

DB2 V8/V9 Optimistic Locking

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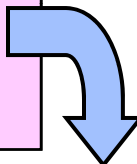
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Optimistic Locking Challenge in V8

- Use optimistic locking to insure update integrity
 - All tables have an update timestamp column
 - Read data WITH UR
 - Include the timestamp in any UPDATE or DELETE

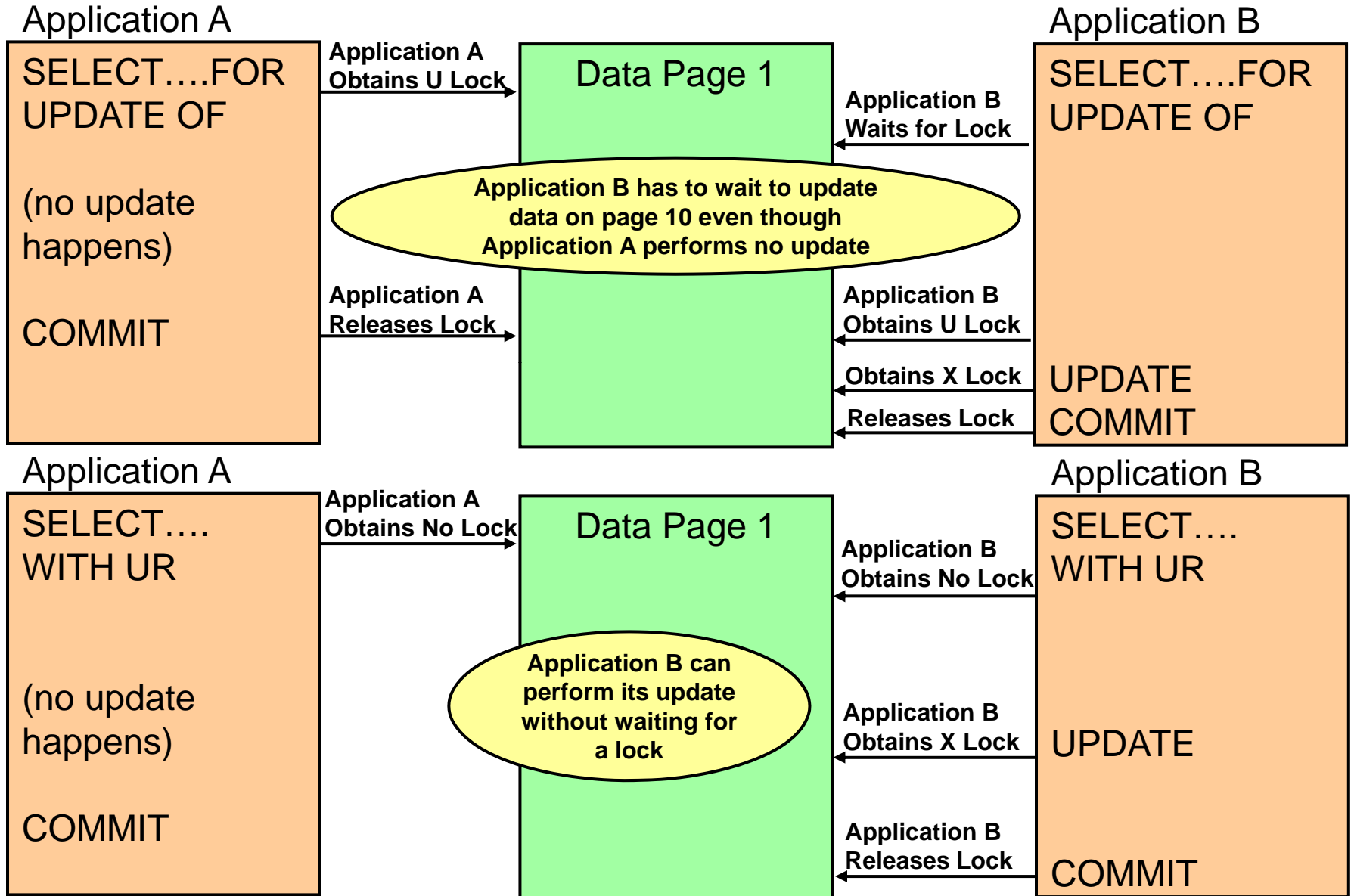
```
SELECT PKG_ID, PKG_DESC, UPD_TSP  
FROM PKG_TBL  
WHERE PKG_ID = :PKG-ID WITH UR
```



