使用DB2 v9.7 轻松移植Oracle应用

为什么要移植到DB2?

- 我作为 客户
  - 当前的数据库性能不能满足需要
  - 在同服务商谈价格时，数据库成为商务负担
  - DB2是性价比最高的产品
- 我作为 服务商
  - 我想扩展客户群
  - 我想得到IBM全方位的支持
  - 我的数据库提供商同时也是我的竞争对手
  - DB2是性价比最高的产品

为什么还没有移植到DB2?

- 作为 **客户** 我认为
  - 移植关键应用还是有风险
  - 投入回报周期可能很长
- 作为 **服务商** 我认为
  - 移植并维护另一个平台可能代价很大
  - 投入回报周期可能很长

但是如果用了DB2 9.7

Oracle	→	DB2
并发控制	→	无需任何更改
SQL用法	→	无需任何更改
PL/SQL	→	无需任何更改
PL/SQL包	→	无需任何更改
系统函数库	→	无需任何更改
JDBC 扩展	→	无需任何更改
OCI	→	无需任何更改
SQL*Plus 脚本	→	无需任何更改

只有极少情况下才需要更改

这就是为什么我们称之为转移，而不是迁移！

那么我们该怎么做呢？

1. 当前存在Oracle应用以及使用Oracle的技能
2. 使用IBM MEET工具来评估移植的代价，当然代价越小越好.
3. 用商业眼光评估移植到DB2后带来的效益
4. 只有效益大于代价时才继续下面的步骤 ☺
5. 使用IBM Data Movement tool 来 “直接把应用转移到DB2”:
   - 映射DDL
   - 导入测试数据
   - 拷贝存储过程等应用

