

V6, V7, V8 Access Path Choice Comparisons

Version 2.2

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Reader comments on this document are welcomed and encouraged. Comments may be sent to:

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Executive Summary Access Path Changes during Migration to DB2 V8

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Objective: This paper outlines a methodology of avoiding the problems and unexpected costs that usually arise as a result of migration to DB2 V8 on a Z/OS platform. The methodology outlined below detects risks **before** the go-live phase. It will avoid degraded transaction performance, outages, required “quick and dirty” fixes – all of which produce disgruntled customers. Avoiding the above mentioned problems results of course in improved customer satisfaction and significant cost savings to the organization.

Background Traditionally IBM goal has been to support two versions of DB2 during any time period. Although there have been times when there were more releases supported concurrently, e.g., V4, V5, V6 and V7 were supported from March 2001 through December 2001. These periods stress the support that can be provided. Examples of the types of problems that can result are the early V6 quality issues. IBM’s response of retrofitting function to V5 instead of moving customers forward to V6 spent valuable resources on V5 that belonged to V6.

When a new version is released there is a short period when three are supported. After the new version is out, usually for less than a year, IBM announces that it is dropping support for the oldest version. Because DB2 is increasingly exploiting new hardware technologies, this dropping of support has created pressure to obtain new hardware along with the DB2 migration.

The traditional strategy of staying on the oldest supported version of DB2 has come under stress, creating serious management issues. The cycle time between versions of DB2 has shortened to an average of less than three years. Migration between releases takes time and planning. This produces stress because the manpower to do a migration is not normally part of business planning. The work has traditionally been absorbed by current staff across a three- to four-year period. Management problems result from staff reductions that limit the amount of effort that can be applied to migration, and from the shortened time period between migrations. The lack of time and staff creates exposures for current business applications because IT staff lack the time and resources to analyze and resolve performance problems introduced by the migration.

Discussion: Each new version of DB2 incorporates not just new functionality but improved analysis of data paths (and thus improved performance). Consequently, IBM suggests complete rebinds as part of the version migration. It is this rebinding that analyzes the pathing used to find data within DB2. One does not need to use new functions to realize performance improvements. One *does* need to rebind.

For many installations the number of such binds is in the thousands. Numbers in excess of fifty thousand are not unknown, and these volumes present both physical and personnel resource issues. Some installations opt for a phased migration. Others choose to limit what is rebound and hope to gain performance improvements through the other features of the version change.

The latter choice presents other long term issues. When a code change is made a rebound is required. Eventually, almost everything will have a code change and so be rebound. This process may, however, take a long time. A program can go from Version to Version of DB2 without being rebound. When it is rebound there can be unpleasant surprises. When more time and personnel resources were available these changes could be found and problems averted. If the change occurs deep inside the normal change management process the different access path choice may reveal itself only after the fact by poor performance. This can have business impacts.

As an example, assume an application that collects data across the year and is reset or cleared out to very little data at the beginning of the year. If DB2 analyzes the data access at the beginning of the year, it will reach a different conclusion, and likely choose a different access path, than if the analysis is done near the end of the year when there is much more data.

What we have discovered is that there are two pieces of information that can be compared between access path analyses that tend to identify performance-impacting changes. The first is the physical access path that DB2 chooses. There is no absolutely correct or incorrect choice, but identifying a change allows for further human analysis that will find a problem if one exists. The second is the cost of the physical access. If there is no change in the type of access, but there is change in the cost, this too needs to be investigated.

By limiting the human analysis to only those items that have changed, instead of having to both find the change and then identify what has changed, we can use our resources to prevent unexpected performance problems. In this way the number of changes that have to be examined and analyzed can be reduced from tens of thousands down to tens. If the process is integrated into the change control procedures, then the surprises can be avoided when implementing new code or code changes.

Conclusion: We have identified a programmatic solution to find unexpected changes in DB2 application performance resulting from migration from one version of DB2 to another. The same solution, when applied to the change control process, will catch application performance issues before they can impact production.

The attached detailed document provides a series of examples of access path changes between V6, V7 and V8 of DB2. It documents both the methodology used and the results to be expected.

