

Connectivity Cheat Sheet for DB2 Universal Database for z/OS (Part 2)

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The Connection Database

The CDB Tables for a TCP/IP connection

| SYSIBM.LOCATIONS | | | | |
|---|--|---|--|--|
| LOCATION char(8) Not Null Primary Key | LINKNAME char(8) Not Null Foreign Key | IBMREQD char(1) Not Null with default 'N' | PORT char(32) Not Null with default | TPN varchar(64) Not Null with default |
| Name of database you want to connect from DB2 UDB z/OS client. This is a primary key. An alias of a database you want to connect needs to be created at a given server if the name is already being used in this table. | Link to table SYSIBM.IPNAMES. | Use default values | Port Number of DB2 Server machine you are trying to connect. If left blank, the default is 446. It can also contain a service name as defined in the services file of this client machine. | Use default values |
| SAMPLE | MYUDBLNK | | 50000 | |
| SAMPLE2 | MYUDBL2 | | 50000 | |
| TORISC6 | MY400LNK | | 446 | |
| MEXICO | MY390LNK | | 447 | |
| SYSIBM.IPNAMES | | | | |
| LINKNAME char(8) Not Null Foreign Key | SECURITY_OUT char(1) Not Null with default 'A' | USERNAMES char(1) Not Null with default | IBMREQD char(1) Not Null with default 'N' | IPADDR varchar(254) Not Null with default |
| Link to table SYSIBM.LOCATIONS. | Security Options - A = Security already verified (Only user id is passed, thus corresponding USERNAMES column should be blank) - R = RACF Pass ticket - P = Password (User id and psw are passed; corresponding USERNAMES column must be set to 'O') | Outbound authorization ID - O = Outbound user id is translated per table SYSIBM.USERNAMES - Blank = No translation | Use default values | IP Address or hostname of the server you want to connect to. |
| MYUDBLNK | A | | | 9.26.93.234 |
| MYUDBL2 | P | O | | 9.23.190.25 |
| MY400LNK | P | O | | 9.89.168.6 |
| MY390LNK | P | O | | 158.228.20.3 |

| SYSIBM.LOCATIONS | | | SYSIBM.IPNAMES | | | | SYSIBM.USERNAMES | | | | | | |
|------------------|----------|---------------------------------|----------------|-------------|----------------------------------|---------------|---------------------------------|-------------|------------------|---------|---------------|------------------|---------------------------------|
| LOCATIO N | LINKNAME | I B M R E Q D | PORT | T P N | SE CU RI TY _O UT | USERN AMES | I B M R E Q D | IPADDR | T Y P E | AUTHID | NEWAU THID | PASS WOR D | I B M R E Q D |
| SAMPLE2 | MYUDBLN2 | | 50000 | | P | O | | 9.23.190.25 | O | TS56692 | db2admin | mypsw | |

Scenario 1

From DB2 UDB for z/OS client (machine 1) to DB2 UDB for Linux, UNIX and Windows server (machine 2)

DB2 UDB for z/OS client to DB2 UDB for Linux, UNIX, Windows Server

| Machine 1 ('tlba22me') DB2 UDB for z/OS client | Machine 2 ('aries') DB2 UDB for Linux, UNIX and Windows server |
|--|--|
| Commands to run on this machine: | Information you need to obtain from this machine, to perform the commands on machine 1: |
| Part I: Configuring the CDB (Communications Database) | |
| Option 1: insert into SYSIBM.LOCATIONS (location, linkname, port) values ('SAMPLE', 'MYUDBLNK', '50000') insert into SYSIBM.IPNAMES (linkname, security_out, ipaddr) values ('MYUDBLNK', 'A', '9.26.93.234') Note: MYUDBLNK is an arbitrary name used to link table SYSIBM.LOCATIONS with table SYSIBM.IPNAMES A value of 'A' for the security_out column implies that authentication has already been verified at this machine. | 1) SAMPLE is the database in this machine 2 that you want to connect from the z/OS client machine. If you don't remember the database name, you can issue from the CLP the command: list db directory and look for any entries with a Directory entry type of 'indirect'. These entries would correspond to local databases in your server machine. 2) For this example: 9.26.93.234 = IP address of machine 2. 50000 = The port used for DB2. To find out the port used, issue this command from the CLP: get dbm cfg Then, look for the parameter SVCENAME If the value of SVCENAME is not the port number but a string, then look in your system for the file 'services' and grep for this string, which is normally based on your DB2 instance name. For example, if your instance name is 'db2inst1', you will normally find a corresponding entry like this: db2cdb2inst1 50000/tcp The 'services' file can be found at: /etc/services (in UNIX) |
| Option 2: insert into SYSIBM.LOCATIONS (location, linkname, port) values ('SAMPLE', 'MYUDBLNK', '50000') insert into SYSIBM.IPNAMES (linkname, security_out, usernames, ipaddr) values ('MYUDBLNK', 'P', 'O', '9.26.93.234') insert into SYSIBM.USERNAMES | |