Optimistic locking uses the update timestamp to insure no other process has modified the data, and is built into DB2 for z/OS V9

```
UPDATE PKG_TBL  
SET PKG_DESC = :PKG-DESC  
    ,UPD_TSP = CURRENT TIMESTAMP  
WHERE PKG_ID = :PKG_ID  
AND    UPD_TSP = :UPD-TSP
```

Optimistic Locking in Action



Optimistic Locking in V9

- **Optimistic Locking (a.k.a concurrency control)**
 - Faster more scalable locking alternative to database locking for concurrent access
 - Used to minimize the time for which a given resource is unavailable for use by other transactions
 - Locks for Reads
 - Obtained immediately before a read operation and released
 - Locks for Updates
 - Obtained immediately before an update operation and held until the end of the transaction
- **Optimistic locking test whether the underlying data source has changed by another transaction since the last read operation**
 - Prior to optimistic locking, all columns marked for update and their values in last read operation are added explicitly through a WHERE clause in the UPDATE statement
 - Therefore the UPDATE fails if the underlying column values have been changed



Optimistic Locking – IBM Example

```
CREATE TABLE EMP_INFO  
(EMPNO CHAR(6) NOT NULL,  
EMP_INFOCHANGE NOT NULL GENERATED ALWAYS FOR EACH  
ROW ON UPDATE AS ROW CHANGE TIMESTAMP,  
EMP_ADDRESS VARCHAR(300),  
EMP_PHONENO CHAR(4),  
PRIMARY KEY (EMPNO))
```

Return all of the rows in EMP_INFO table that have changed since 9:00 AM January 1, 2006

```
SELECT * FROM EMP_INFO  
WHERE ROW CHANGE TIMESTAMP FOR EMP_INFO  
>= '2006-01-01-09.00.00'
```



Optimistic Locking in V9 (cont..)

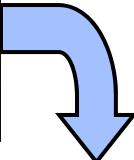
- **Provides an easier and more efficient way to detect change in a row**
 - Application does not need to know all old values marked for update
- **New expressions**
 - **ROW CHANGED TOKEN**
 - Returns a token that represents a relative point in the row modification
 - Application can compare the current ROW CHANGE TOKEN value of a row with the ROW CHANGE TOKEN value stored when the row was last fetched
 - This will determine if there was an update
 - **GENERATED ALWAYS (DEFAULT) FOR EACH ROW ON UPDATE AS ROW CHANGE TIMESTAMP**
 - Stored the time when the row is last changed (or initially insert)
 - Provides a way to capture the timestamp of the most recent change to a row
 - **IMPLICITLY HIDDEN**
 - In column definition so timestamp does not show in **SELECT ***



Optimistic Locking Programming in V9

- It is optimistic locking support
 - Not automatic optimistic locking
 - You still have to program for it
- Advantage is that DB2 is in control
 - At page level if no ROW CHANGE TIMESTAMP column
 - At row level if there is a ROW CHANGE TIMESTAMP column