Sugar Land, Texas

April 12, 2005

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Introduction

Since the mid eighties users of IBM's DB2 product have had to contend with upgrades to the base product. We will deal with the main issues in the background section of this document. For now it is simpler to state that to achieve new function and improved performance a DB2 installation has had to assume the risks associated with performing an upgrade.

Most of the risks have been *known* in the sense that the DB2 installation has been aware of their existence. Unfortunately, the installation never knew the extent of the risks. Finding specific exposures was difficult because the test bed for the upgrade almost never matched production in terms of volume of data. Thus it could not accurately reflect the specific stress that production placed on the system.

This lack of certainty has itself produced some interesting behaviors. For example some applications are known to be troublesome. In these cases staff often chose not to risk allowing the new version of DB2 to optimize the performance of the application. The philosophy of "If it isn't broken then do not fix it!" presents both opportunity and risks. The opportunity is that the application can benefit from systems level performance improvements, e.g., I/O performance, without risking reoptimization. The risk is that when a change to application code occurs it will have to be optimized again and new unanticipated access paths may occur. This approach has, of course, the "benefit" of shifting the risk from the people doing the migration to the people changing the application

What we are attempting here is a little different from what we have seen before in comparisons between releases of DB2. In proposing a methodology to compare Optimizer choices between different Versions of DB2, we are showing a direct comparison of the same SQL with the same change in V6, V7 and V8. The same data is being used with the same setup in each version of DB2. The work is being run on the same mainframe. The only variable should be what is unique to each version of DB2 and how it views both the SQL and the data.

Because different mainframes will have different effects on the DB2 Optimizer, we are making the data, the SQL and the COBOL programs available for download from our website.

This is an attempt to use more of the scientific method to assist in making these version to version comparisons. We expect both criticism and suggestions. Where we can we will respond to both.

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April 18, 2005

Background

General Issues

We have DB2 V5, V6, V7 and V8 available to us for comparisons. Because DB2 V5 is no longer commercially available, we have decided to exclude it from the comparisons. Later when some of the items in the comparisons have settled down we may go back and include DB2 V5 to show the range and growth in DB2 functionality and optimization.

This leaves us with comparing choices made in V6, V7 and V8. V6 will shortly be unsupported and not formally an issue. With the present push to get to V8 we have worked with sites that had to move from V5 to V6 to V7 to get to V8. We have heard of sites still running V4, but have no direct evidence of that.

To limit the difference between the versions of DB2 we extracted data from the V7 system catalog for columns and for tables. Everyone who is likely to be a user of this document should be familiar with this data. We chose the data from a V7 subsystem because it was the most plentiful. Since the accesses are to the data as data and not part of the system catalog that is part of the optimization, the data and the information about the data will be the same to each version of the Optimizer.

How the Optimizer works

DB2 uses what is termed a cost based optimization. This means that data stored in the system catalog describes the amount and sometimes the type of data stored in DB2 tables and indexes. This information is used by the DB2 Optimizer to determine which access path should be used to retrieve or update the data. DB2 makes a list of the possible access paths that can be used to obtain the data. Each of these methods is then scored as to its CPU cost and its I/O Cost. From this list the *best* access path is selected. If there is a tie from the cost analysis then the access path is selected from a list of Preferred Access Paths (see appendix of Access Path Preferences.)

What is reported in DB2 EXPLAIN

The final choice of the DB2 Optimizer will be reported if the data is requested. The Optimizer will write some of the supporting data to DB2 tables if the tables are present and an EXPLAIN (YES) option is given to the optimizer. There are three basic tables used for EXPLAIN:

- PLAN_TABLE -- this has the access path information which, includes the access path selected the tables used and their method of access. The same information is repeated for the indexes used, if any.
- DSN_STATEMENT_TABLE -- this has the estimated costs for the CPU and I/O factors used to determine the final cost.
- DSN_FUNCTION_TABLE -- this has the function information for V6 and V7. In V8 only the User Defined Functions (UDF) are reported. (See the DSNZPARM Notes in the appendix.)

The above is the formal information that is made available. Remember this information is only for the Access Path selected and not for those that were not chosen.