     此时可能会人工进行一些调整来消除报错（如果需要的话）!
6. 测试，测试再测试
7. 没问题后导入生产数据
8. 部署上线

并发控制比较

- Oracle 默认情况
  - 语句级快照

是否阻塞	读操作	写操作
读操作	No	No
写操作	No	Yes

- DB2 默认情况
  - 游标稳定隔离级别

是否阻塞	读操作	写操作
读操作	No	No
写操作	No	Yes

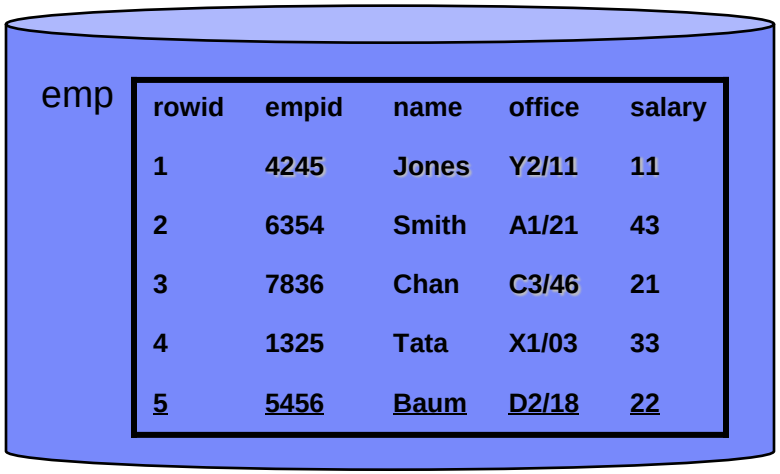
并发控制

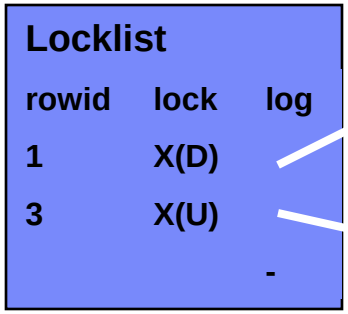
Client 1

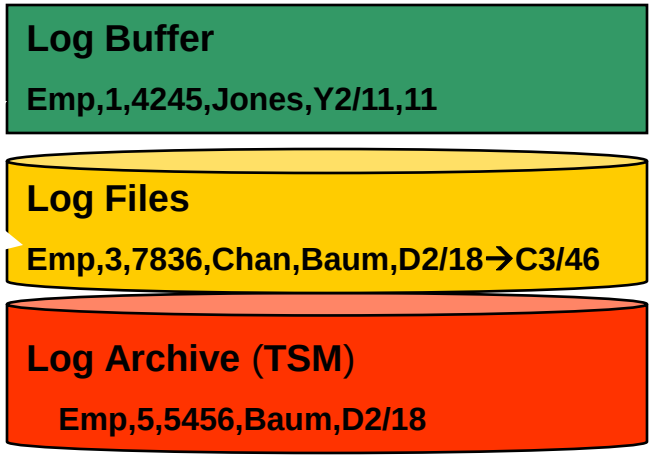
```
INSERT INTO emp VALUES (5456, 'Baum', 'D2/18', 22);
Commit;
UPDATE emp SET   office = 'C3/46' WHERE empid = 7836;
DELETE FROM emp WHERE name = 'Jones';
```

Client 2

```
SELECT name FROM emp WHERE salary > 20
```







支持Oracle SQL 用法

- 数据类型
- 类型转换
- 函数库
- SQL语法

DB2 9.7新数据类型

类型	注释
NUMBER	利用了P6芯片加速处理能力的DECFLOAT
VARCHAR2	零长度字符串等同于NULL
TIMESTAMP (n)	0 (date + time) <= N <= 12 (date + time + picoseconds)
“DATE”	从年到秒, 可以使用SYSDATE
BOOLEAN	在应用开发中使用的类型
Hash tables	可以在应用中结合 “INDEX BY” 使用
VARRAY	在应用中使用的数组类型
Row Type	表示该结果行的类型
Cursor type	扩展了游标特性

DB2支持弱类型转换

- DB2 曾经严格限制数据类型
  - 但目前业界趋势是弱类型转换 (PERL, RUBY, PHP, ...)
- 目前
  - 字符串和数值类型可以隐式转换:

```
SET salary = '52000'
WHERE salary > '52000'
'salary: ' || 52000
```

  - DATE和TIMESTAMP可以互相转换
  - 对于NULL和参数符也解除了限制

```
values foo(?, NULL)
```

DB2 9.7新函数

功能	
数据类型转换	TO_CHAR, TO_DATE, TO_TIMESTAMP, TO_NUMBER, TO_CLOB
日期计算	EXTRACT, ADD_MONTHS, ...
字符串处理	INITCAP, RPAD, LPAD, INSTR, ...
其他	DECODE, NVL, LEAST, GREATEST, BITAND