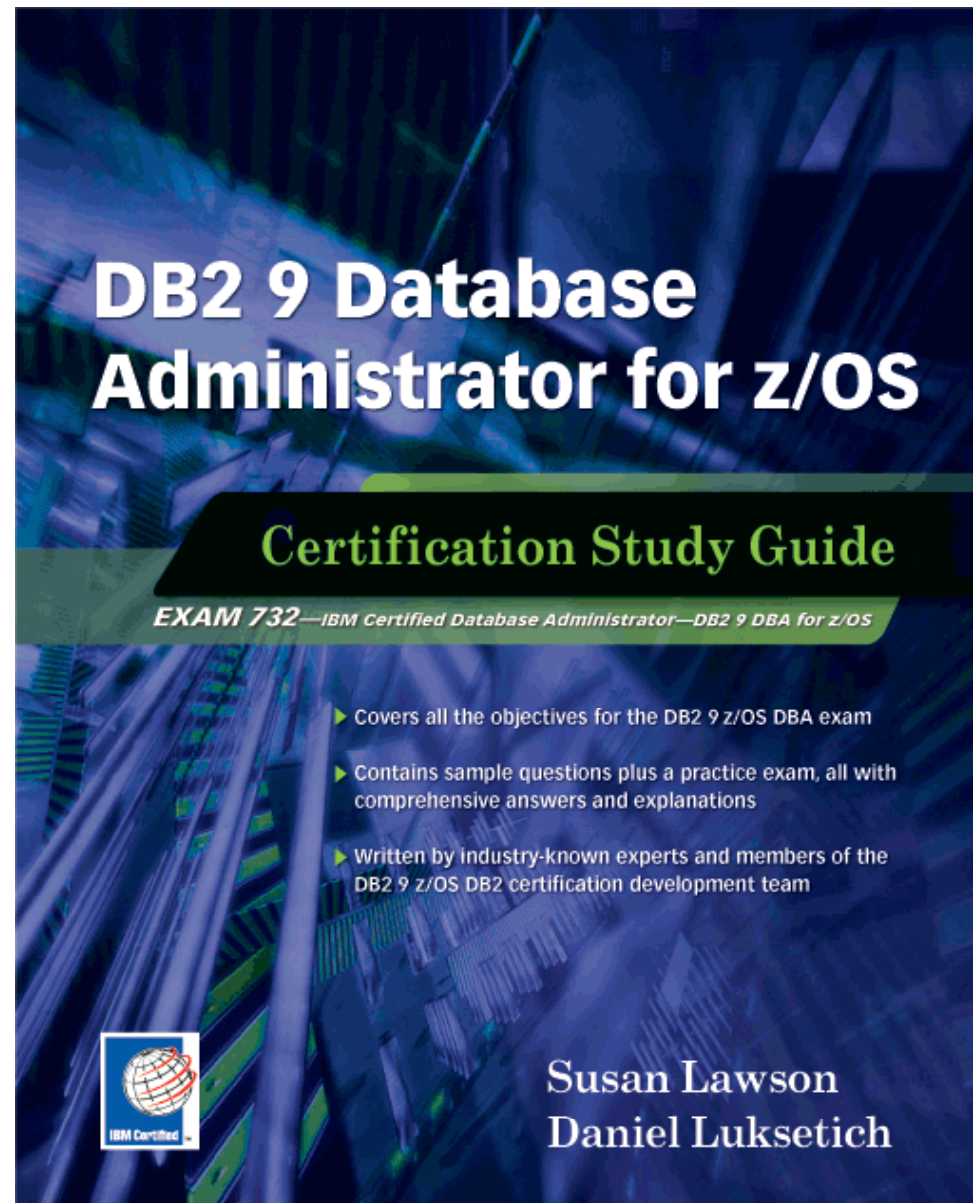
```
SELECT PKG_ID, PKG_DESC,  
       ROW CHANGE TIMESTAMP FOR PKG_TBL  
FROM PKG_TBL  
WHERE PKG_ID = :PKG-ID WITH UR
```



```
UPDATE PKG_TBL  
SET PKG_DESC = :PKG-DESC  
WHERE PKG_ID = :PKG_ID  
AND ROW CHANGE TIMESTAMP FOR PKG_TBL = :UPD-TSP
```

DB2 9 for z/OS DBA Certification Guide

- “DB2 9 for z/OS DBA Certification Guide”
- McPress
- January 2008
- Authored By Susan Lawson and Dan Luksetich



DB2 Version 8 for z/OS DBA Certification Guide

- “DB2 for z/OS Version 8 DBA Certification Guide”
- Prentice-Hall
- October 2004
- Authored By Susan Lawson



DB2 V9 Manuals

- **DB2 V9.1 for z/OS Administration Guide, SC18-9840-00**
- **DB2 V9.1 for z/OS Application Programming and SQL Guide, SC18-9841-00**
- **DB2 V9.1 for z/OS Application Programming Guide and Reference for JAVA
SC18-9842-00**
- **DB2 V9.1 for z/OS Codes, GC18-9843-00**
- **DB2 V9.1 for z/OS Command Reference, SC18-9844-00**
- **DB2 V9.1 for z/OS Data Sharing: Planning and Administration, SC18-9845-00**
- **DB2 V9.1 for z/OS Diagnosis Guide and Reference, LY37-3218-00**
- **DB2 V9.1 for z/OS Diagnostic Quick Reference, LY37-3219-00**
- **DB2 V9.1 for z/OS Installation Guide, GC18-9846-00**
- **DB2 V9.1 for z/OS Introduction to DB2, SC18-9847-00**
- **DB2 V9.1 for z/OS Licensed Program Specifications, GC18-9848-00**
- **DB2 V9.1 for z/OS Messages, GC18-9849-00**
- **DB2 V9.1 for z/OS ODBC Guide and Reference, SC18-9850-00**
- **DB2 V9.1 for z/OS Performance Monitoring and Tuning Guide, SC18-9851-00**
- **DB2 V9.1 for z/OS RACF Access Control Module Guide, SC18-9852-00**



DB2 Information on the Web

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