What is not reported DB2 EXPLAIN

We are not told the Access paths considered but not selected. For example: If an index is present but not used then why it is not used? If tables are joined why is one particular table selected for the outer? These are simple examples. We general believe that we can guess at the answers. Some of the Case Examples below are designed to test those beliefs.

What we do not definitively know is why a given Access Path was selected or which other Access Paths were considered and why they were not selected.

With V8 some additional information is available through further analysis. If an Access Path is chosen, but not chosen again, and yet chosen on a third try, check the CPU utilization for the periods when the optimization was attempted. Effective with V8, two existing variables are now externalized: these are MAX_OPT_CPU and MAX_OPT_ELAP (see appendix "DSNZPARM Notes.") They are marked as serviceability entries in the DSNZPARM. When either of these values is exceeded, additions to the access path list cease and a selection is made from what is currently available in the list.

This means that Static SQL should be bound during period of low CPU usage and that Dynamic SQL may not always find the best access path.

Creating an Access Path List

DB2's Optimizer uses an algorithm to create a list from which the Access Path will be selected. The Access Paths that are most likely to work are processed first. If neither the MAX-OPT_CPU nor the MAX_OPT_ELAP are exceeded, then the list contains all possible access paths. When the list is complete its costs are weighed and an access path chosen.

Some other factors that influence the choices are:

- The faster the CPU the more the Optimizer will skew this weight in the cost analysis. This is why a different access path can be chosen for Production than in QA or test. Production is normally on the largest and fastest CPU available to the installation.
- The setup of the buffer pools will influence the choice. Both QA and Test environments often have smaller and fewer buffer pools. The control values for the buffer pools, VPPSEQT, VXPPSEQT, etc, also have an influence.
- In an LPAR environment varying the number of CPs will affect the CPU weighting.
- The setting of certain DSNZPARM values will turn on/off or influence the weighting process. (See DSNZPARM Notes in the appendix.)

Methods

Basics

We extracted data from our V6, V7 and V8 catalogs for the SYSIBM.SYSCOLUMNS and SYSIBM.TABLES. After examination it was determined that the V7 data was sufficient for our test our purposes. This unloaded data was then used to create PUBLIC.SYSCOLUMNS and PUBLIC.SYSTABLES in each DB2 subsystem. Tables were place in buffer pool 1 and Indexes were placed in buffer pool 2.

The basic three EXPLAIN Tables were created in each DB2 Subsystem. The hidden tables were not created or used in any way. The additional EXPLAIN tables available for IBM's Visual Explain V8 were created and used.

Specifics

V8 Notes

V8 presents some additional information available from the Visual Explain product. These tables are classified as “opaque” as opposed to the hidden tables of previous versions of DB2. This means the DDL to create them is available, unlike the hidden tables. They are, however, not documented.

Please note that when creating any of the EXPLAIN tables for V8 they must be created as EBCDIC tables. If you create them in Unicode, EXPLAIN will still work, but the data will be difficult if not impossible to retrieve.

Tools

The following tools were used in this analysis:

Bind Manager from IBM was used to control binding, identify timestamp matches and mismatches and to browse individual DBRMs.

Path Checker from IBM was used to compare the results of the individual binds. The COMPARE command was used to compare “before “and “after” results in the EXPLAIN tables within and between DB2 subsystems. The TEST command was used in the same manner as the COMPARE, except that it does not require a bind of the DBRM to obtain its answers.

Visual Explain for V8 by IBM was used to obtain the graphics of the access paths. The version of this code was the latest available at the time of the testing. If you have not obtained a fresh copy within the last two months, we suggest that you do. This code is updated frequently by the IBM developers.

Express Hints from HLS Technologies was used as an ISPF interface to assist in setting DB2 Hints.

