

MPE-TurboIMAGE to HP-UX ORACLE Migration

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- 1. Some Basic Concepts**
- 2. HP e3000 TurboIMAGE to ORACLE Transformation**
- 3. HP9000 ORACLE Database Creation**
- 4. Emulator**
- 5. Translator**
- 6. Conclusion and Demo**
- 7. Q & A**

1. Basic Concept - General

- 1) SQL-DML, SQL-DDL, and sqlplus vs TurboIMAGE API, QUERY, DBSCHEM, DBUTIL, Adager, and DBGeneral
- 2) INSTANCE, ALLBASE/SQL DBE vs TurboIMAGE Database
- 3) TABLE and TABLESPACE vs TurboIMAGE Dataset and MPE File
- 4) INDEX vs TurboIMAGE Hash and B-tree, SUPERDEX and OMIDEX
- 5) ROW, PAGE, TABLE and DATABASE locks vs TurboIMAGE Predicate, Dataset, and Database locks
- 6) Name Space, Authority, and Security vs TurboIMAGE Password and Class
- 7) Embedded SQL and Pre-processor vs TurboIMAGE API Intrinsic

1. Basic Concept - Terminology

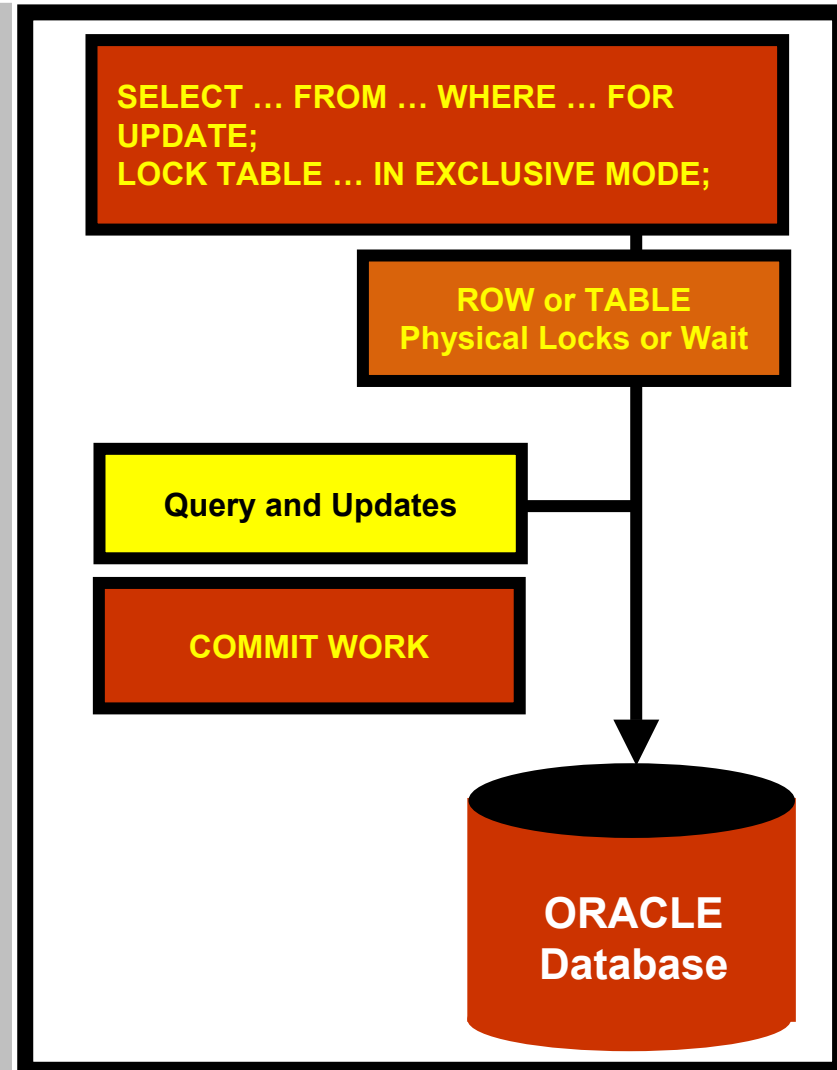
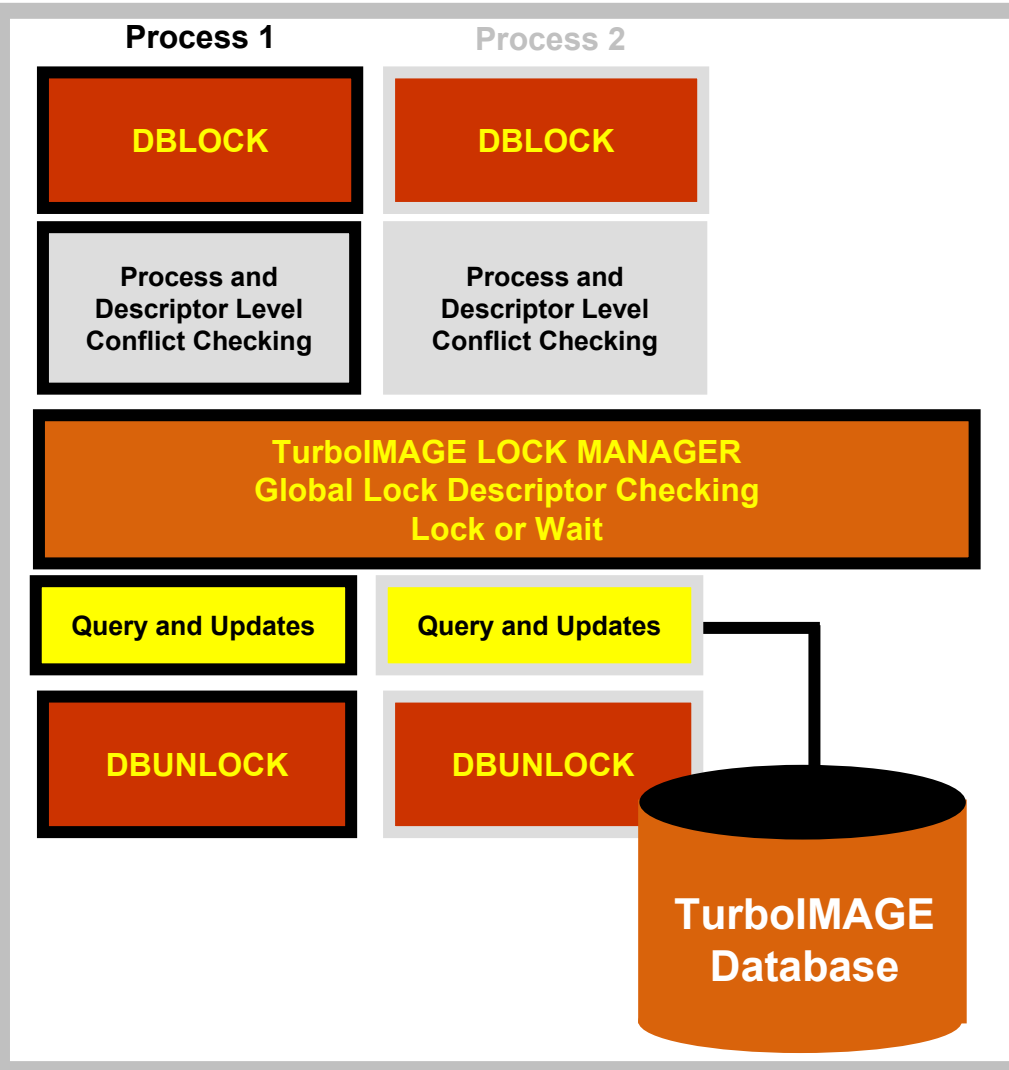
Description	TurboIMAGE	ORACLE
An Instance is a group of databases, users and owners	Database or DBE (IMAGE/SQL)	Instance, Owner and User
Data Record, Row and Page	Dataset	Table, View
Index and Data Retrieval Technology	Hash, B++, OMIDEX, SUPERDEX	B++, Cluster, Vector, Hash
Physical Database Storage	Record and MPE File	TABLESPACES – shared (PAGE)
Constrain	Automatic and Manual --> Detail	Primary, Foreign, Unique
Trigger, Stored Procedure, Sequence, Queue, ... , etc.	-	ANSI SQL and ORACLE
DML – Cursor, Query, Query-Plan, Aggregate Function	DBFIND, DBGET, DBCONTROL	SELECT, EXPLAIN PLAN, Query Performance Hints
DML – Update	DBPUT, DBUPDATE, DBDELETE	INSERT, UPDATE, DELETE
DML – Locking	DBLOCK, DBUNLOCK – DB, SET, ITEM Abstract Lock Descriptor	ROW and TABLE Physical Locks
DML –Transaction, Locking and Isolation LOCK ORDER Enforcement – DB, TABLE or SET, COLUMN or ITEM ordered by Names	DBXBEGIN, DBXEND, DBXUNDO No Transaction Isolation Support Dirty Read Only (Read Uncommitted)	SELECT .. FROM .. WHERE .. FOR UPDATE; LOCK TABLE .. IN EXCLUSIVE MODE; Read Committed (Default) or RR, and 2PC
DDL – Database Structure Manipulation	Adager DBGeneral, DBSCHEM, DBUTIL	CREATE, ALTER, ...
Utilities – Data Control, Import and Export	QUERY, SUPRTOOL	DBAQ(GUI), sqlplus, sqlldr and Server Manager(GUI)
Logging and Auditing	IMAGE-LOG and DBAUDIT	ARCHIEVE LOG and AUDIT
High Availability, Backup and Recovery	Fundamental	More Comprehensive (HP-UX)
SQL Net and TurboIMAGE Remote Access	RDA (DSLIN)	Client-Server N-tier Architecture
ODBC, JDBC, Foreign Database Access	3rd Party Solutions	Bundled

