ORACLE8 OVERVIEW
Key Features and Functions

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ORACLE8 OVERVIEW

- **POSITIONING**

- **ARCHITECTURE**

- **OPERATIONAL FEATURES**

- **DATA WAREHOUSE FEATURES**

- **"OBJECT-RELATIONAL" FEATURES**

POSITIONING

- **NETWORK COMPUTING**
  - EMPHASIZING CENTRALIZED APPLICATION AND DATABASE SERVER CONTROL, WITH THIN CLIENTS
- **ORACLE HAS THROWN IN THE TOWEL ON CLIENT/SERVER, REJECTING IT AS "UNSUCCESSFUL"**
- **MULTI-TIER, THIN CLIENT, WEB**
- **CLAIM LEADERSHIP IN OLTP, DSS, NT**
- **WILL CLAIM LEAD IN O-R AND VLDB**
  - MORE USERS, MORE DATA, BETTER PERFORMANCE, LOWER COST

ARCHITECTURE (NCA)

- **3 CARTRIDGE TYPES**
  - **1. CLIENT 2. APPLICATION 3. DATA**
- **PLATFORMS AND SERVERS**
  - **ANY CLIENT**
  - **WEB APPLICATION SERVER**
  - **UNIVERSAL DATA SERVER**
- **ORACLE SECURITY SERVER**
  - **DIGITAL SIGNATURES**
  - **PUBLIC/PRIVATE KEY AND X.509**
  - **SERVER TO SERVER AUTHENTICATION**
- **GOING TO STATELESS SERVER**

OPERATIONAL FEATURES

- **CONNECTION IMPROVEMENTS (NET8)**
  - MORE USERS (10'S OF THOUSANDS - 16K DEMO)
  - *RESOURCES (30-60% LESS MEMORY / USER)
  - POOLING
  - MULTIPLEXING VIA CONNECTION MANAGER (CONCENTRATOR)
  - AUTOMATIC PREFETCH, *NETWORK BUNDLING
  - RECONNECT TIMED-OUT CONNECTIONS W/O LOGON
  - PASS SESSION ID AND USER ID WITH EACH PACKET
  - *CONTEXT HIERARCHY - SERVICE:SESSION:TRANSACTION:STATEMENTS
    - » CAN SAVE AND HAND OFF A CONTEXT

OPERATIONAL FEATURES

- ***DATABASE-INTEGRATED MESSAGE QUEUING**
  - CAN CORRELATE AND QUERY MESSAGES VIA SQL
  - POSITIONED AGAINST MULTIPLE PRODUCTS DUE TO $ AND RESOURCE COSTS
  - BUNDLED AS A PL/SQL PACKAGE
- ***SERIALLY REUSABLE STORED PROCEDURES**
- **INDEXES**
  - *CLUSTERED INDEXES (INDEX-ONLY TABLES)
    - » "COOPERATIVE INDEXING"
  - REVERSE KEY INDEXES

OPERATIONAL FEATURES

- **REPLICATION IMPROVEMENTS**
  - ***PARALLEL PROPAGATION OF TRANSACTIONS (SCN ORDER APPLY)**
  - ***IMPROVED SUBSETTING**
  - **INTEGRATED WITH ENTERPRISE MANAGER**
  - ***LOB SUPPORT**
  - **INTERNAL TRIGGERS**
  - **MASTER LOG INDEXES**

OPERATIONAL FEATURES

- **BACKUP, RECOVERY, AND ARCHIVAL**
  - *AUTOMATED DATA MANAGEMENT (PRESERVES CORRECT BACKUP SET, SEQUENCE, AND LOCATION)
  - *INCREMENTAL BACKUP
  - *INTEGRATED WITH ORACLE (NO LONGER OS-BASED)
  - ONLINE AND PARALLEL PARTITION RECOVERY
  - POINT IN TIME RECOVERY
- **AVAILABILITY**
  - UNAFFECTED PARTITIONS REMAIN AVAILABLE
  - ONLINE ORACLE7.2 OR 7.3 TO 8 MIGRATION