Case Examples

Case 1: WHERE clause change

Version 6 Comparison Data

```

PCK031I EXECUTING LICENSED PATH CHECKER V2R2
OPTIONS CATALOGSQL NOMATCHCREATOR
REPORTCOSTGT
CONNECT TO DB6G
COMPARE PACKAGE TESTCOLLX.TEST01 IN PUBLIC.PLAN_TABLE
TO PREVIOUS
2005/04/11 SQL ID - ACCESS PATH FOR TEST01 COLLID - TESTCOLLX OLD PLAN_TABLE -
IN QRYNO M CREATOR TNAME TBNO AC MC CREATOR ACCESSNAME IO SORTUJGO
LK PF QBNO PLNO MXSQ
PCK212I TIMESTAMP USED FOR PREVIOUS COMMAND = 2005041113364831 VERSION = 2005-04-11-
18.20.42.913225

1 327 0 PUBLIC SYSCOLUMNS 1 I 0 PUBLIC.DSNDCX01 N NNNNNNNN IS S 1
PCK220I DATA CHANGE FOR COLUMN MATCHCOLS WAS 0
PCK220I DATA CHANGE FOR COLUMN PREFETCH = WAS S
2 327 0 PUBLIC SYSCOLUMNS 1 I 2 PUBLIC.DSNDCX01 N NNNNNNNN IS 1
1
PCK221I DATA CHANGE FOR COLUMN MATCHCOLS IS NOW 2
PCK221I DATA CHANGE FOR COLUMN PREFETCH = IS NOW
PCK206I COMPARE COMPLETE FOR PROGRAM = TEST01 VERSION = 2005-04-11-18.34.53.754785
PREVIOUS VERSION = 2005-04-11-18.20.42.913225
PCK203I STATEMENTS WITH SAME ACCESS PATH 1
STATEMENTS WITH DIFFERENT ACCESS PATH 1
FOR PROGRAM TEST01
PCK204I QUERIES WITH MATCHING EXPLAIN 2
QUERIES WITHOUT MATCHING EXPLAIN 0
FOR PROGRAM TEST01
PCK217I TOTAL DBRMS COMPARED 1
PCK217I TOTAL STATEMENTS COMPARED 2
PCK217I TOTAL ACCESS PATH CHANGES 1
PCK217I TOTAL ACCESS PATH SAME 1
PCK217I TOTAL NEW SQL STATEMENTS 0
PCK217I TOTAL DELETED SQL STATEMENTS 0
PCK217I TOTAL DSN_STATEMNT COST INCR 0
COMPLETE RET CODE= 0 2005/04/11 SQL ID - ACCESS PATH FOR
TEST01 COLLID - TESTCOLLX = OLD PLAN_TABLE -

STATEMENT 327 THIS IS THE OLD ACCESS PATH.

STATEMENT# 327 DECLARE SELECT-1 CURSOR FOR SELECT NAME, TBNAME, COLNO, COLTYPE,
LENGTH FROM SYSCOLUMNS WHERE TBNAME = : H

STEP 1 ACCESSES TABLE PUBLIC.SYSCOLUMNS
USING INDEX PUBLIC.DSNDCX01 USING 0 COLUMN(S).
THE ACCESS WILL USE SEQUENTIAL PREFETCH
THE INTENT LOCK FOR THE TABLE IS IS
THE TIMESTAMP FOR THIS EXPLAIN IS 2005041113364824
THE TABLE HAS 6,361 ROWS OF 969 BYTES.
THE NON-UNIQUE INDEX HAS 6,361 ENTRIES IN 2 LEVELS WITH CLUSTER RATIO 81
DB2 ESTIMATES THIS QUERY WILL USE 22 MILLISECONDS OF CPU TIME
DB2 ESTIMATES THIS QUERY WILL USE 61 SERVICE UNITS

STATEMENT 327 THIS IS THE NEW ACCESS PATH.

STATEMENT# 327 DECLARE SELECT-1 CURSOR FOR SELECT NAME, TBNAME, COLNO,
COLTYPE , LENGTH FROM SYSCOLUMNS WHERE TBNAME = : H AND
TBCREATOR = : H

STEP 1 ACCESSES TABLE PUBLIC.SYSCOLUMNS
USING INDEX PUBLIC.DSNDCX01 USING 2 COLUMN(S).