TurboIMAGE vs. ORACLE

1. Basic Concept - Locking

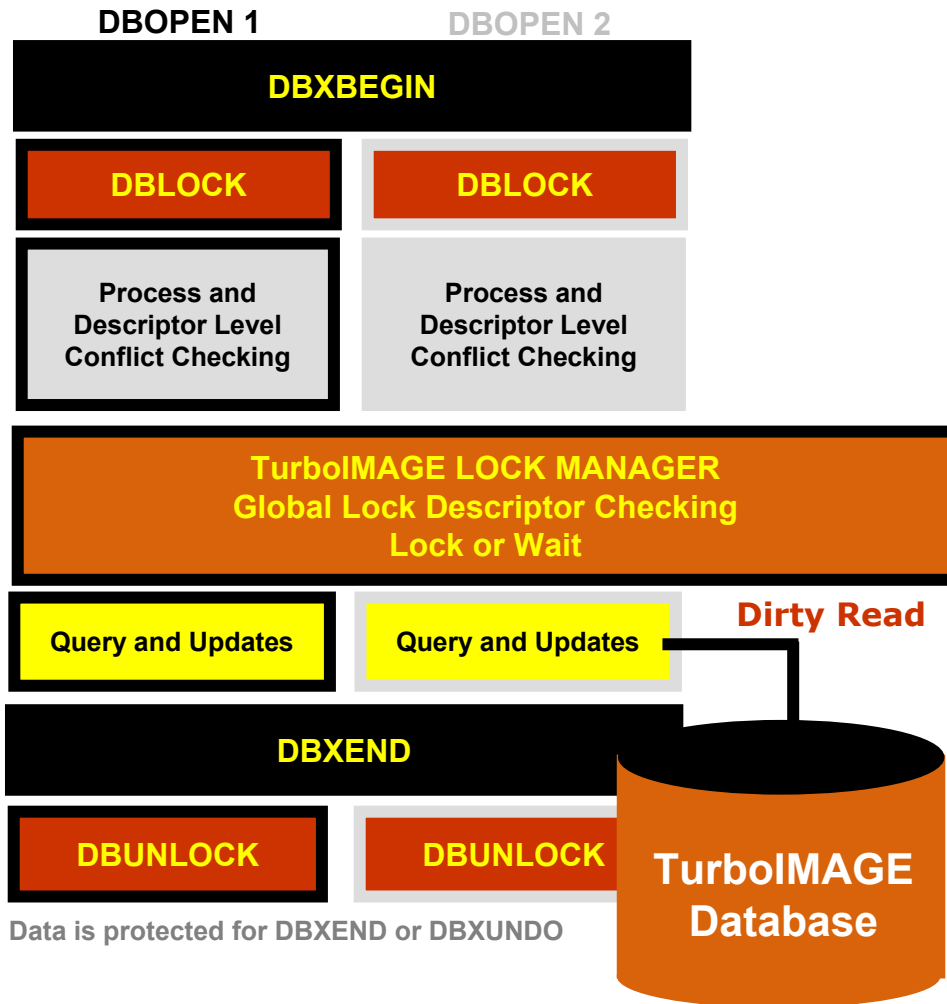
TurboIMAGE

ORACLE

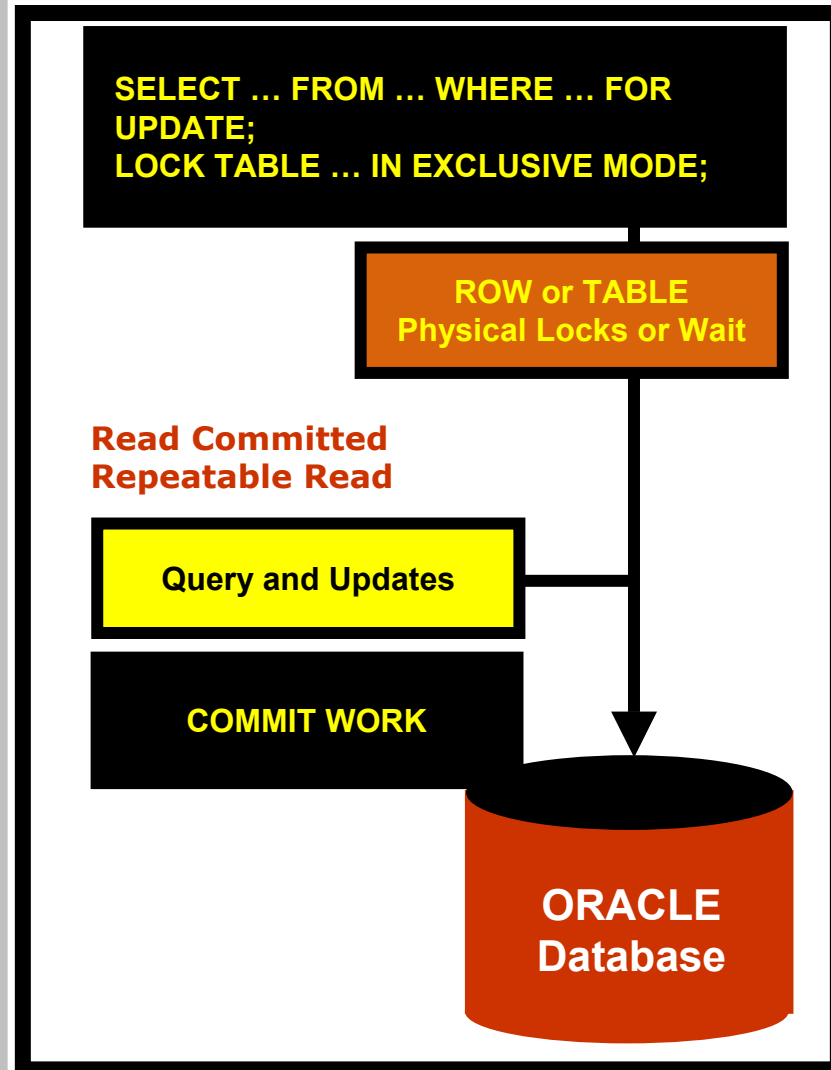


1. Basic Concept – Transaction and Isolation

TurboIMAGE

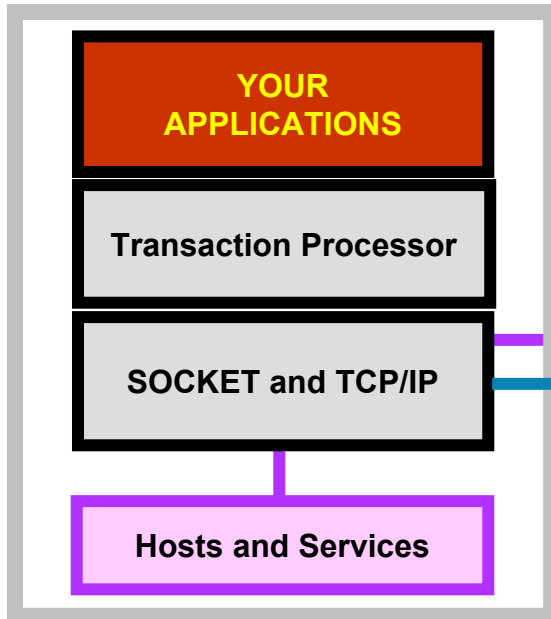


ORACLE

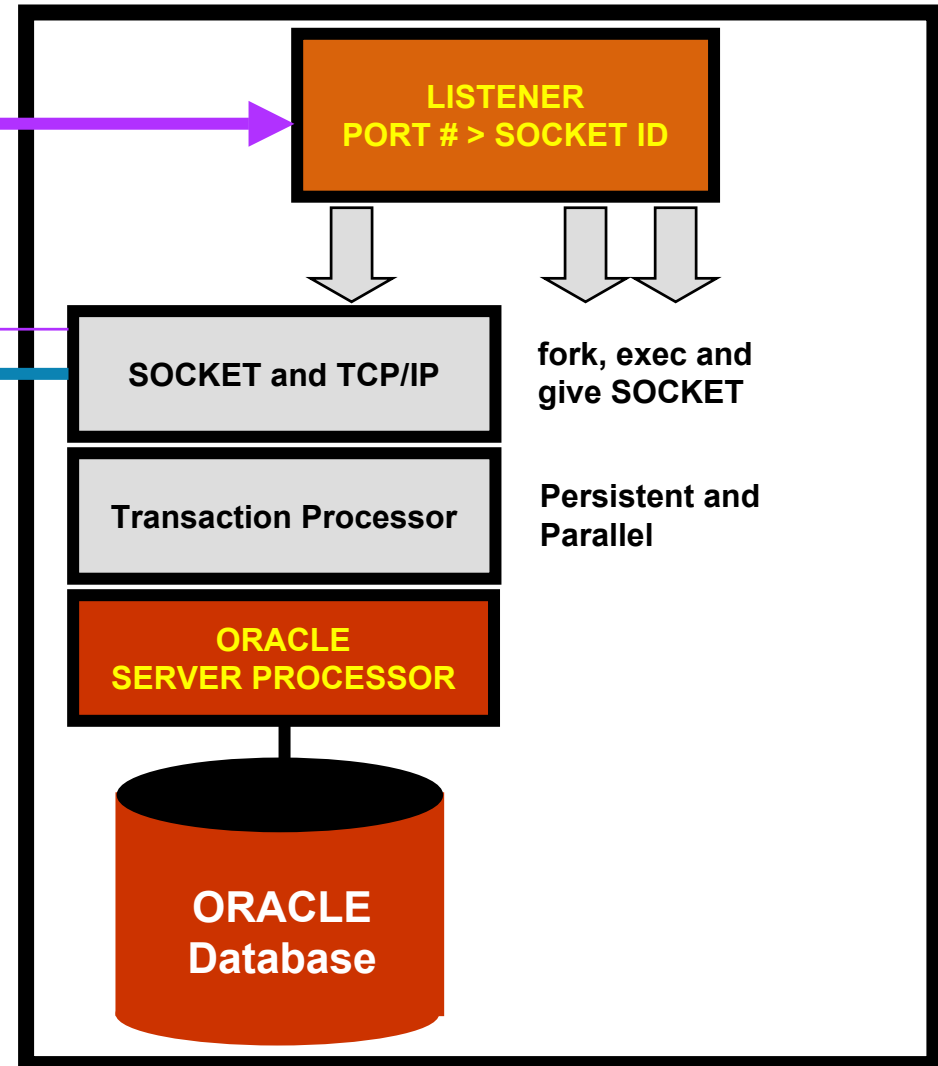


1. Basic Concept – Client Server

Client – HP-UX



Server – HP-UX



ORACLE SQLNET

Virtual Circuit
Share Memory

1. Basic Concept – Summary

1. **Database vs. Instance**
2. **Terminology**
3. **LOCK – abstract vs. physical**
4. **Transaction – DBX vs. COMMIT WORK**
5. **Dirty vs. RR and RC**
6. **Client Server Architecture**

2. HP e3000 TurboIMAGE to ORACLE Transformation

- 1) Generate ORACLE Schema**
- 2) Generate TurboIMAGE and ORACLE Transformation Map – for Structure, Security, Data Type Conversion Rule, Constraint, Name Space**
- 3) Unload Data from Datasets (Parallel and 24X7)**
- 4) Generate ORACLE Table Data-Load Script (sqlldr)**
- 5) Generate HP e3000 to HP9000 File Transfer Job (ftp)**
- 6) Generate ORACLE version of TurboIMAGE Rootfile (re-generate TurboIMAGE, re-generate ORACLE, ... etc.)**
- 7) Real-time Data Replication Tool (Sync for 24X7)**