OPERATIONAL FEATURES

- **PARALLEL SERVER**
  - **INTERNAL DLM**
  - **AUTOMATIC RECONNECT TO SURVIVING NODES**
    - » **QUERIES CONTINUE WITHOUT INTERRUPTION**
    - » **UPDATE TRANSACTIONS MUST BE ROLLED BACK AND RESUBMITTED**
    - » **1000-USER FAILOVER IN UNDER 2 MINUTES TESTED**
  - ***STANDBY DATABASE VIA LOG VAULTING AND CONTINUOUS RECOVERY**

OPERATIONAL FEATURES

- **ENTERPRISE MANAGER**
  - **REPLICATION, PARTITIONS, MULTIPLE SERVERS**
  - **WEB-BASED (JAVA)**
  - **PUBLISHED API, USES SBT INTERFACE FOR MEDIA**
  - **EVENT, JOB, AND SECURITY SUB-SYSTEMS**
  - **INTELLIGENT AGENTS**

DATA WAREHOUSE FEATURES

- **KEY RANGE PARTITIONING**
  - **PARALLELISM DEGREE NOT DETERMINED BY NUMBER PARTITIONS**
  - **ADD, DROP, MOVE, SPLIT, RENAME ONLINE**
  - **CONVERT BETWEEN TABLES AND PARTITIONS**
  - **PARTITION ONLY SEARCH**
    - » **IF PARTITIONED SPECIFIED IN QUERY**
    - » **IF PARTITION KEY LEADS INDEX KEY**
  - **LOCAL (PARTITION SPECIFIC) AND GLOBAL INDEXING**
    - » **LOCAL CAN BE ALIGNED OR NON-ALIGNED WITH TABLE PARTITIONS**
    - » **AUTO-EQUIPARTITIONING ACROSS PARTITIONS**
    - » **_NOT_ THE SAME A ORACLE'S "EQUI-PARTITIONING"**

DATA WAREHOUSE FEATURES

- **INCREASE FROM 254 COLUMNS TO 1000**
- **DB SIZE**
  - **512 PETABYTE BLOCK ADDRESSABILITY**
  - **MORE FILES (1023 / TABLESPACE)**
  - **CLAIMING TERABYTES TO TENS OF TERABYTES ACTUAL**
- **STAR JOINS**
  - **CAN USE BOTH B-TREE AND BIT-MAPPED INDEXES**
  - **SEMI-JOIN (PROBES TO FACT TABLE ARE GUARANTEED SUCCESSFUL)**
  - **PATENT-PENDING**

DATA WAREHOUSE FEATURES

- **INTEGRATED BIT MAPPED INDEXING**
  - *TESTED TO 4000 UNIQUE VALUES
- **PARALLEL**
  - **MAX DEGREE PARALLELISM LIMITED BY NUMBER EXTENTS**
  - **LOAD, INDEX BUILD**
  - **BULK PARALLEL INSERT/UPDATE/DELETE**
  - **INDEX SCANS (BIT MAP AND B-TREE)**
  - **CONTRAINT ENFORCEMENT**
  - **GATHERING STATISTICS**

DATA WAREHOUSE FEATURES

- **MISCELLANEOUS**
    - **PARTITION PRUNING**
    - **MULTIPLE INDEXES PER QUERY**
    - **QUERY REWRITE INTO SUBQUERIES, THEN SUBQUERIES IN PARALLEL**
    - **INSTANCE GROUPS**
    - **GLOBAL DYNAMIC PERFORMANCE VIEWS**

OBJECT-RELATIONAL FEATURES

- **POSITIONED AGAINST INFORMIX AND IBM**
- **DATA TYPES**
  - **NESTED OBJECT TYPES**
  - **NESTED TABLES (UNORDERED COLLECTION TYPE)**
    - » ***SELECT IN SELECT LIST NOW SUPPORTED**
  - **VARYING ARRAYS (ORDERED COLLECTION TYPE)**
    - » **CAN'T BE INDEXED**
    - » **STORED AS LOB IF >4K**
    - » **CAST TO TABLE TO DO RELATIONAL OPS ON**
  - **ROW/TABLE/OBJECT TYPES**
  - **ROWID BASED REFERENCES, PERMITS "NAVIGATION"**
  - **GLOBAL OBJECT IDs**