| | |
|--|--|
| <p>(type, authid, linkname, newauthid, password) values ('O', 'TS56692', 'MYUDBLNK', 'db2admin', mypsw')</p> <p>Note: MYUDBLNK is an arbitrary name used to link tables SYSIBM.LOCATIONS, SYSIBM.IPNAMES and SYSIBM.USERNAMES.</p> <p>A value of 'P' for the security_out column implies that authentication will be performed at the server machine 2.</p> <p>TS56692 is the TSO id on this mainframe machine 1 client.</p> | <p>X:\WINNT\System32\drivers\etc\services (in Windows)</p> <p>3) dbm cfg AUTHENTICATION should be set to CLIENT for option 1, when column 'security_out' is set to 'A'. It should be set to SERVER for option 2, when this column is set to 'P'.</p> <p>4) db2admin = user id as defined on machine 2 mypsw = password as defined on machine 2</p> |
| <p>To make sure the changes to the CDB take effect, restart DDF (-stop ddf -start ddf) This may not be necessary if you have entered a <i>new</i> entry in the CDB.</p> | |
| <p>Part II: Bind SPUFI</p> | |
| <pre> BIND PACKAGE (SAMPLE.DSNESPCS) MEMBER (DSNESM68) LIBRARY ('SHARE.DSN710.PROD.SDSNDBRM') ACTION(REPLACE) ISOLATION (CS) SQLERROR(NOPACKAGE) VALIDATE(BIND) BIND PACKAGE (SAMPLE.DSNESPRR) MEMBER (DSNESM68) LIBRARY ('SHARE.DSN710.PROD.SDSNDBRM') ACTION(REPLACE) ISOLATION (CS) SQLERROR(NOPACKAGE) VALIDATE(BIND) BIND PLAN (DSNESPCS) PKLIST (*.DSNESPCS.DSNESM68) ISOLATION(CS) ACTION(REPLACE) BIND PLAN (DSNESPRR) PKLIST (*.DSNESPRR.DSNESM68) ISOLATION(CS) ACTION(REPLACE) </pre> <p>Note: DSNESPCS is the package to bind for the SPUFI application with isolation Cursor Stability. DSNESPRR would be for isolation Repeatable Read.</p> | <p>SAMPLE is the database in this server machine 2 that you want to connect from the z/OS client machine.</p> <p>The user id performing the bind should have been granted the appropriate authorization/privileges.</p> |

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| <p>The library specified in the bind package command, contains DBRM member DSNESM68 (for the SPUFI application). This library location will vary depending on how DB2 was set up in your system.</p> <p>After the packages have been bound against the server machine 2, the PLAN has to be bound. Using * in the package list guarantees the plan is bound in all locations.</p> | |
| Part III: Testing the connection from SPUFI | |
| <p>Make sure to specify: - Connect Location field: SAMPLE Then issue: select * from db2admin.employee</p> <p>Note: There is no connect statement issued from SPUFI, but there is a specific field where you put the location you want to connect to. Note as well that the userid and psw are stored in the CDB.</p> | <p>When configuring the CDB using option 1 (when column 'security_out' is set to 'A'), you would be passing the TSO id to the DB2 UDB for Linux, Unix and Windows server. For this example the TSO id is TS56692. Thus in order to access a table for 'select', you would need to do this:</p> <p>GRANT select on db2admin.employee to user TS56692</p> |