3. HP9000 ORACLE Database Creation

- 1) Create ORACLE Physical Database, Tablespaces and ';' equivalent ORACLE User (creator)
- 2) Re-fine all HP e3000 generated scripts for ORACLE sqlplus (dbschema.pub.sys)
- 3) Create ORACLE Logical Database: Tables, Indexes, Sequences, Triggers, Constraints, Stored Procedures, and Views
- 4) Create Map Tables for TurboIMAGE Original Structure, and ORACLE TurboIMAGE Mapping rules
- 5) Load Data into ORACLE Tables (sqlldr)
- 6) Database Post-loading Validation Reports
- 7) Database Structure Checksum setting
- 8) How to make ORACLE structure change after HP e3000 is gone?

3. I have my mirrored ORACLE database built, then what?

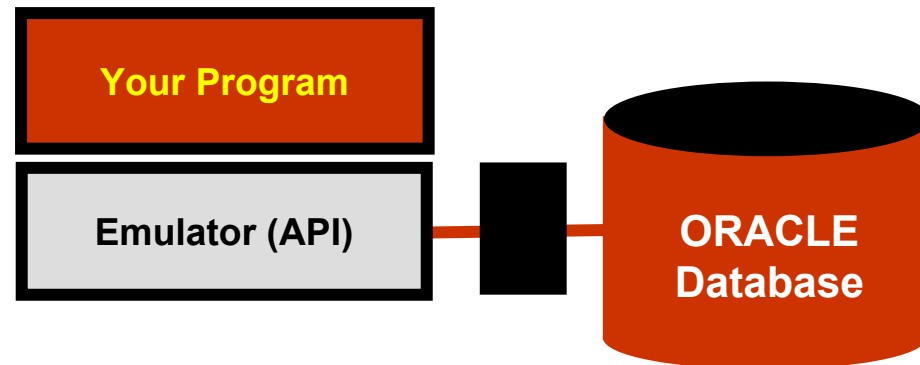
- 1) **Core Business Logic - COBOLII vs UNIX COBOL Profiler and Filter**
- 2) **4GL – COGNOS, SPEEDWARE, and Report Writers (BRW)**
- 3) **MPE Intrinsic Migration (File System – MSG, CIO, KSAM)**
- 4) **JCL and MPE CI Shell (preserve JCL and emulate MPE CI Commands)**
- 5) **OMIDEX and SUPERDEX (ORACLE B-tree Index)**
- 6) **SUPRTOOL (sqlplus and standard SQL)**
- 7) **View Plus and other UI (Translation Tools)**