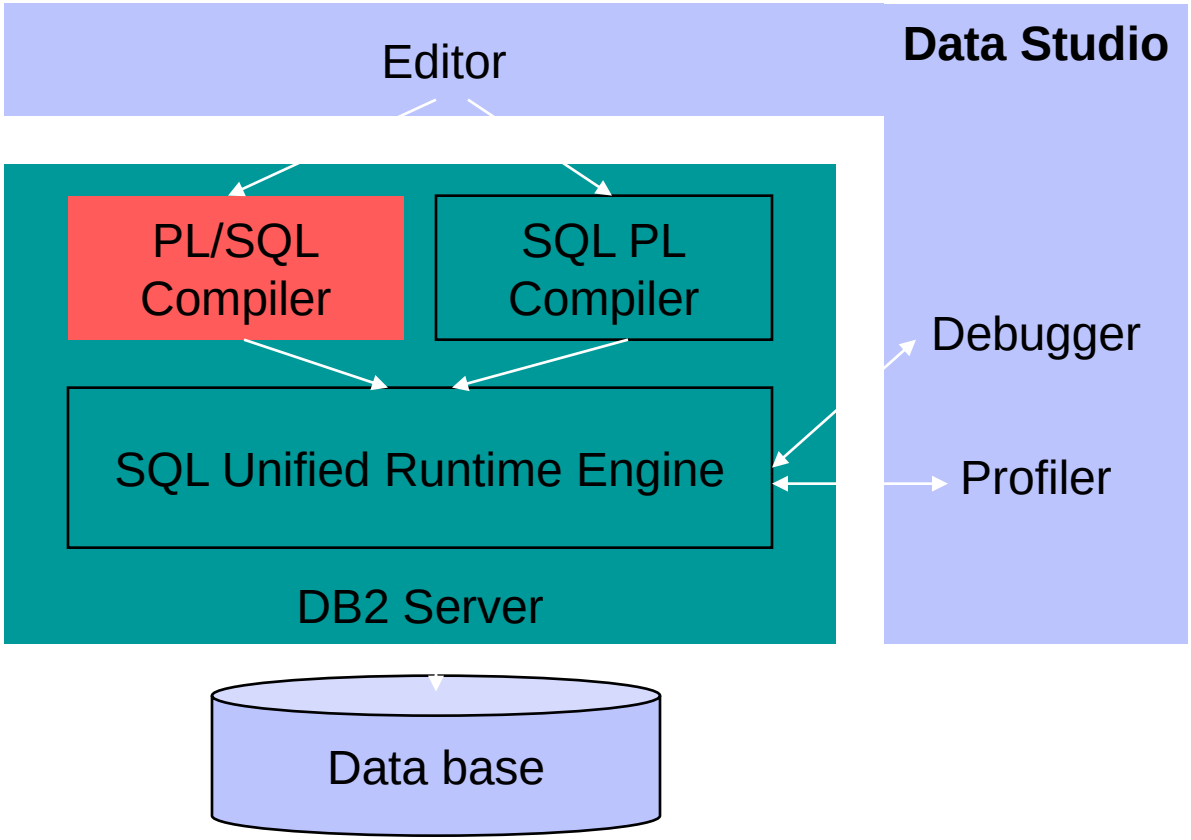
DB2新SQL语法

语法	
CONNECT BY	树形递归查询
(+)-join	等同于 OUTER JOIN
DUAL	返回一行记录的傀儡表
ROWNUM	ROWNUMBER() 的伪列
SELECT INTO FOR UPDATE	无需游标即可获得U锁
ROWID	RID_BIT()的伪列
AUTONOMOUS TX	用于审计的独立事务
TRUNCATE table	无需记录日志即可快速清空表记录
Public synonym	用于table, sequence, module
CREATEd temp table	定义被记录在系统编目中的私有临时表
...and more...	

支持Oracle PL/SQL语法

- PL/SQL 结构
- 存储过程
- 用户定义函数
- 程序包
- 触发器
- 匿名块

DB2的PL/SQL引擎



支持的PL/SQL结构

功能		
逻辑判断		IF, WHILE, :=, etc..
异常处理		Try/catch处理
常量		常数值
循环	基于值范围	
	基于SELECT语句	
	基于游标	
用户定义的异常处理		自定义触发条件以及SQLCODEs
%TYPE		根据列或变量取得数据类型
%ROWTYPE		根据整行取得数据类型

DB2支持的PL/SQL应用

Area	
匿名块	在服务器端执行的PL/SQL块
用户自定义函数	
存储过程	
程序包	也就是SQL PL的MODULE
触发器	

DB2的程序包

特点		
CREATE PACKAGE		定义公共对象和程序描述信息
CREATE PACKAGE BODY		定义私有对象和程序实体
Replace package body		替换程序体
PKG [BODY]	VARIABLE	共有/私有变量
	CURSOR	共有/私有游标
	TYPE	共有/私有数据类型
	EXCEPTION	用户自定义异常
	FUNCTION	
	PROCEDURE	
SYNONYM ON PACKAGE		为程序包创建同义词

系统程序包

Library	
DBMS_OUTPUT	用于打印输出信息或者调试信息
UTL_FILE	服务器端的IO接口
DBMS_ALERT	跨会话的信号灯
DBMS_PIPE	跨会话的数据通道
DBMS_JOB	任务调度
DBMS_LOB	等同于DB2自带的LOB函数
DBMS_SQL	等同于 PREPARE/EXECUTE
DBMS_UTILITY	辅助的函数和过程工具
UTL_MAIL	服务器端的邮件接口
UTL_SMTP	服务器端的SMTP接口

DB2 9.7 SQL兼容性一览

Currently Committed (log based)	Scalar functions TO_CHAR, TO_DATE, TO_NUMBER, TO_TIMESTAMP	Arithmetic functions, String Functions	CLPPLUS	MEET Assessment
Weak Typing	Dictionary Views	JDBC Extensions	OPTIM Development Studio	Data Movement
Number Varchar2 Timestamp (n) Date Boolean VARRAY Index By Table ROWTYPE Cursor Type	CONNECT BY, Outer Join(+), DUAL, ROWNUM, SELECT INTO FOR UPDATE, ROWID, AUTONOMOUS TX, TRUNCATE table, Public synonym, CGTT	PL/SQL logic, EXCEPTION, Constant variables, FOR LOOP (over range over SELECT over cursor), User Defined Exceptions, %TYPE, %ROWTYPE, PRAGMA Autonomous	Anonymous block Procedure Function Trigger PACKAGE – VARIABLE, CURSOR TYPE, EXCEPTION, FUNCTION, PROCEDURE PACKAGE SYNONYM	DBMS_OUTPUT UTL_FILE DBMS_ALERT DBMS_PIPE DBMS_JOB DBMS_LOB DBMS_SQL DBMS_UTILITY UTL_MAIL UTL_SMTP