```

THE INTENT LOCK FOR THE TABLE IS IS
 THE TIMESTAMP FOR THIS EXPLAIN IS 2005041113370473
 THE TABLE HAS 6,361 ROWS OF 969 BYTES.
 THE NON-UNIQUE INDEX HAS 6,361 ENTRIES IN 2 LEVELS WITH CLUSTER

RATIO 81

	DB2 ESTIMATES THIS QUERY WILL USE	1	MILLISECONDS OF CPU TIME
	DB2 ESTIMATES THIS QUERY WILL USE	1	SERVICE UNITS
PCK206I	COMPARE COMPLETE FOR PROGRAM = TEST01	VERSION =	2005-04-11-18.34.53.754785
		PREVIOUS VERSION =	2005-04-11-18.20.42.913225
PCK217I	TOTAL DBRMS COMPARED	1	
PCK217I	TOTAL STATEMENTS COMPARED	2	
PCK217I	TOTAL ACCESS PATH CHANGES	1	
PCK217I	TOTAL ACCESS PATH SAME	1	
PCK217I	TOTAL NEW SQL STATEMENTS	0	
PCK217I	TOTAL DELETED SQL STATEMENTS	0	

Version 7 Comparison Data

```

11          OPTIONS CATALOGSQL REPORTCOSTGT
11          CONNECT TO DB7G
11COMPARE  PACKAGE TESTCOLLX.TEST01 IN PUBLIC.PLAN_TABLE
          TO PREVIOUS
          2005/04/11  SQL ID - ACCESS PATH FOR TEST01 COLLID - TESTCOLLX          OLD
PLAN_TABLE -
          IN QRYNO M CREATOR  TNAME TBNO AC MC CREATOR  ACCESSNAME          IO SORTUJGO LK PF QBNO
PLNO MXSQ
          PCK212I TIMESTAMP USED FOR PREVIOUS COMMAND = 2005041112321419  VERSION = 2005-04-11-
18.20.42.913225

1 327 0 PUBLIC SYSCOLUMNS I PUBLIC DSNDXC01 N NNNNNNNN IS S 1 1
PCK220I DATA CHANGE FOR COLUMN MATCHCOLS WAS          0
PCK220I DATA CHANGE FOR COLUMN PREFETCH = WAS          S
2 327 0 PUBLIC SYSCOLUMNS 1 I 2 PUBLIC.DSNDXC01 N NNNNNNNN IS 1 1
PCK221I DATA CHANGE FOR COLUMN MATCHCOLS IS NOW 2
PCK221I DATA CHANGE FOR COLUMN PREFETCH = IS NOW
PCK206I COMPARE COMPLETE FOR PROGRAM = TEST01  VERSION = 2005-04-11-18.34.53.754785
PREVIOUS VERSION = 2005-04-11-18.20.42.913225
PCK203I STATEMENTS WITH SAME ACCESS PATH 1
STATEMENTS WITH DIFFERENT ACCESS PATH 1
FOR PROGRAM TEST01
PCK204I  QUERIES WITH MATCHING EXPLAIN 2
QUERIES WITHOUT MATCHING EXPLAIN 0 FOR PROGRAM TEST01
PCK217I TOTAL DBRMS COMPARED 1
PCK217I TOTAL STATEMENTS COMPARED 2
PCK217I TOTAL ACCESS PATH CHANGES 1
PCK217I TOTAL ACCESS PATH SAME 1
PCK217I TOTAL NEW SQL STATEMENTS 0
PCK217I TOTAL DELETED SQL STATEMENTS 0
PCK217I TOTAL DSN_STATEMNT COST INCR 0
COMPLETE RET CODE= 04
11          2005/04/11  SQL ID -          ACCESS PATH FOR TEST01          COLLID - TESTCOLLX
OLD PLAN_TABLE -

```

STATEMENT 327 THIS IS THE OLD ACCESS PATH.