4. 4 ways to use emulator – one

1

Access HP-UX ORACLE Database Direct

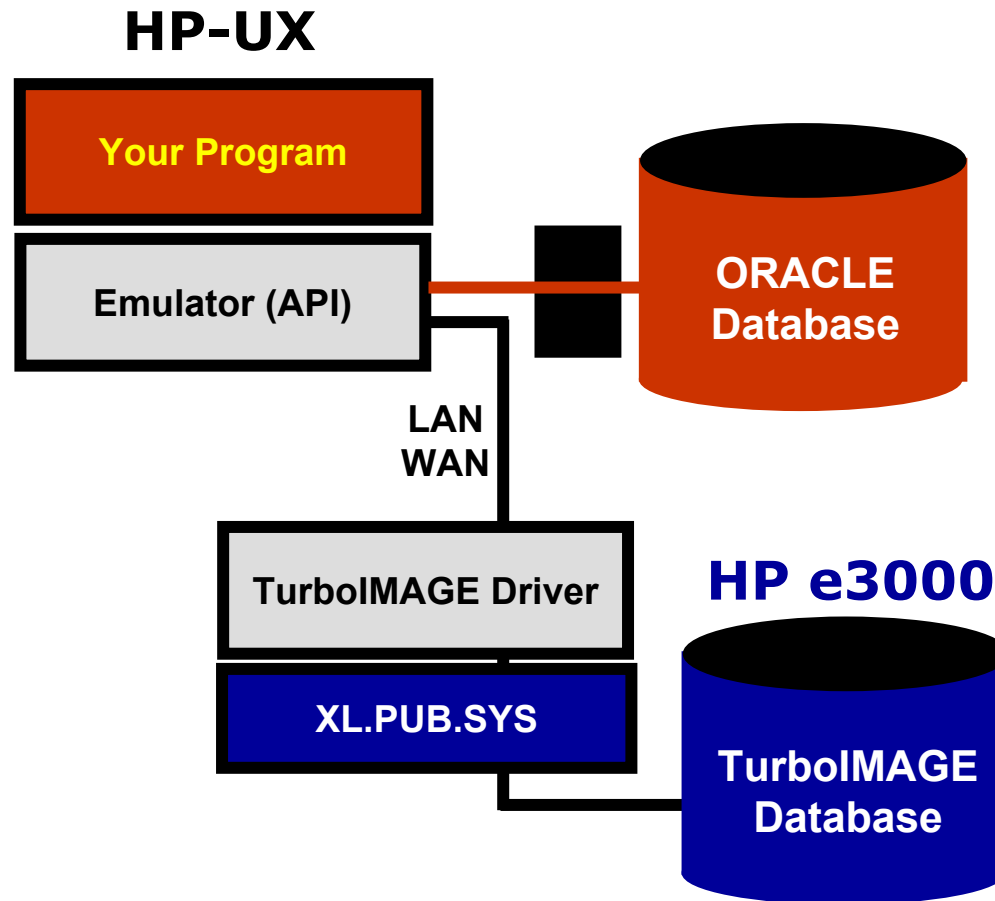
HP-UX



4. 4 ways to use emulator – two

Concurrent Access ORACLE and TurboIMAGE Databases

2

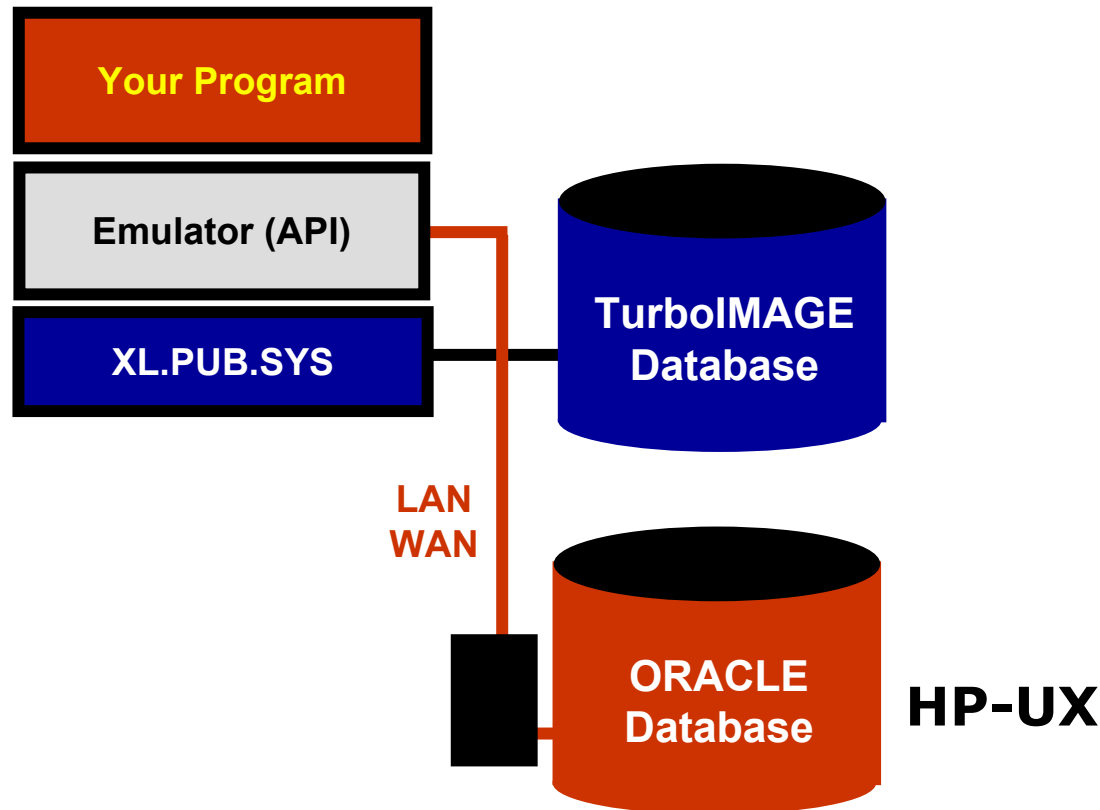


4. 4 ways to use emulator - three

Concurrent Access TurboIMAGE and ORACLE Databases

