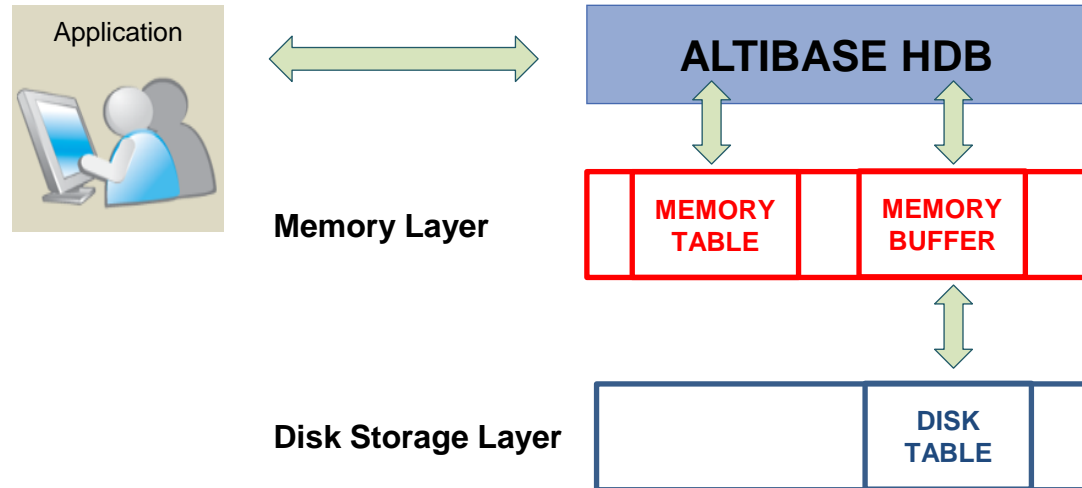
Management cost : One Hybrid DBMS(Cost reduced by $\frac{1}{2}$)

Contents cost : One Hybrid DBMS (Cost reduced by $\frac{1}{2}$)

Hybrid DBMS

❖ Hybrid DBMS Concept

- User only access to single DBMS rather than In-Memory and Disk DBMS separately



2. ALTIBASE HDB FEATURES

FEATURES

Functions	ALTIBASE HDB	Notes
DBMS Process	Multi Thread	
Model	Relational DBMS	
Architecture	Client-Server	
High Availability	Replication	Replication is processed by table unit
	Separate Instance	
	Individual storage	
	Individual schema	
	Data Cloning	
64bit mode	Supported	
Locking Mode	Table & Row-Level Locking	MVCC is supported
DB Recovery	Datafile & Redo logfile	
DeadLock Detection	Auto Deadlock Detect & Recovery	

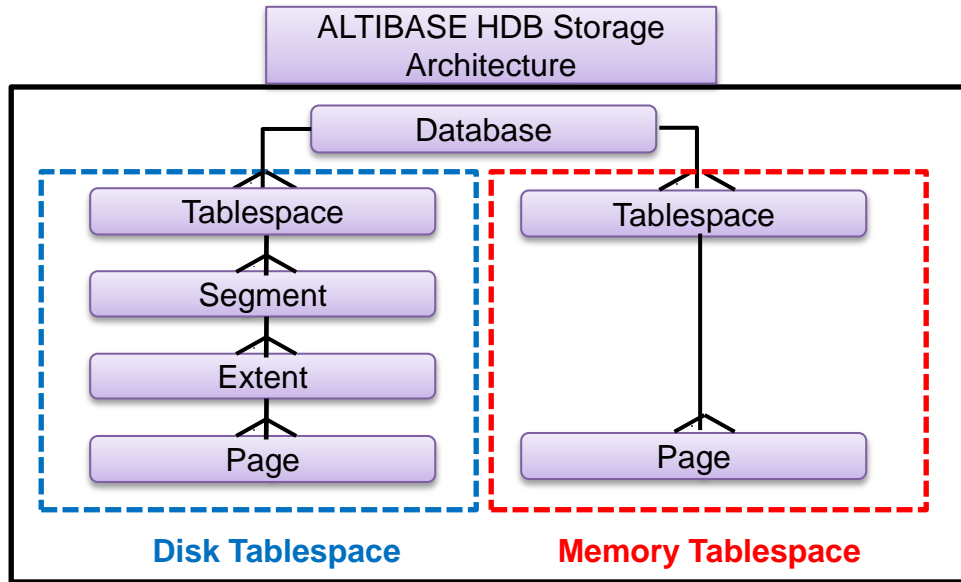
FEATURES

Functions	ALTIBASE HDB	Notes
DB Info File	loganchor file	
Online log file	Redo log file(Sequential)	
Archive log file	logfile0 ~	
Undo TBS	SYS_TBS_DISK_UNDO	
System TBS	SYS_TBS_MEM_DIC, SYS_TBS_MEM_DATA, SYS_TBS_DISK_DATA	
Temp TBS	SYS_TBS_DISK_TEMP User defined	
Memory TBS	User defined	
Volatile TBS	User defined	
Disk TBS	User defined	

ALTIBASE HDB Storage

❖ Storage Architecture

- A single database consists of one or more tablespaces, and a single tablespace consists of many segments (disk only) and pages