Typical errors

| Error Message | Resolution |
|---|--|
| SQLCODE = -805, ERROR: DBRM OR PACKAGE NAME SAMPLE..DSNESM68.149EEA 901A79FE48 NOT FOUND IN PLAN DSNESPCS. REASON 02 | You need to bind the package <i>and</i> the plan for SPUFI as explained in table 1 |
| SQLCODE = -551, SQLSTATE = 42501, SYNTAX ERROR OR ACCESS RULE VIOLATION FROM OS/2 TOKENS TS56692 SELECT DB2ADMIN.EMPLOYEE | For option 1 of the CDB setup, you are passing only the user id (TSO id), which for this example is TS56692. You need to grant authorization to this user to query the db2admin.employee table. From the CLP issue: grant select on db2admin.employee to user ts56692 |

Besides the typical errors shown above, other things to check are mentioned in the table below.

What to check if you cannot connect:

| Client Machine 'tlba22me' | Database Server 'aries' |
|--|---|
| ping aries.xyz.com (Assuming the hostname was used instead of the ip address itself in the SYSIBM.IPNAMES table. This command can be performed from the TSO Command Processor | <ul style="list-style-type: none"> aries.xyz.com = Host name of Database Server If cannot ping, there may be problems with the DNS. Try pinging the IP address |
| ping 9.26.93.234 This command can be performed from the TSO Command Processor | <ul style="list-style-type: none"> 9.26.93.234 = IP address of Database Server This will confirm if there are problems or not with the network. |

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| . | <ul style="list-style-type: none"> • Is DB2 started? If not run db2start • Is DB2COMM set to TCPIP? Check by executing: <code>db2set -all</code>. If this registry variable is not set, you should execute: <code>db2set db2comm=tcpip</code> and then issue a db2stop/db2start to make sure the change takes effect. • Is SVCENAME set to the port number or service name specified in the 'services' file of this server machine? Check this parameter from the CLP by issuing: <code>get dbm cfg</code> |
| If you used a service name instead of the port number in your table SYSIBM.LOCATIONS, make sure the entry is correct in the 'services' file at the <i>client</i> machine. | |
| <code>netstat</code> Shows all connections and port numbers and their status. This command can be performed from the TSO Command Processor. | <code>netstat -a -n</code> Shows all connections and port numbers and their status. Issue this from your command prompt. |

Notes:

1. DB2COMM and SVCENAME are set up automatically during the installation of DB2 UDB for Linux, UNIX and Windows for the default instance. Any other new instance created after installation with the db2icrt command, will not have these parameters set up.
2. DB2 will check the 'services' file in the machine where the DB2 command is issued.

Scenario 2

From DB2 UDB for z/OS client (machine 1) to DB2 UDB for iSeries server (machine 2). For this scenario, we only tested with one configuration for the CDB, however you are encouraged to try other setups.

DB2 UDB for iSeries client to DB2 UDB z/OS Server

| Machine 1 ('tlba22me') DB2 UDB for z/OS | Machine 2 ('big400') DB2 UDB for iSeries |
|---|---|
| Commands to run on this machine: | Information you need to obtain from this machine, to perform the commands on machine 1: |
| Part I: Configuring the CDB (Communications Database) | |