STATEMENT# 327 DECLARE SELECT-1 CURSOR FOR SELECT NAME, TBNAME, COLNO, COLTYPE, LENGTH FROM SYSCOLUMNS WHERE TBNAME = : H

```

STEP      1  ACCESSES TABLE PUBLIC.SYSCOLUMNS
          USING INDEX PUBLIC.DSNDXC01 USING 0 COLUMN(S).
          THE ACCESS WILL USE SEQUENTIAL PREFETCH
          THE INTENT LOCK FOR THE TABLE IS IS
          THE TIMESTAMP FOR THIS EXPLAIN IS 2005041112321402
          THIS OPERATION REFERENCES A TABLE
          THE TABLE HAS 6,361 ROWS OF 969 BYTES.
          THE NON-UNIQUE INDEX HAS 6,361 ENTRIES IN 2 LEVELS WITH CLUSTER RATIO 81
DB2 ESTIMATES THIS QUERY WILL USE 22 MILLISECONDS OF CPU TIME
DB2 ESTIMATES THIS QUERY WILL USE 61 SERVICE UNITS

```

STATEMENT 327 THIS IS THE NEW ACCESS PATH.

STATEMENT# 327 DECLARE SELECT-1 CURSOR FOR SELECT NAME, TBNAME, COLNO, COLTYPE , LENGTH FROM SYSCOLUMNS WHERE TBNAME = : H AND TBCreator = : H

```

STEP      1  ACCESSES TABLE PUBLIC.SYSCOLUMNS
          USING INDEX PUBLIC.DSNDXC01
          USING 2 COLUMN(S).
          THE INTENT LOCK FOR THE TABLE IS IS
          THE TIMESTAMP FOR THIS EXPLAIN IS 2005041112393478
          THIS OPERATION REFERENCES A TABLE
          THE TABLE HAS 6,361 ROWS OF 969 BYTES.
          THE NON-UNIQUE INDEX HAS 6,361 ENTRIES IN 2 LEVELS WITH CLUSTER RATIO 81
DB2 ESTIMATES THIS QUERY WILL USE 1 MILLISECONDS OF CPU TIME
DB2 ESTIMATES THIS QUERY WILL USE 1 SERVICE UNITS
PCK206I COMPARE COMPLETE FOR PROGRAM = TEST01

```

```

VERSION =      2005-04-11-18.34.53.754785
PREVIOUS VERSION =      2005-04-11-18.20.42.913225
PCK217I TOTAL DBRMS COMPARED                1
PCK217I TOTAL STATEMENTS COMPARED          2
PCK217I TOTAL ACCESS PATH CHANGES         1
PCK217I TOTAL ACCESS PATH SAME            1
PCK217I TOTAL NEW SQL STATEMENTS          0
PCK217I TOTAL DELETED SQL STATEMENTS      0

```

```

*****
*****

```

```

PCK218I PROGRAM TEST01      HAS A CHANGED ACCESS PATH
QUERYNO                      327
COLLECTION                    TESTCOLLX
NEW VERSION                   2005-04-11-18.34.53.754785
OLD VERSION                   2005-04-11-18.20.42.913225

```

```

*****
*****

```

```

PCK217I TOTAL DBRMS COMPARED                1
PCK217I TOTAL STATEMENTS COMPARED          2
PCK217I TOTAL ACCESS PATH CHANGES         1
PCK217I TOTAL ACCESS PATH SAME            1
PCK217I TOTAL NEW SQL STATEMENTS          0
PCK217I TOTAL DELETED SQL STATEMENTS      0