各国用户对DB2 9.7的评价

Two years … One week!

To move our application to DB2 9.5 would have taken an estimated two-year effort. We were thrilled to see it took only one week to move it to DB2 9.7. **This represents a terrific opportunity to expand our international community of users, partners and developers, and we′re very excited to partner with IBM to make new deployment options available.″**

Paolo Juvara, CTO of Openbravo (Spain)

Significantly lower overall costs

"These features drastically reduce the time required for migration efforts and significantly lower overall costs.‟

Axel Puerner, Managing consultant, Puerner Unternehmensberatung

Paradigm shift

"The new IBM DB2 offers true ENABLEMENT and not mere PORTING. This feature is a paradigm shift in the very concept of database migration!"

Godson Retna, Senior Architect, Cognizant Technology Solutions

各国用户对DB2 9.7的评价

Amazing!

“DB2's PL/SQL compatibility is excellent. We’re looking forward to integrating the current dual source code base into a single one. This will increase our development and testing productivity. In addition, SQL compatibility is significantly improved. We ran an Oracle Database program as is on DB2, and the test result was more than we expected.

The compatibility level that DB2 9.7 achieved is also amazing. We can integrate a lot of incompatible queries into the same one. Now we can stop our program’s different behaviors, which comes from DBMS’s differences, and this will help us improve the quality of our package.”

Masato Kudo, Developer for Platform Development Group, Works Applications

Porting time 1/6 the original estimate

“As we expand, we consistently see a requirement *to support DB2 within large government departments. We specifically chose to take part in the IBM DB2 early access program because of the program's goal to run much of Oracle Database applications without modification.* *This allows us to reduce the time to port our stored produce persistence layer from Oracle Database to DB2 from 450 days down to 75 days.* ***With what we regard as excellent support from the IBM DB2 team, we believe that IBM has achieved these goals.”***

David Moody - Senior Vice President of Product and Founding Director, Lagan Technologies Ltd.

中国用户对DB2 9.7的评价

Neusoft

"We are very impressed with the latest release of DB2 9.7 and its Oracle compatibility features, which drastically reduced our core HealthCare application migration effort. It just took 5 days to move the Oracle database objects and data to DB2, and we were able to bring up our Java application and successfully perform testing on DB2 9.7! "- Jian Yuankun, director of healthcare industry development for Neusoft.

招商银行 CHINA MERCHANTS BANK

"In our extensive evaluation of the new DB2 9.7, we are highly satisfied with the features, stability and quality of the DB2 code. In particular, we tested the new Workload Manager, the concurrency enhancements and the security enhancements, and they are truly beneficial to our application environment. The overall product performance and the many amazing features really strenghtens DB2's position as a world class database." - Chen Kaifu, Lead DBA, China Merchants Bank

UFIDA

"Exploiting the new DB2 9.7 with our latest NC 5.5 ERP application has ***greatly improved the application performance and scalability****. DB2 9.7 has* ***dramatically reduced*** *the locking contentions,* ***allowing higher number of concurrent users,*** *while delivering* ***25% better average response time*** *and* ***consuming 30% less CPU resources****. The performance, and many rich application development features, and advanced compression will contribute to lower the TCO."* - Dan Han Lin, CTO of NC R&D Center, UFIDA

Qware

"DB2 V9.7 进一步提高了XML的处理能力,降低了XML存储成本,增强了我们基于XML构建大型应用的信心"

"DB2 V9.7 has greatly enhanced the pureXML functionalities, and performance. The compression feature also significantly reduced XML data storage cost. It has boosted our confidence on building high end application based on DB2 pureXML"
- Zhou Liangbin (周梁斌), Manager of Qware R&D Department


Thank
You