◆ Memory Tablespace

- Consists of pages
- Each page is 32KB

◆ Disk Tablespace

- Consists of multiple segments
- Each segment consists of multiple extents
- Each extent consists of 64 pages
- Each page is 8KB, and each extent is 512KB

GENERAL FUNCTIONS

Functions	ALTIBASE HDB	Notes
Table	Supported	
Multi Key-Index	Supported	
Stored Procedure	Supported	
Stored Function	Supported	
Package	Not Supported	
Trigger	Supported	Before Update is not supported
View	Supported	M-View is supported from R2

GENERAL FUNCTIONS

Functions	ALTIBASE HDB	Notes
Sequence	Supported	
Queue	Supported	
Monitoring View	Supported	
Authorization	Supported	
Role	Not Supported	
Snapshot	Not Supported	
DB Link	Supported	ALTIBASE HDB-ALTIBASE HDB and ALTIBASE HDB-ORACLE(Only SELECT)

GENERAL FUNCTIONS

Functions	ALTIBASE HDB	Notes
Synonym	Supported	
Table partitioning	Supported	Global Index is supported from R2
User Defined Type	Supported	Supports only in procedure
Cluster Object	Not Supported	
On-Line Backup	Supported	Incremental backup is supported from R2
XML	Not Supported	
DB Auto-Extend	Supported	

SQL

Functions	ALTIBASE HDB	Notes
SQL	Standard SQL (ANSI-SQL92)	Only some are not supported ANSI-SQL1999
Sub-query(In-Line View)	Supported	
Sub-query(Scalar)	Supported	
Sub-query(=,IN,EXISTS)	Supported	
Equi Join	Supported	
Inner Join	Supported	
Outer Join	Supported	
Self Join	Supported	
Hierarchical Query CONNECT BY ~ WITH	Supported	CONNECT_BY_ROOT & SYS_CONNECT_BY_PATH is supported from R2
Array Processing	Supported	

SQL

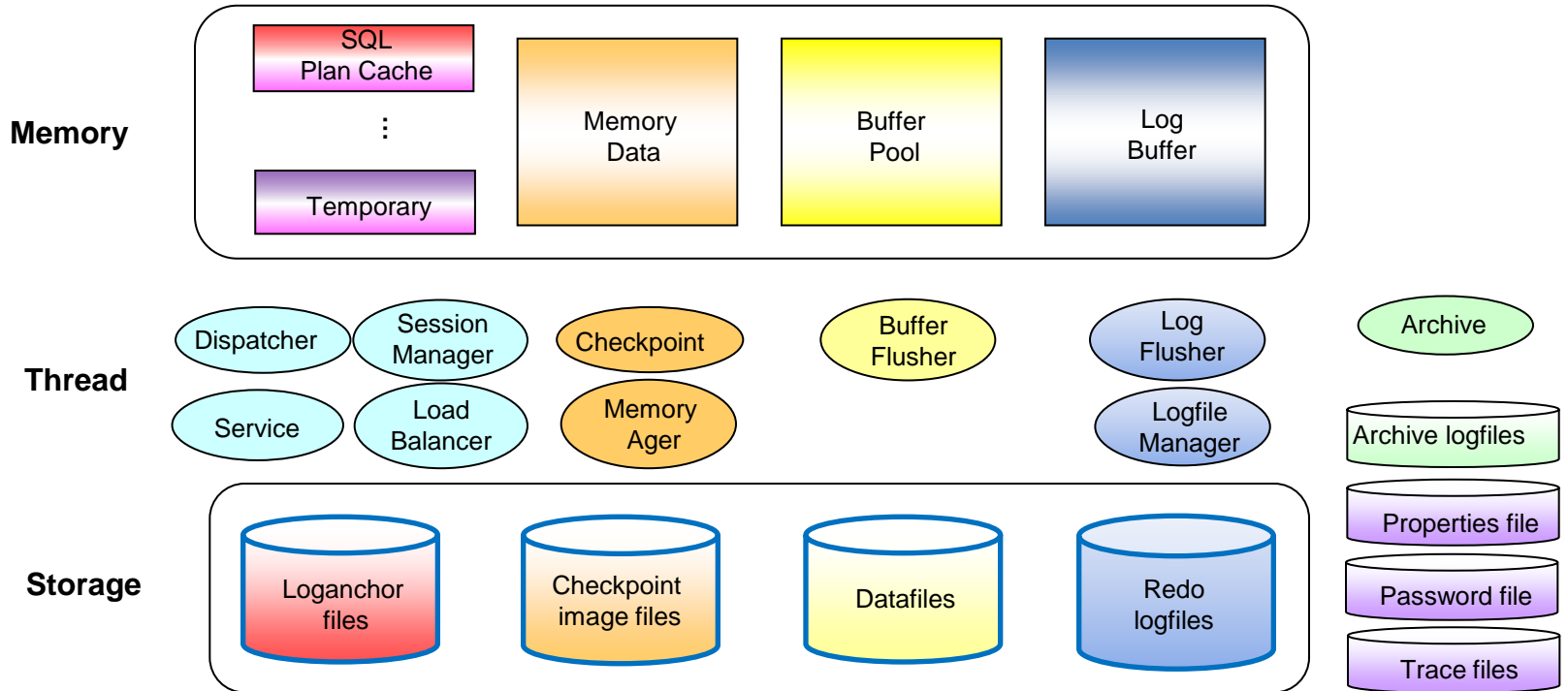
Functions	ALTIBASE HDB	Notes
Move	Supported	
Queue	Enqueue/Dequeue	Different syntax and method
SELECT ~ FOR UPDATE	Supported	Does not support using 'Join'
SELECT DISTINCT ~	Supported	
UNION	Supported	
UNION ALL	Supported	
INTERSECT	Supported	
MINUS	Supported	
CERATE TABLE AS SELECT ~	Supported	