OBJECT-RELATIONAL FEATURES

- **LOB SUPPORT**
  - *DIRECT ACCESS
  - BLOB, CLOB, READ-ONLY BFILE
  - *MULTIPLE LOBS PER TABLE
  - INLINE (<4K) OR FILE
  - READ CONSISTENT
  - *OPTIONAL LOGGING (DELTA ON CHUNK OR BLOCK) AND *CACHING
  - *IMAGE AND TEXT SUPPORT
  - TIME SERIES, SPATIAL, VIDEO AND AUDIO LATER
  - EXTENSIBLE DATA TYPES LATER
  - EXPOSED API

OBJECT-RELATIONAL FEATURES

- **METHODS**
  - **PL/SQL**
  - **C/C++**
    - » **SEPARATE ADDRESS SPACE - NOT FULLY NCA**
    - » **CALLBACK VIA ESQL TO INVOKING DB ADDRESS SPACE**
  - **JAVA LATER**
    - » **RUNS IN SERVER ADDRESS SPACE VIA MTS**
    - » **NATIVE COMPILER**
  - ***EXTERNAL PROCEDURES WITH CALLBACKS**
  - **OVERLOADING**
  - **TYPES INCLUDE MEMBER/CONSTRUCTOR/COMPARISONS**

OBJECT-RELATIONAL FEATURES

- **GENERAL C++ SUPPORT**
  - **OMT DIAGRAMMER**
  - **DESIGNER 2000**
  - **CLASS LIBRARY FOR O8 BINDINGS**
- **JAVA**
  - **STORED PROCEDURES AND TRIGGERS**
  - **SERVER-BASED JAVA VM AND <u>COMPILER</u>**
- **OBJECT VIEWS**
  - **INSTEAD OF TRIGGERS**
  - **MATERIALIZE OBJECTS IN CACHE**
    - » **FROM RELATIONAL, OBJECT, OR O-R SCHEMAS**

OBJECT-RELATIONAL FEATURES

- **OBJECT CACHE**
  - **TRANSPARENTLY MAPS DB OBJECT TO 3GL OBJECTS**
  - **OBJECT RETRIEVAL AND CACHING**
  - **EXPLICIT OR IMPLICIT (ON COMMIT)**
- **OBJECT TYPE TRANSLATOR**
  - **AUTOMATICALLY MAP DATABASE OBJECT TO PROGRAMMING LANGUAGE CONSTRUCTS**
  - **ACCESSIBLE FROM PRO*C, OCI JAVA**
  - **NO NEED FOR BINDS, DEFINES**

OBJECT-RELATIONAL FEATURES

- **EXTENSIBILITY LATER**
  - **FUNCTION OR INDEX BASED METHODS**
  - **META DATA DRIVEN INTERFACES**
  - **DATA TYPES**
  - **INDEX, UTILITY, ACCESS, AND OPTIMIZER EXTERNALIZATION**
    - » **EXPOSED VIA C-API**
    - » **OPTIMIZER COST / SELECTIVITY / ANALYZE / STATISTICS**

OBJECT-RELATIONAL FEATURES

- **EXTENSIBILITY LATER**
  - **DOMAIN SPECIFIC STORAGE**
  - **OPAQUE TYPES (SERVER CAN'T BREAK ENCAPSULATION)**
  - **SINGLE TYPE INHERITANCE, MULTIPLE INTERFACE INHERITANCE**
  - **OPERATORS, AGGREGATES (PRE AND POST)**
  - **IMPORT/EXPORT, LOADER, INSTALL/UN-INSTALL, MONITOR**
  - **ERROR HANDLING**

OBJECT-RELATIONAL FEATURES

- **NEW TYPE SYSTEM AND CATALOG**
  - CREATE / DROP / ALTER / GRANT /REVOKE TYPE OR TYPE BODY

- **GLOBAL OBJECT IDENTIFIERS**
  - UNIQUE AND IMMUTABLE ON *ROW OBJECTS ONLY*
  - ACCESSIBLE AS REF TYPE

- **INTERFACE**
  - OO4O
  - JSQL/JDBC
  - OCI/PRO*C
  - SQL/PLSQL
  - C OBJECT CLI