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| <p>insert into SYSIBM.LOCATIONS (location, linkname,port) values (' TORISC6','MY400LNK', '446')</p> <p>insert into SYSIBM.IPNAMES (linkname, security_out, usernames, ipaddr) values ('MY400LNK', 'P', 'O', ' 9.89.168.6')</p> <p>insert into SYSIBM.USERNAMES (type, authid, linkname,newauthid, password) values ('O', 'TS56692','MY400LNK', 'john01','psw400')</p> <p>Note: MY400LNK is an arbitrary name used to link tables SYSIBM.LOCATIONS, SYSIBM.IPNAMES and SYSIBM.USERNAMES.</p> <p>A value of 'P' for the security_out column implies that authentication will be performed at the server machine 2.</p> <p>TS56692 is the TSO id on this mainframe machine 1 client.</p> | <p>1) TORISC6 is the local RDB Name. In order to determine the local RDB name contact your iSeries administrator who can issue the command: WRKRDBDIRE When the 'Work with Relational Database Directory Entries' panel appears, he can find the desired value in column 'Relational Database' that maps to the column 'Remote Location' with a value of '*LOCAL'.</p> <p>2) For this example: 9.89.168.6 = IP address of machine 2. 446 = The port used for DB2.</p> <p>Port 446 is the default value for the drda service,it is very unlikely this port is changed.</p> <p>3) john01 = user id as defined on machine 2 psw400 = password as defined on machine 2</p> |
| <p>To make sure the changes to the CDB take effect, restart DDF (-stop ddf -start ddf) This may not be necessary if you have entered a <i>new</i> entry in the CDB.</p> | |
| <p>Part II: Bind SPUFI</p> | |
| <p>BIND PACKAGE (TORISC6.DSNESPCS) MEMBER(DSNESM68) LIBRARY ('SHARE.DSN710.PROD.SDSNDBRM') ACTION(REPLACE) ISOLATION (CS) SQLERROR(NOPACKAGE) VALIDATE(BIND)</p> <p>BIND PACKAGE (TORISC6.DSNESPRR) MEMBER(DSNESM68) LIBRARY ('SHARE.DSN710.PROD.SDSNDBRM') ACTION(REPLACE) ISOLATION (CS) SQLERROR(NOPACKAGE) VALIDATE(BIND)</p> <p>BIND PLAN (DSNESPCS) PKLIST (* .DSNESPCS.DSNESM68) ISOLATION(CS) ACTION(REPLACE)</p> | <p>TORISC6 = The local RDB Name.</p> <p>In order to bind the packages, you first need to create the collections: CREATE COLLECTION DSNESEPCS CREATE COLLECTION DSNESPRR</p> <p>And grant iSeries user john01 the appropriate authorization/privileges against the collection.</p> |

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| <pre> BIND PLAN (DSNESPRR) PKLIST (* .DSNESPRR.DSNESM68) ISOLATION(CS) ACTION(REPLACE) </pre> <p>Note:</p> <p>DSNESPCS is the package to bind for the SPUFI application with isolation Cursor Stability. DSNESPRR would be for isolation Repeatable Read.</p> <p>The library specified in the bind package command, contains DBRM member DSNESM68 (for the SPUFI application). This library location will vary depending on how DB2 was set up in your system.</p> <p>After the packages have been bound against the server machine 2, the PLAN has to be bound. Using * in the package list guarantees the plan is bound in all locations.</p> | |
|---|--|

Part III: Testing the connection from SPUFI

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|---|--|
| <p>Make sure to specify:</p> <ul style="list-style-type: none"> - Connect Location field: TORISC6 <p>Then issue:</p> <pre>SELECT * FROM QIWS.QCUSTCDT</pre> <p>Note:</p> <p>There is no connect statement issued from SPUFI, but there is a specific field where you put the location you want to connect to. Note as well that the userid and psw are stored in the CDB.</p> <p>Issue this query for testing purposes. The sample table QIWS.QCUSTCDT is normally available after installation of iSeries unless it was removed or not set up by your iSeries administrator.</p> | <p>GRANT select on QIWS.QCUSTCDT to user john01</p> <p>Also most tables in iSeries are automatically journalled, but QCUSTCDT sample table is not, so make sure to journal it.</p> |
|---|--|

Typical errors

| Error Message | Resolution |
|---|--|
| <pre> SQLCODE = -204, SQLSTATE = 42704, SQLERRMT = QSYS.DSNESPRR: COLLECTION </pre> | <p>If you get this error when binding the package, you first need to create the collection in iSeries. From STRSQL issue:</p> <pre>CREATE COLLECTION DSNESPRR</pre> <p>and</p> <pre>CREATE COLLECTION DSNESPCS (for the other package)</pre> |
| <pre> SQLCODE = -7008, SQLSTATE = 55019, OBJECT NOT IN PREREQUISITE STATE FROM </pre> | <p>Table QCUSTCDT needs to be journalled.</p> |