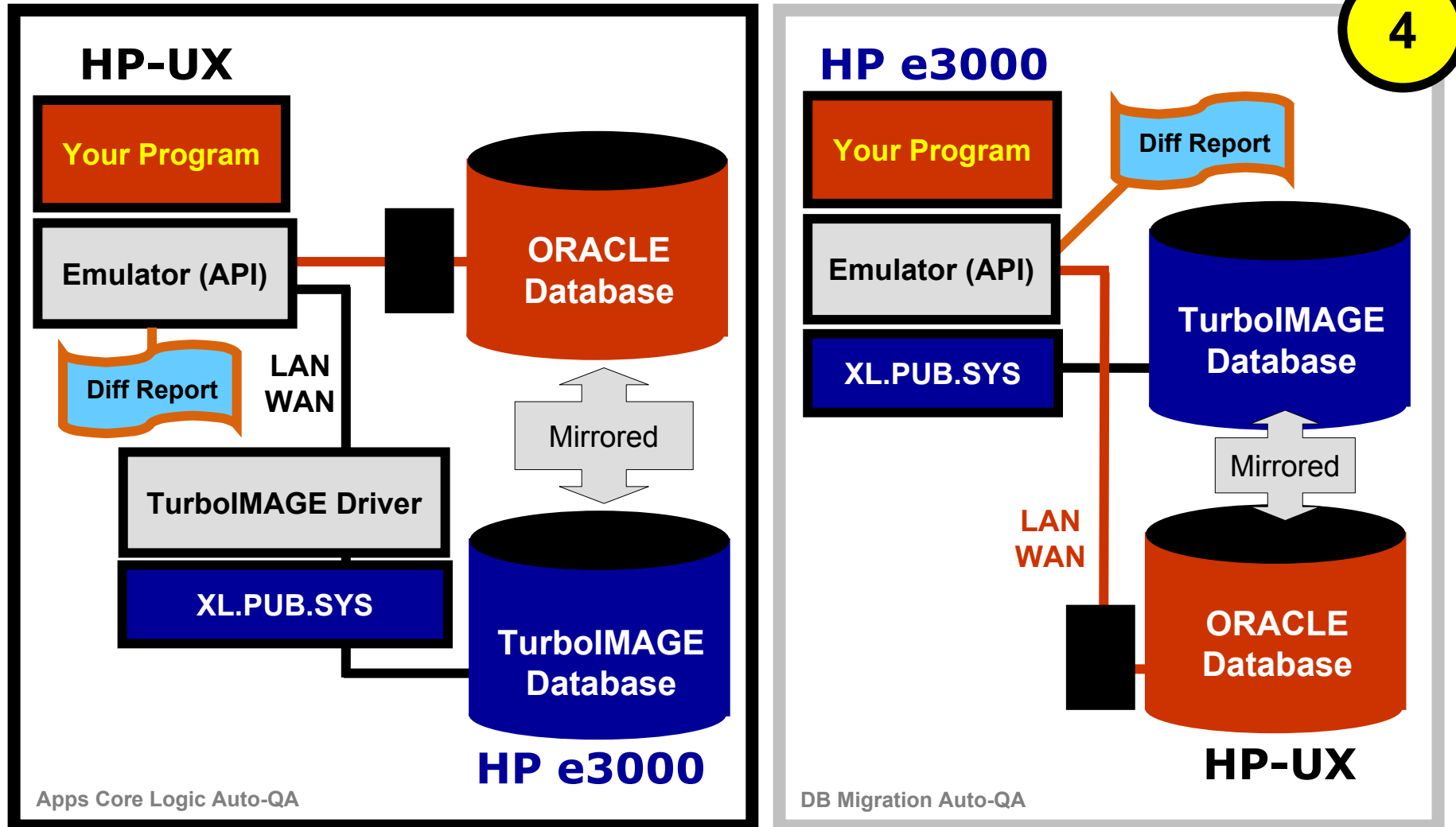
3

HP e3000

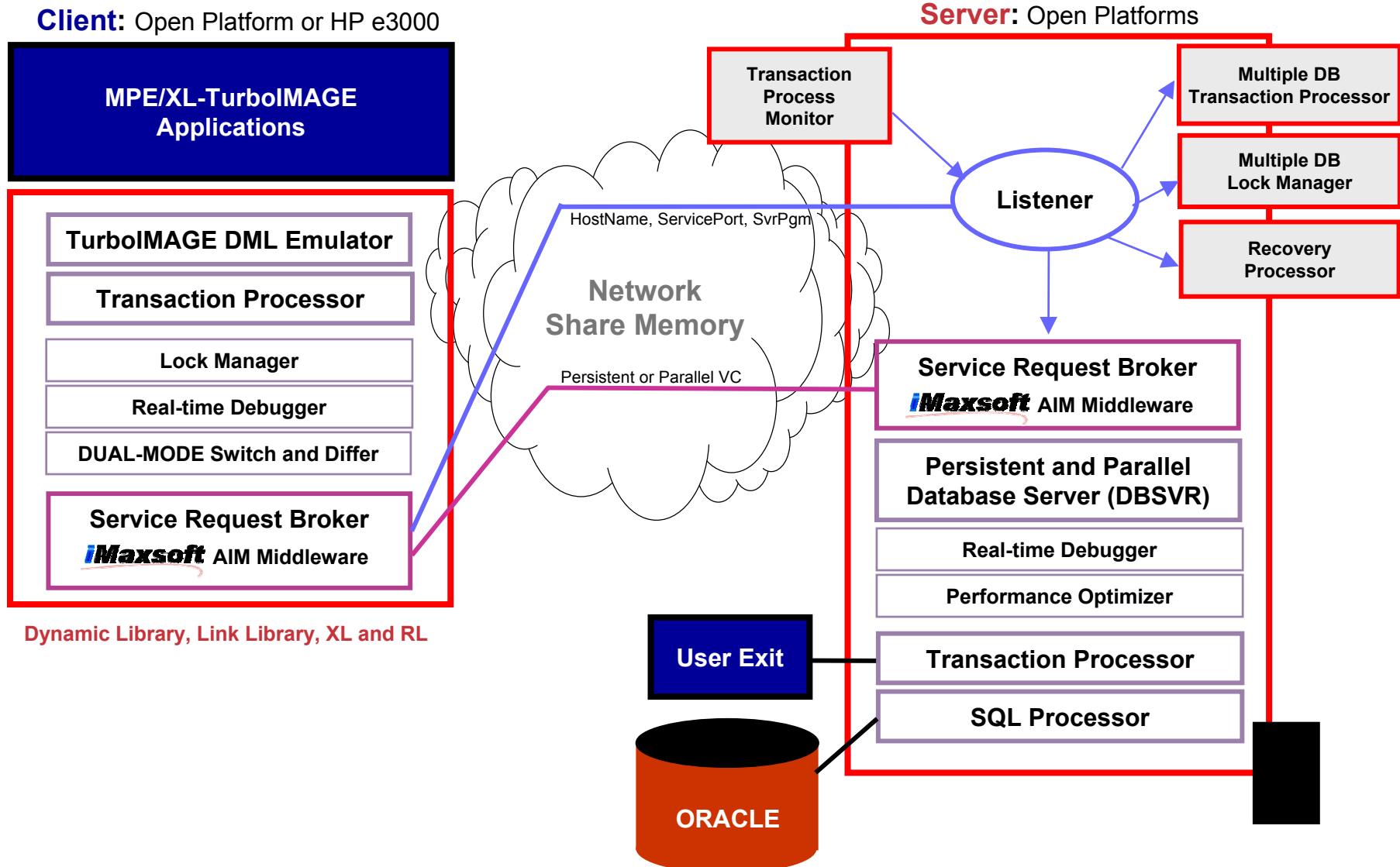


4. 4 ways to use emulator - four

DUAL-MODE - Concurrent Access TurboIMAGE and Mirrored ORACLE Databases



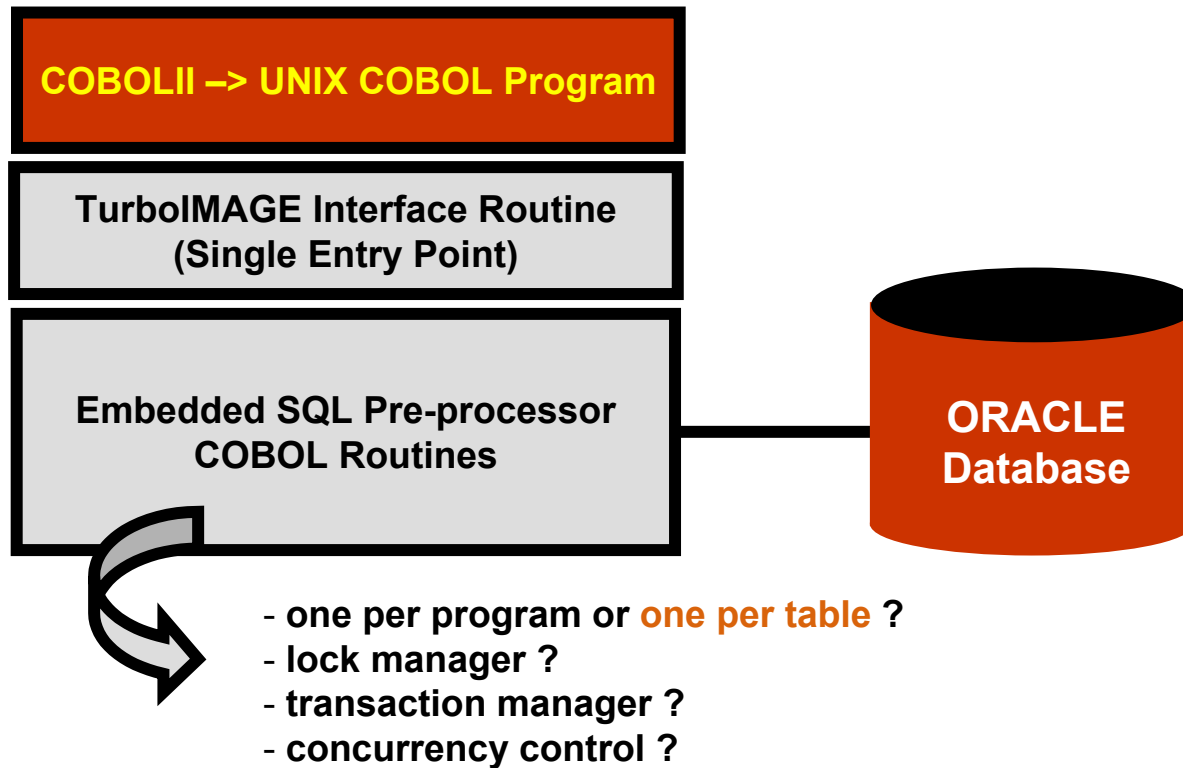
4. Emulator N-tier Architecture Overview (Black Box)