SQL

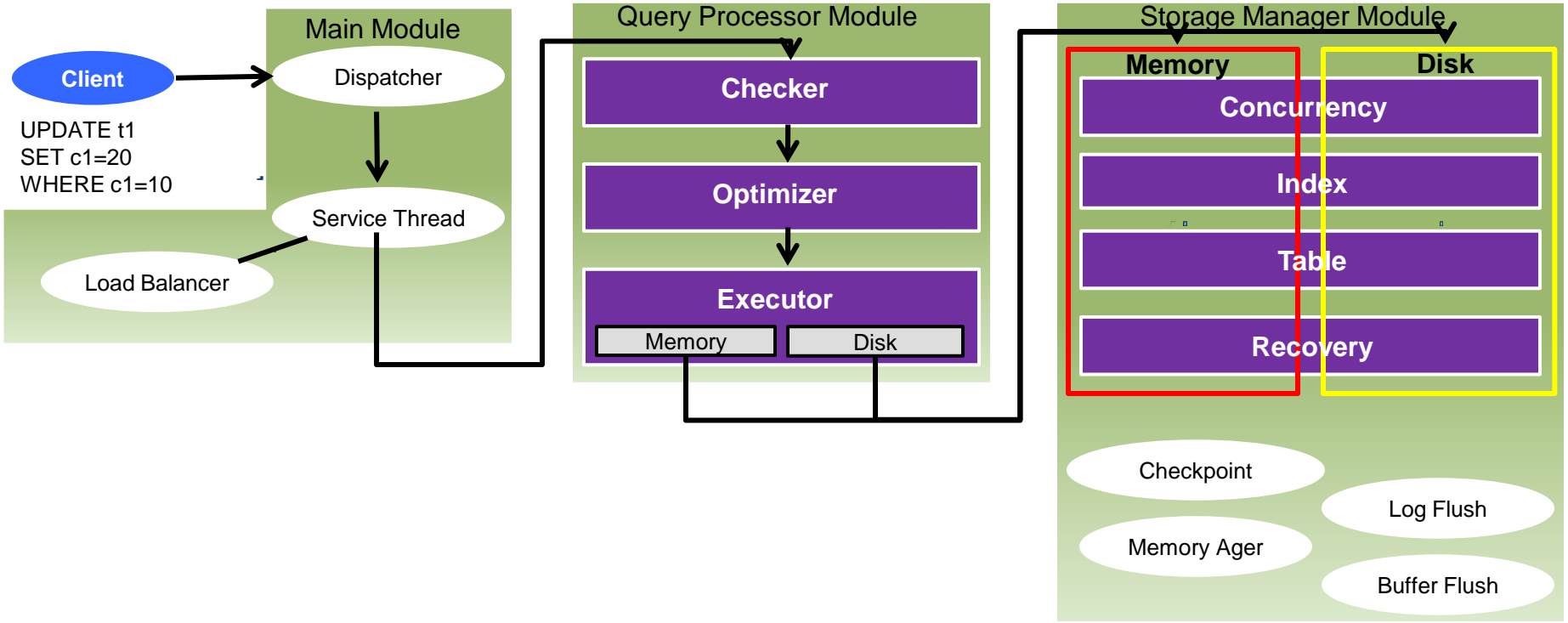
Functions	ALTIBASE HDB	Notes
Literal/Bind SQL	Not Supported	
DML via VIEW	Not Supported	
Hint	Supported	
Cost Optimizer	Supported	
Parallel Select	Not Supported	
Parallel Insert	Supported	
Parallel Index Build	Supported	

3. ARCHITECTURE

ARCHITECTURE



INTERNAL PROCESS



ALTIBASE HDB DIRECTORY CONTENTS

\$ALTIBASE_HOME

admin	Contains scripts for creating monitoring-related views and procedures
arch_logs	The default archive log file storage directory
audit	Contains a sample Replication “audit” utility config file
bin	Contains ALTIBASE HDB executable files
conf	Contains the license file and ALTIBASE HDB configuration file (altibase.properties)
dbs	The default data file storage directory
include	Contains header files that are needed for developing applications
install	Contains a macro configuration file and other makefile-related information
lib	Contains library files needed for developing applications
logs	The default directory for redo log files and loganchor files
msg	Contains error messages files
sample	Contains sample application source code and makefiles
trc	Contains ALTIBASE HDB trace logs