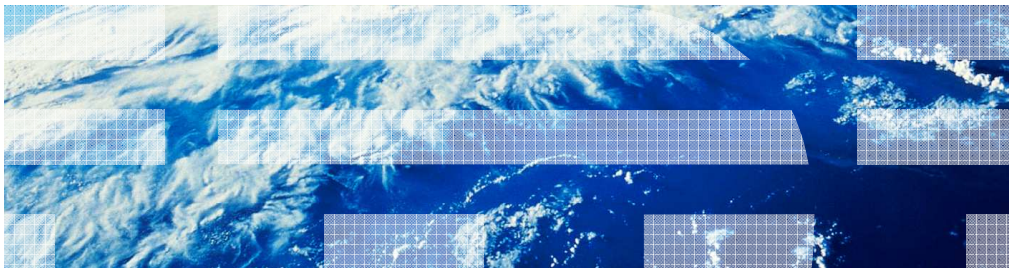


IBM WebSphere Application Server

DB2 lock sharing between transaction branches



This presentation describes support for DB2® lock sharing between transaction branches included in IBM WebSphere® Application Server V8.

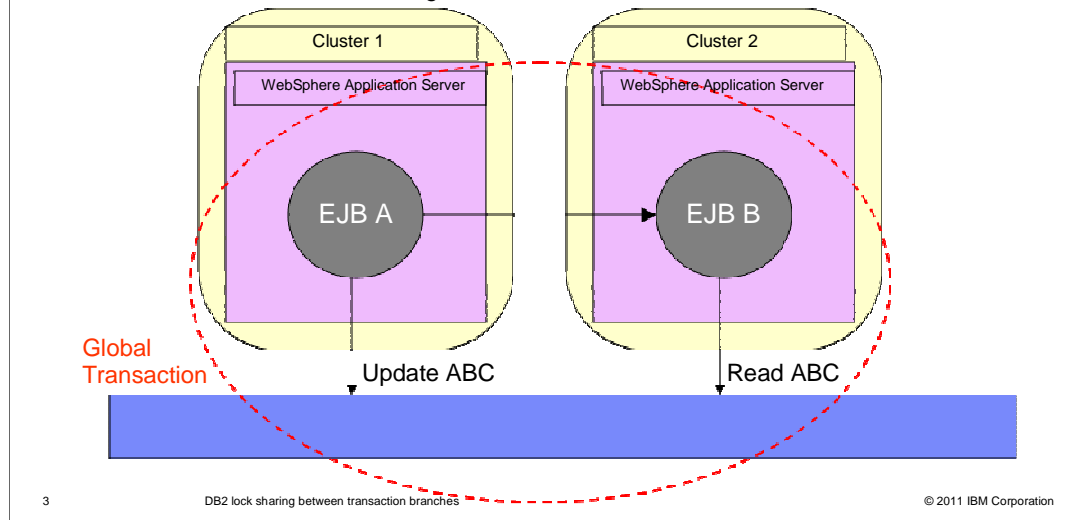
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This presentation covers DB2 lock sharing, including requirements, troubleshooting, and an explanation of the internal operation.

Overview

- This feature addresses the scenario where enterprise beans deployed on different servers need to access same data in a single transaction



This feature addresses the scenario where multiple enterprise beans deployed on different servers want to access the same data within a single transaction.

The example here shows EJB A updating a row in DB2 and then calling a method on EJB B which attempts to read the same row.

Because the scope of database locks is the physical JDBC connection, a deadlock occurs when EJB B attempts to access the row updated by EJB A. If both enterprise beans were deployed on the same server, the deadlock is avoided since both enterprise beans can share the same DB2 connection.

This feature aims to avoid this inconsistency by exploiting a recent capability of DB2 that allows database locks to be shared across multiple transaction branches.

Usage

- Enabled using Rational® Application Developer V8.0.3
- Set the Branch Coupling property to Tight in the WebSphere Extensions panel on the Resources tab in the EJB deployment descriptor editor

WebSphere Extensions

The following are extension properties for the WebSphere Application Server.

Isolation level:	<input type="text"/>	▼
Connection policy:	<input type="text"/>	▼
Commit priority:	<input type="text"/>	▼
Branch Coupling:(Beta)	Tight	▼

- The default value is Loose meaning that locks are not shared across different connections within the same transaction

Use Rational Application Developer V8.0.3 or later to enable this feature.

Select each resource reference and set the Branch Coupling property to Tight in the WebSphere Extensions section.

Internal representation

- Proprietary extension to resource-ref XML descriptor
- Logically this looks like:

```
<resource-ref>  
<res-ref-name>jdbc/myDS</res-ref-name>  
<res-type>javax.sql.DataSource</res-type>  
<res-auth>Container</res-auth>  
<res-sharing-scope>Shareable</res-sharing-scope>  
<branch-coupling>Loose/Tight</branch-coupling>  
</resource-ref>
```
- Actually the extension exists in META-INF/ibm-ejb-jar-ext.xmi

A proprietary extension has been added to the resource reference section of the EJB deployment descriptor.

The new property can actually be found in the ibm-ejb-jar-ext.xmi file like the other WebSphere extensions.

System requirements

- The database must be DB2 on distributed or z/OS®
- The JDBC driver must be using IBM JCC Driver version 3.51 and later, version 3.6 and later, or version 4.1 and later
- Connections must use JDBC type 4 connectivity to one of the following:
 - DB2 UDB version 8 and later
 - DB2 UDB version 8 for z/OS with PTF UK27815 and later
 - DB2 UDB version 9 for z/OS with PTF UK27816 and later

This slide shows the database and driver versions currently supported.

The database must be DB2 on distributed or z/OS and the versions of supported JDBC drivers and supported DB2 versions are listed here.

An up-to-date list of the exact drivers and versions is available from the information center.

Troubleshooting

- Check the EJB deployment descriptor to ensure all relevant resources have the Branch Coupling property set.
- Get trace with this specification:
WAS.j2c=all:Transaction=all:RRA=all:WAS.database=all

In order to diagnose problems, check the EJB deployment descriptors to confirm the feature is correctly enabled and trace with this specification to confirm correct processing.

Internal operation

- Connection manager includes branch coupling information when it enlists resources in transactions.
- If branch coupling is required, transaction manager includes a special flag on the XA start call to the resource manager.
- `com.ibm.db2.jcc.DB2XAResource.TMLCS`

The connection manager derives information concerning branch coupling from the deployment descriptor.

This information is passed to the transaction manager when resources are enlisted in transactions.

If branch coupling is required, the transaction manager passes the `com.ibm.db2.jcc.DB2XAResource.TMLCS` flag on the XA start call to the resource manager.

Summary

- Provides lock sharing across physical connections to DB2.
- Lock sharing is no longer affected by whether enterprise beans are co-located or not.

In summary, this feature allows WebSphere Application Server to provide true location transparency for data access across multiple physical database connections to DB2.

DB2 lock sharing is no longer constrained to connections shared between co-located enterprise beans.

References

- Information center:

http://www14.software.ibm.com/webapp/wsbroker/redirect?version=matt&product=was-nd-dist&topic=cjta_lockshare

This slide contains a link to the information center documentation.



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