5. Translator – design concerns

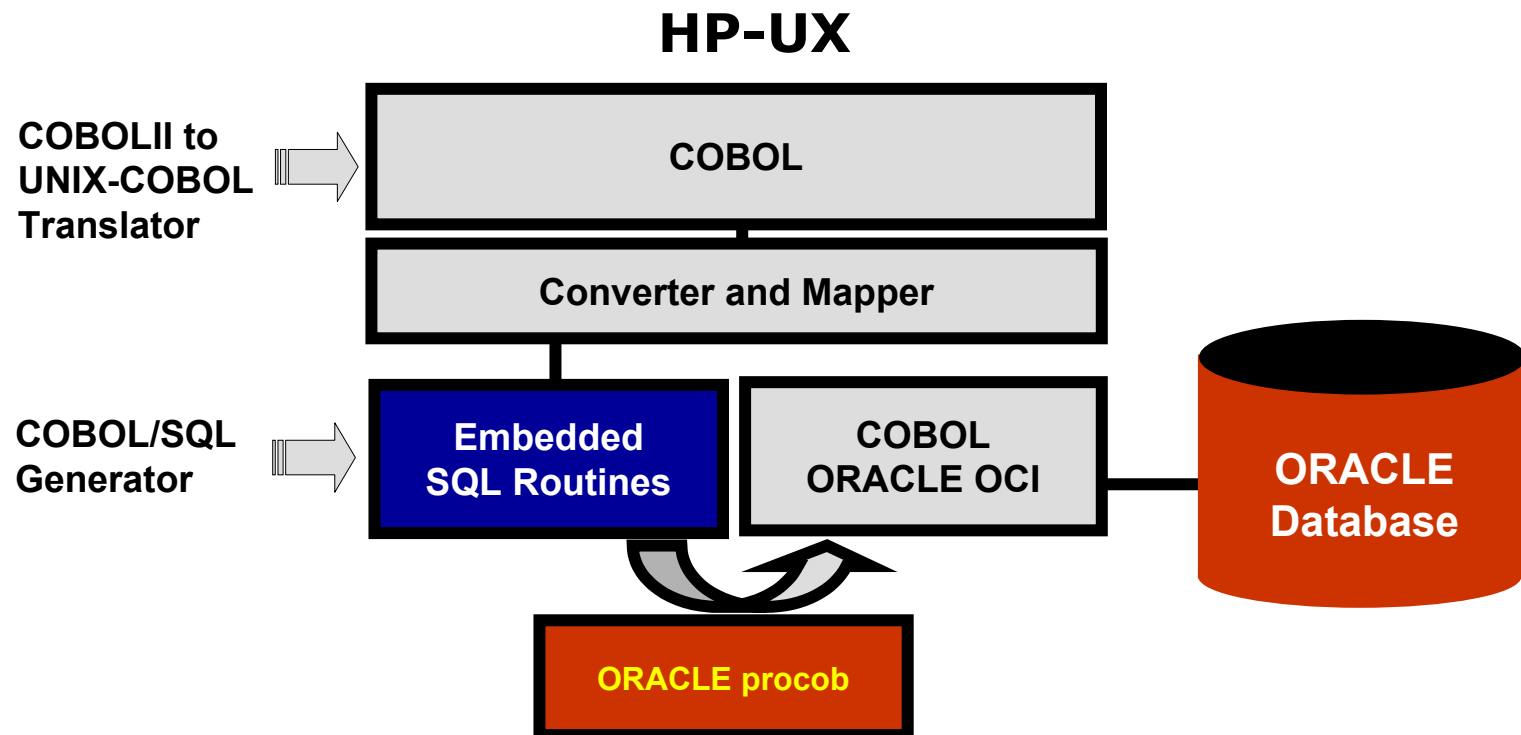
HP-UX COBOL Program

HP-UX



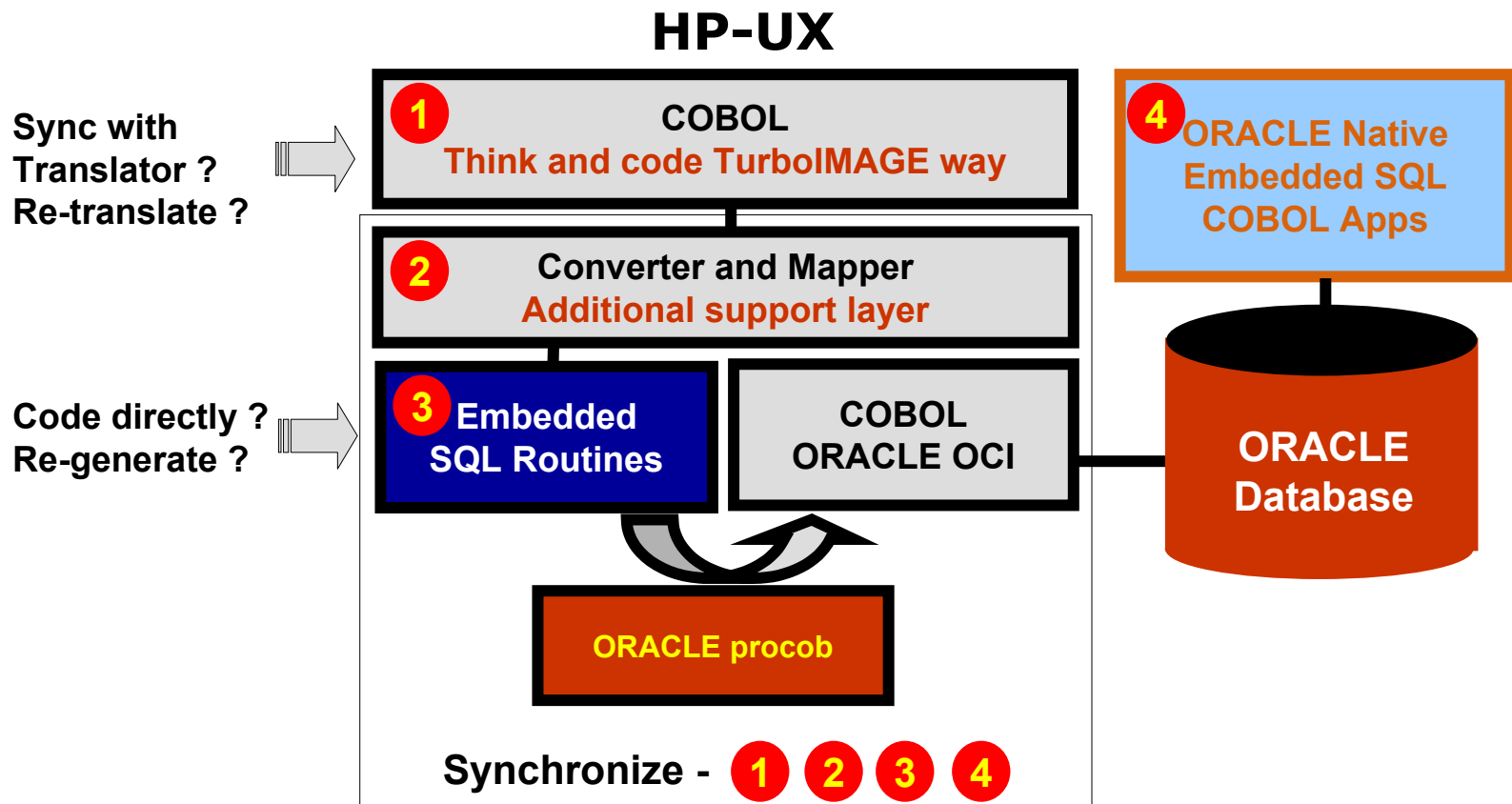
5. Translator – common technology

Common Translator Technology



5. Translator – co-existence

Translator vs. Native ORACLE Applications



5. Translator and Emulator - General Discrepancies

- 1) ORACLE Database – instances vs users and owners, security vs users and authorities, concurrency (DB Exclusive Mode and MR)
- 2) Locking Strategy – physical ROW or TABLE vs abstract, deadlock detection, unconditional lock may wait for-ever, operation ‘show lock’ and ‘free lock’, multiple DBLOCK calls and multiple-lock-entries descriptor, **DB level unique key** (sequence), . . . etc.
- 3) Transaction Isolation and Commit / Rollback - ORACLE vs ANSI SQL, transaction isolation override, when and how to end a transaction, how to handle TurboIMAGE error condition in your existing program when unexpected status is returned, **auto-commit**, transaction and rollback segment / audit-log, . . . etc.
- 4) CURSOR Control and OPEN / CLOSE – number of cursors per instance, number of cursors per process, multiple concurrent cursors support, **close at commit / rollback**, . . . etc.
- 5) Pre-processor Embedded SQL Code Generator – one per table, one per program, auto-code-gen, manual-code-gen, generic or specific to each program, . . . etc.
- 6) Others - item list (@;), DBX-calls, performance tuning capability (types of DBFIND and DBGET), . . . etc.
- 7) Maintenance – TurboIMAGE calls, io-interface, PSQL, and ORACLE database.

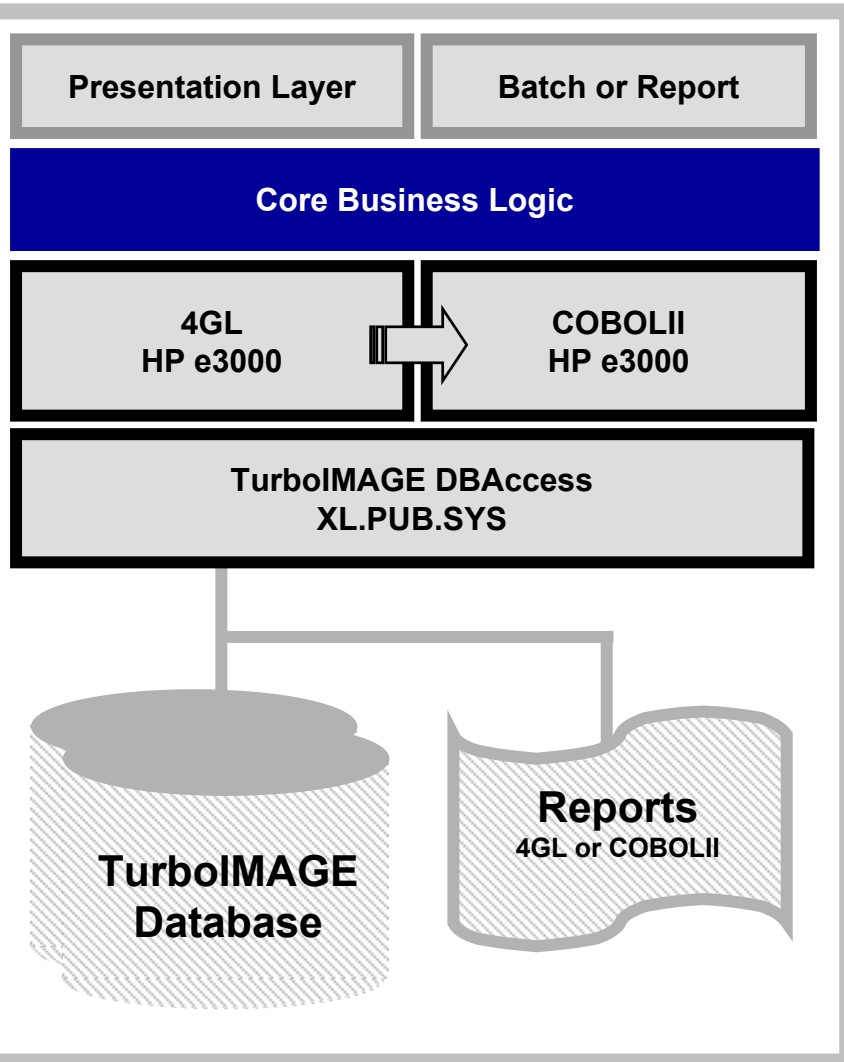
5. Translator and Emulator – DBA & Operation