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|--------------------------------|--|
| OS/400 TOKENS QCUSTCDT QIWS | |
|--------------------------------|--|

What to check if you cannot connect:

| Client Machine 'tlba22me' | Database Server 'big400' |
|---|---|
| ping big400.ca.ibm.com | <ul style="list-style-type: none"> big400.ca.ibm.com = Host name of Database Server If cannot ping, there may be problems with the DNS. Try pinging the IP address |
| ping 9.89.168.6 | <ul style="list-style-type: none"> 9.89.168.6 = IP address of Database Server This will confirm if there are problems or not with the network. |
| | Since the Database server is DB2 UDB for iSeries, check: Is DDM started? If not, execute: STRTTCPSPVR SERVER(*DDM) |
| If you used a service name instead of the port number in your table SYSIBM.LOCATIONS, make sure the entry is correct in the 'services' file at the <i>client</i> machine. | |
| netstat Shows all connections and port numbers and their status. This command can be performed from the TSO Command Processor. | netstat Shows all connections and port numbers and their status. This command can be performed from the OS/400® Main menu, options 6 -> 5 -> 10 -> 7 -> 3 |

Scenario 3

From DB2 UDB for z/OS client (machine 1) to DB2 UDB for z/OS server (machine 2). For this scenario, we only tested with one configuration for the CDB, however you are encouraged to try other setups.

DB2 UDB for z/OS client to DB2 UDB for z/OS Server

| Machine 1 ('tlba22me') DB2 UDB for z/OS | Machine 2 ('tlba23me') DB2 UDB for z/OS |
|--|---|
| Commands to run on this machine: | Information you need to obtain from this machine, to perform the commands on machine 1: |
| Part I: Configuring the CDB (Communications Database) | |

| | |
|--|---|
| <p>insert into SYSIBM.LOCATIONS (location, linkname, port) values ('MEXICO', 'MY390LNK', '447')</p> <p>insert into SYSIBM.IPNAMES (linkname, security_out, usernames, ipaddr) values ('MY390LNK', 'P', 'O ', '158.228.20.3')</p> <p>insert into SYSIBM.USERNAMES (type, authid, linkname, newauthid, password) values ('O', 'TS56692', 'MY390LNK', 'tso1234', 'tsopsw')</p> <p>Note: MY390LNK is an arbitrary name used to link tables SYSIBM.LOCATIONS, SYSIBM.IPNAMES and SYSIBM.USERNAMES.</p> <p>A value of 'P' for the security_out column implies that authentication will be performed at the server machine 2.</p> <p>TS56692 is the TSO id on this mainframe machine 1 client.</p> | <p>1) MEXICO is the location name for the DB2 UDB for z/OS subsystem in this machine 2 that you want to connect from the other DB2 UDB for z/OS client.</p> <p>2) For this example: 158.228.20.3 = IP address of machine 2. 447 = The port used for DB2.</p> <p>To find out the port used, contact your DB2 for OS/390 and z/OS DBA who can check the MVS syslog for message -DSNL004I. "TCPPORT" in that message contains the port to use. Also, the - DISPLAY DDF command provides this info.</p> <p>3) tso1234 = user id as defined on machine 2 tsopsw = password as defined on machine 2</p> |
| <p>To make sure the changes to the CDB take effect, restart DDF (-stop ddf -start ddf) This may not be necessary if you have entered a <i>new</i> entry in the CDB.</p> | |
| <p>Part II: Bind SPUFI</p> | |
| <pre> BIND PACKAGE (MEXICO.DSNESPCS) MEMBER(DSNESM68) LIBRARY ('SHARE.DSN710.PROD.SDSNDBRM') ACTION(REPLACE) ISOLATION (CS) SQLERROR(NOPACKAGE) VALIDATE(BIND) BIND PACKAGE (MEXICO.DSNESPRR) MEMBER(DSNESM68) LIBRARY ('SHARE.DSN710.PROD.SDSNDBRM') ACTION(REPLACE) ISOLATION (CS) SQLERROR(NOPACKAGE) VALIDATE(BIND) BIND PLAN (DSNESPCS) PKLIST (* .DSNESPCS.DSNESM68) ISOLATION(CS) ACTION(REPLACE) </pre> | <p>MEXICO is the location name for the- DB2 UDB for z/OS subsystem in this machine 2 that you want to connect from the other DB2 UDB for z/OS client.</p> <p>The user should have the appropriate authorization to bind.</p> <p>This may also be required to run the packages:</p> <p>GRANT all on package DSNESPCS.DSNESM68 to <user id></p> <p>GRANT all on package DSNESPRR.DSNESM68 to <user id></p> |

