

ALL ROADS LEAD TO DB2 DATA VIA THE SAS SYSTEM

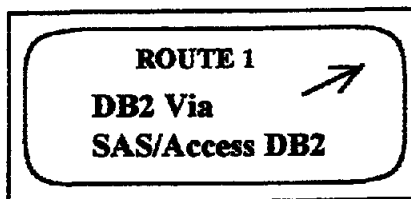
Harmon Jolley, Provident Life and Accident Insurance Co., Chattanooga, TN

Introduction

The SAS® System in many cases offers the user options to accomplish a task, depending on the application and desired result. Rarely does the user see this sign:



If data are stored in DB2® format, the user has various methods to access the data including SAS/ACCESS® DB2 views, PROC SQL Pass-Through, and SAS/ASSIST® SQL Query Window. While these "roads" all lead to DB2 data, the travel preparation differs for each, and each has some side benefits as well as cautions.



Road Maps:

SAS/ACCESS Interface to DB2, Usage and Reference: Version 6, First Edition

SAS Guide to the SQL Procedure: Usage and Reference, Version 6, First Edition

Directions:

In this method of accessing DB2 data, one must build SAS/ACCESS DB2 access and view descriptors prior to executing a SAS program. These are created through the SAS/ACCESS DB2 interface by selecting Globals|Access from a SAS window.

The access descriptor is defined first, and describes the DB2 table or view name to SAS. The SAS/ACCESS DB2 module will then verify that the user is authorized via DB2 security to query the data, and will proceed to

retrieve the column definitions from the DB2 catalog. In most cases, the user will want to save the access descriptor in a permanent SAS library.

Before a DB2 table or view can be queried through SAS/ACCESS DB2, a SAS/Access view descriptor must be established. This is done through the same SAS/ACCESS DB2 window. The DB2 table or view may be defined in a SAS/ACCESS DB2 view descriptor to include every column, or columns may be selected. In addition to this form of subsetting, the Subset window under the View Descriptor Display Window allows the user to specify SQL to select only the rows meeting specified criteria.

Travel Tips:

- Note that the first eight characters of DB2 column names become SAS variable names in the view descriptor. Because of the possibility of duplicate names, the user will need to adjust the SAS variable names manually.
- I recommend that a single copy of an access descriptor for all columns in the DB2 table/view be maintained by the systems team responsible for the DB2 data. The access descriptor should be available in a shared SAS library.
- Be aware that the native SQL which is sent to the DB2 DBMS is influenced by the number of columns in the view descriptor, as well as the presence of statements in a SAS query which select, group, or sort the data.

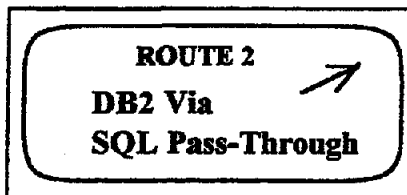
Sights to See:

After a DB2 table or view has been defined under SAS/ACCESS DB2, the data becomes available to use in SAS programs or in interfaces such as SAS/Assist. One SAS procedure which you will find especially familiar if you're already using SQL to query your DB2 data is PROC SQL. Here's a sample program:

PROC SQL With SAS/Access Example:

```
PROC SQL;
SELECT A.OFFICE, ZIPSTATE(ZIP) AS STATE,
      SUM(SALES) AS SALESTOT
FROM FIELD.OFFICE A LEFT JOIN
      SALES.MONTH B
ON A.OFFICE = B.OFFICE
GROUP BY A.OFFICE;
QUIT;
```

Note in the above example, there are standard SQL statements such as SELECT, FROM, and GROUP BY. In addition, the SAS SQL Procedure allows SAS functions such as ZIPSTATE (returns a state name based on a given ZIP Code), along with the ability to give a derived column a name (SALESTOT). It also allows the user to perform an "outer join" (LEFT JOIN in this example) to cause the query to display observations from the "left" table, FIELD.OFFICE, which had no matches in the "right" table, SALES.MONTH.

**Road Maps:**

SAS Technical Report P-221: SAS/ACCESS Software: Changes and Enhancements, Release 6.07

SAS Guide to the SQL Procedure: Usage and Reference, Version 6, First Edition

Directions:

In the SQL Pass-Through form of DB2 access, which became available in version 6.07, no SAS/ACCESS DB2 descriptors are required. However, the SAS/ACCESS DB2 product must be installed.

As the name implies, SQL Pass-Through allows the user to submit native SQL statements through SAS to be processed directly by the DB2 DBMS. The following is a sample program:

PROC SQL Pass-Through Example:

```
PROC SQL;
CONNECT TO DB2(SSID=DB2A);
SELECT * FROM CONNECTION TO DB2
(SELECT A.OFFICE_CODE, ZIP, SUM(SALES)
FROM FIELD.OFFICE A, SALES.MONTH B
WHERE A.OFFICE = B.OFFICE
GROUP BY A.OFFICE);
%PUT &SQLXRC &SQLXMSG;
DISCONNECT FROM DB2;
QUIT;
```

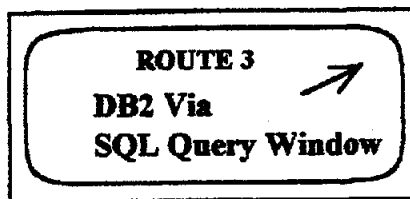
In this example, a connection is made to DB2 subsystem name DB2A (this name will vary by site). Native SQL, with full DB2 column names, is enclosed in the parentheses. The SQL return code and message are returned in SAS macro variables, SQLXRC and SQLXMSG, and are displayed in the LOG window. Note that while this example produces a report, a subset of the DB2 data could be created in a SAS dataset by adding a CREATE TABLE SAS library.dataset AS immediately preceding SELECT *.

Travel Tips:

- Be aware that with SQL Pass-Through, you lose the ability to enter SAS SQL statements within the parentheses. You are limited to functions that native SQL provides.
- You should have handy a DB2 manual which lists error codes and messages.
- Note that DB2 column names are returned to SAS as variable names which match the first eight characters of the DB2 column name. If there are duplicates, SAS will execute an algorithm to make the names unique. A derived column, such as SUM(SALES) will be returned as EXPRESSN; additional derived columns are named in a sequence starting with EXPRESS0.

Sights to See:

Those familiar with using native SQL will like the ability to submit familiar queries within SAS. Also, this method does not require SAS/ACCESS DB2 access and view descriptors to be defined and stored.



Road Maps:

SAS Technical Report P-254: Using SQL Query Window Release 6.08

Directions:

The SQL Query Window is available under SAS/ASSIST release 6.08 TS408. It may be invoked within SAS/ASSIST by clicking on the QUERY icon, or by entering the command QUERY in the Program Editor window.

Sights to See:

The Query window is designed to be an interface which does not require the user to know SQL in order to query DB2 data, as well as data in other formats. The interface is generally point-and-click, with SQL being generated in the process.

References

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