- 1) Logical TurboIMAGE and ORACLE Instance - on-line or off-line backup, roll-forward and roll-backward recovery, database startup and shutdown, full and partial database restore, . . . etc.
- 2) DBUTIL alike tool for dead-lock detection and protection - show users, kill users, show locks, free locks, . . . etc.
- 3) Database integrity checking - objects, structure, authorities, triggers, stored procedures, . . . etc.
- 4) ORACLE performance tuning – indexes, query analyzer and run-plan enforcement, resource and SGA management, buffering, pre-fetching and look-ahead, concurrency control, . . . etc.
- 5) Synchronization of TurboIMAGE and ORACLE structure – dataset vs table, data field vs table column, path vs constrain and index, . . . etc.
- 6) Synchronization of TurboIMAGE calls and ORACLE SQL code – more efforts if it is one Pre-processor SQL code per program; in general, any TurboIMAGE access changes or database changes require at least concurrency and throughput re-certification. Example, in TurboIMAGE, if all databases and datasets are locked via the order of their names, no dead-lock will occur, but in translator, unless you have a LOCK MANAGER, it would be a disaster.
- 7) Synchronization of TurboIMAGE and ORACLE data types – integer vs character, short integer (16) vs long integer (32 or 64), packed decimal and zoned decimal, character with binary data, integer vs date and time, character vs date and time, . . . etc. and **alignment on 16-bit, 32-bit and 64-bit.**

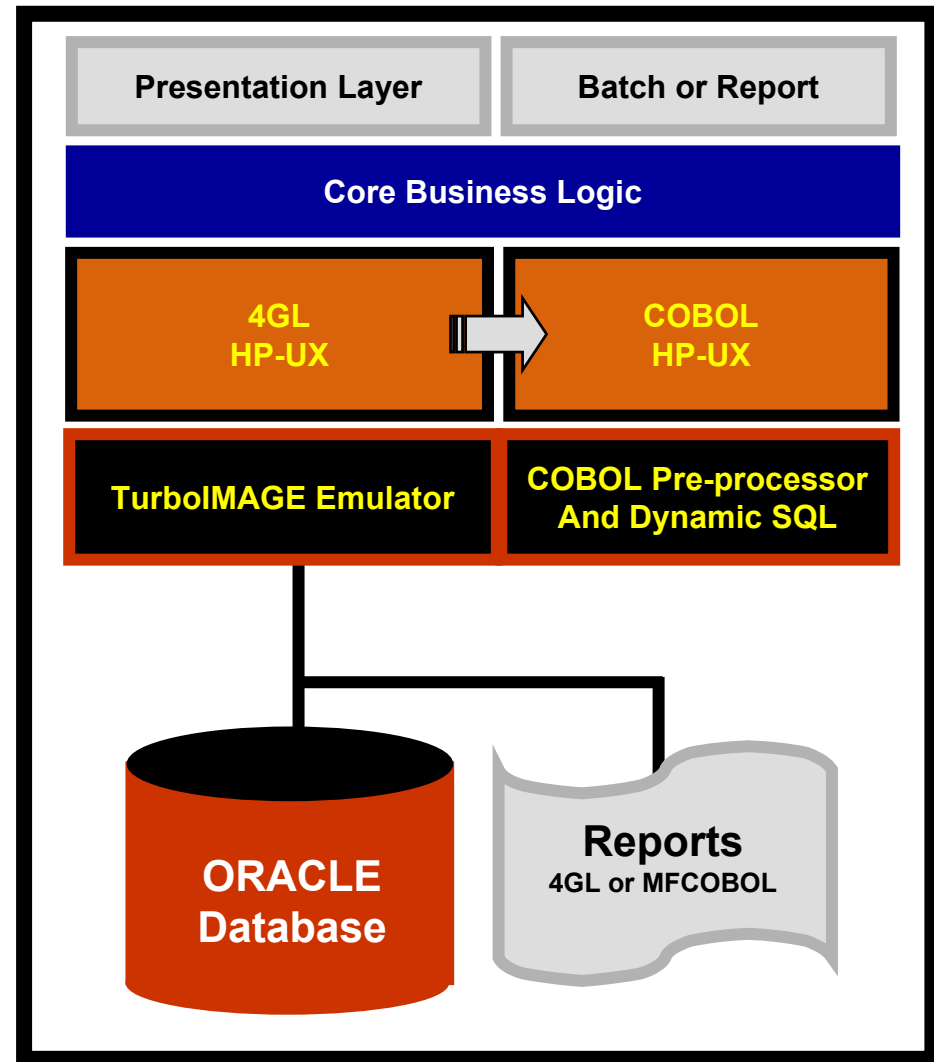
1. Emulator – simple, risk-free and straight-forward (step one only?)
2. Translator – questionable, but you see the code (**dynamic** or **static SQL**)
3. Native and co-existence
 - LOCKING strategy
 - TRANSACTION strategy

6. Migration Overview

HP e3000 and TurboIMAGE

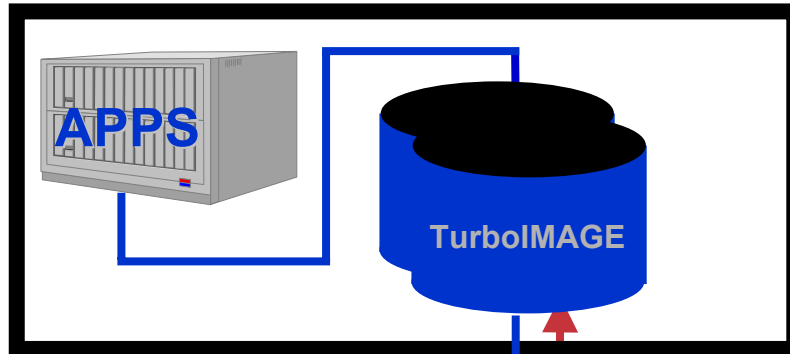


HP-UX and ORACLE

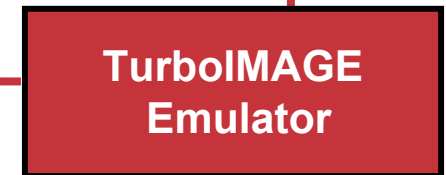
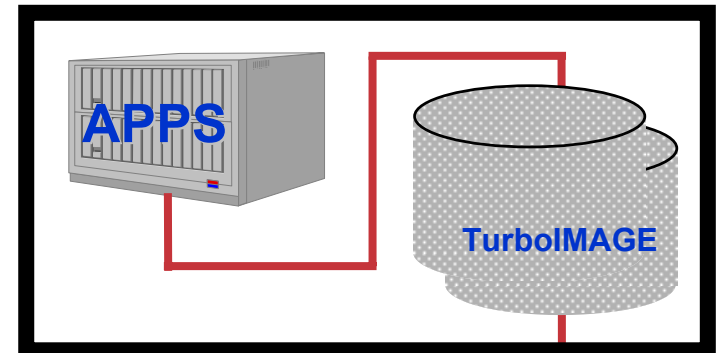