| | |
|--|---|
| <pre> BIND PLAN (DSNESP RR) PKLIST (* .DSNESP RR.DSNESM68) ISOLATION(CS) ACTION(REPLACE) </pre> <p>Note:</p> <p>DSNESP CS is the package to bind for the SPUFI application with isolation Cursor Stability. DSNESP RR would be for isolation Repeatable Read.</p> <p>The library specified in the bind package command, contains DBRM member DSNESM68 (for the SPUFI application). This library location will vary depending on how DB2 was set up in your system.</p> <p>After the packages have been bound against the server machine 2, the PLAN has to be bound. Using * in the package list guarantees the plan is bound in all locations.</p> | |
| Part III: Testing the connection from SPUFI | |
| <p>Make sure to specify:</p> <ul style="list-style-type: none"> - Connect Location field: MEXICO <p>Then issue:</p> <pre>select * from dsn8810.emp</pre> <p>Note:</p> <p>There is no connect statement issued from SPUFI, but there is a specific field where you put the location you want to connect to. Note as well that the userid and psw are stored in the CDB.</p> <p>Issue this query for testing purposes. The sample table dsn8810.emp is normally available after installation of DB2 for OS/390 and z/OS unless it was removed or not set up by your mainframe DBA. The example uses version 8 'emp' table. If connecting to a DB2 UDB for OS/390 and z/OS version 7 subsystem, use table dsn8710.emp instead.</p> | <p>Make sure the user executing the query has the appropriate authorization/privilege. Eg:</p> <pre>GRANT select on dsn8810.emp to user tso1234</pre> |

What to check if you cannot connect:

| Client Machine 'tlba22me' | Server Machine 'tlba23me' |
|---|---|
| <p>ping tlba23me.torolab.ibm.com (Assuming the hostname was used instead of the ip address itself in the SYSIBM.IPNAMES table. This</p> | <ul style="list-style-type: none"> tlba23me.torolab.ibm.com = Host name of Database Server <p>If cannot ping, there may be problems with the DNS. Try pinging the IP address</p> |

| | |
|---|---|
| command can be performed from the TSO Command Processor | |
| ping 158.228.20.3 This command can be performed from the TSO Command Processor | <ul style="list-style-type: none"> • 158.228.20.3 = IP address of Database Server This will confirm if there are problems or not with the network. |
| . | <ul style="list-style-type: none"> • Is DB2 started? If not, execute -start db2 • Is DDF started? If not, execute -start ddf |
| If you used a service name instead of the port number in your table SYSIBM.LOCATIONS, make sure the entry is correct in the 'services' file at the <i>client</i> machine. | |
| netstat Shows all connections and port numbers and their status. This command can be performed from the TSO Command Processor. | netstat Shows all connections and port numbers and their status. This command can be performed from the TSO Command Processor. |

Note:

DB2 for OS/390 and z/OS supports two protocols:

DRDA: This is the recommended protocol, and the one for which the instructions of this article apply. The application uses a CONNECT statement, a three-part name, or an alias (if bound with DBPROTOCOL (DRDA) to access the server.

DB2 private protocol: This protocol is being phased out and can only be used among DB2 UDB for OS/390 and z/OS client and servers. The application must connect using an alias or three-part name to direct the SQL statement to a given location.

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