6. Replication and Co-existence

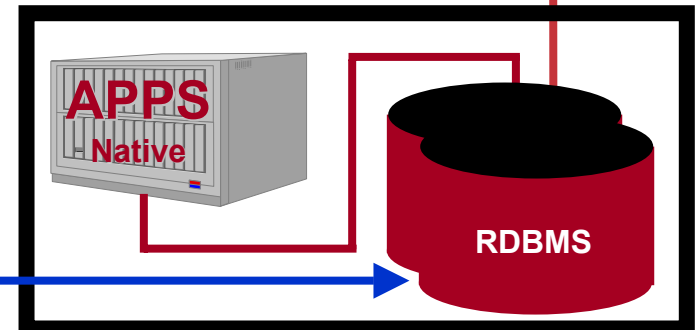
HP e3000 MPE-IMAGE Apps



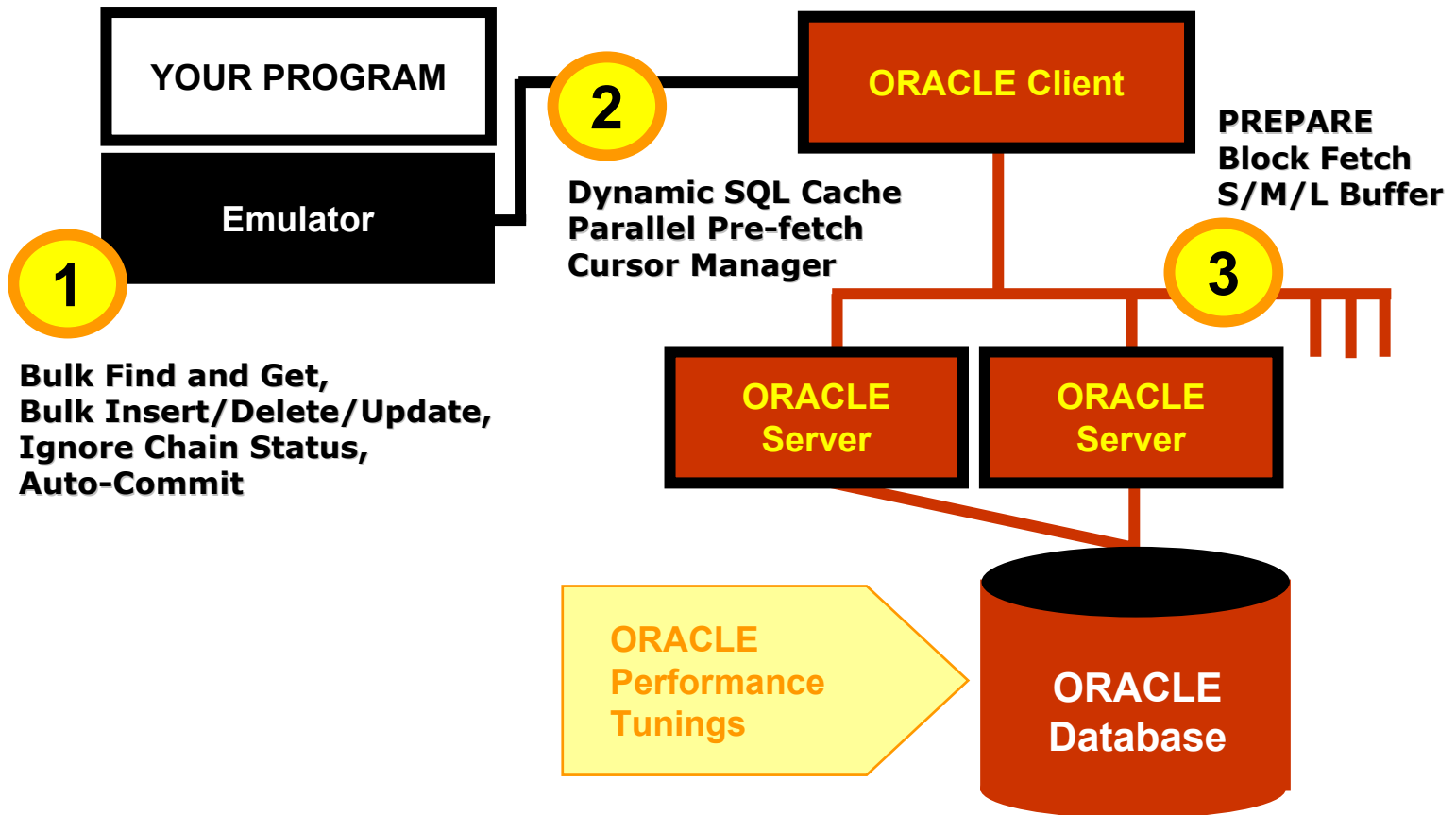
HP-UX ORACLE Migrated Apps



ORACLE Native Apps



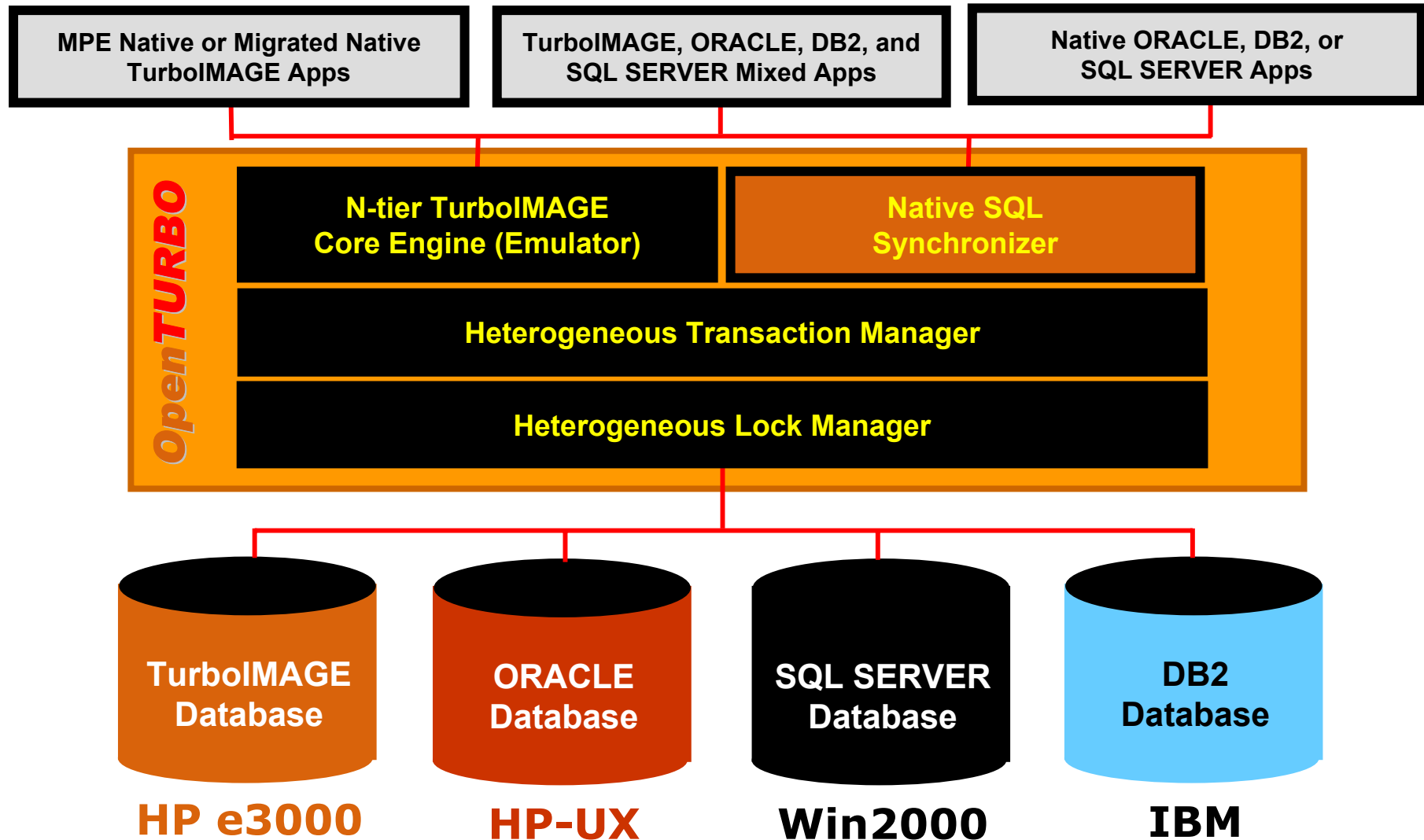
6. Performance Tunings



1 2 3 22.34 Times READ Performance Improvement (2.77 times faster than TurboIMAGE)
3.66 Times WRITE/READ Performance Improvement (1.13 times faster than TurboIMAGE)

22.34 = 105 / 4.7 (Basic Configuration), 2.77 = 13 / 4.7 (969/200), 1.96 = 9.2 / 4.7 (N4000 2- Way); 3.66 = 64 / 17.5 (Basic Configuration), 1.13 = 13 / 11.5 (969/200)

6. OpenTURBO Technology



6. DEMO – TurboIMAGE to HP-UX ORACLE



Open**TURBO**:

1. TurboIMAGE Database Transformation
2. HP-UX ORACLE Database Creation
3. SQL Translation, QUERY.PUB.SYS, and Debugging Facility

iMaxsoft
Q & A



Interex, Encompass and HP bring you a powerful new HP World.