```

Version 8 Comparison Data

```

11          OPTIONS CATALOGSQL REPORTCOSTGT
11          CONNECT TO DB8G
11          COMPARE PACKAGE TESTCOLLX.TEST01 IN PUBLIC.PLAN_TABLE
              TO PREVIOUS
11          2005/04/11 SQL ID -          ACCESS PATH FOR TEST01          COLLID - TESTCOLLX
OLD PLAN_TABLE -
  IN QRYNO M CREATOR TNAME          TBNO AC MC CREATOR ACCESSNAME          IO
SORTUJGO LK PF QBNO PLNO MXSQ
PCK212I TIMESTAMP USED FOR PREVIOUS COMMAND = 2005041114355531 VERSION = 2005-04-11-
18.20.42.913225

1  327 0 PUBLIC SYSCOLUMNS 1 I 0 PUBLIC.SNDCX01 N NNNNNNNN IS S 1 1
PCK220I DATA CHANGE FOR COLUMN MATCHCOLS WAS 0
PCK220I DATA CHANGE FOR COLUMN PREFETCH = WAS S
2  327 0 PUBLIC SYSCOLUMNS 1 I 2 PUBLIC.DSNDCX01 N NNNNNNNN IS 1 1
PCK221I DATA CHANGE FOR COLUMN MATCHCOLS IS NOW 2
PCK221I DATA CHANGE FOR COLUMN PREFETCH = IS NOW
PCK206I COMPARE COMPLETE FOR PROGRAM = TEST01 VERSION = 2005-04-11-18.34.53.754785
              PREVIOUS VERSION = 2005-04-11-18.20.42.913225
PCK203I STATEMENTS WITH SAME ACCESS PATH 1 STATEMENTS WITH DIFFERENT ACCESS
PATH 1 FOR PROGRAM TEST01
PCK204I QUERIES WITH MATCHING EXPLAIN 2 QUERIES WITHOUT MATCHING
EXPLAIN 0 FOR PROGRAM TEST01
PCK217I TOTAL DBRMS COMPARED 1
PCK217I TOTAL STATEMENTS COMPARED 2
PCK217I TOTAL ACCESS PATH CHANGES 1
PCK217I TOTAL ACCESS PATH SAME 1
PCK217I TOTAL NEW SQL STATEMENTS 0
PCK217I TOTAL DELETED SQL STATEMENTS 0
PCK217I TOTAL DSN_STATEMNT COST INCR 0
COMPLETE RET CODE= 04
11          2005/04/11 SQL ID -          ACCESS PATH FOR TEST01          COLLID - TESTCOLLX
OLD PLAN_TABLE -

STATEMENT 327 THIS IS THE OLD ACCESS PATH.

STATEMENT# 327 DECLARE SELECT-1 CURSOR FOR SELECT NAME , TBNAME , COLNO , C
          OLTYPE , LENGTH FROM SYSCOLUMNS WHERE TBNAME = : H

STEP 1 ACCESSES TABLE PUBLIC .SYSCOLUMNS
          USING INDEX PUBLIC .DSNDCX01 USING 0 COLUMN(S).
          THE ACCESS WILL USE SEQUENTIAL PREFETCH
          THE INTENT LOCK FOR THE TABLE IS IS
          THE TIMESTAMP FOR THIS EXPLAIN IS 2005041114355506
          THIS OPERATION REFERENCES A TABLE
          THE TABLE HAS 6,361 ROWS OF 969 BYTES.
          THE NON-UNIQUE INDEX HAS 6,361 ENTRIES IN 2 LEVELS WITH
CLUSTER RATIO 81
          DB2 ESTIMATES THIS QUERY WILL USE 6 MILLISECONDS OF CPU
TIME
          DB2 ESTIMATES THIS QUERY WILL USE 16 SERVICE UNITS

STATEMENT 327 THIS IS THE NEW ACCESS PATH.

STATEMENT# 327 DECLARE SELECT-1 CURSOR FOR SELECT NAME , TBNAME , COLNO ,
          C
          OLTYPE , LENGTH FROM SYSCOLUMNS WHERE TBNAME = : H AND TBCRE
          ATOR = : H

STEP 1 ACCESSES TABLE PUBLIC .SYSCOLUMNS
          USING INDEX PUBLIC .DSNDCX01 USING 2 COLUMN(S).
          THE INTENT LOCK FOR THE TABLE IS IS
          THE TIMESTAMP FOR THIS EXPLAIN IS 2005041114361162
          THIS OPERATION REFERENCES A TABLE
          THE TABLE HAS 6,361 ROWS OF 969 BYTES.
          THE NON-UNIQUE INDEX HAS 6,361 ENTRIES IN 2 LEVELS WITH
CLUSTER RATIO 81

```

```

                DB2 ESTIMATES THIS QUERY WILL USE                1 MILLISECONDS OF CPU
TIME
                DB2 ESTIMATES THIS QUERY WILL USE                1 SERVICE UNITS
PCK206I COMPARE COMPLETE FOR PROGRAM = TEST01  VERSION =      2005-04-11-18.34.53.754785
                PREVIOUS VERSION =      2005-04-11-18.20.42.913225
PCK217I TOTAL DBRMS COMPARED                                1
PCK217I TOTAL STATEMENTS COMPARED                          2
PCK217I TOTAL ACCESS PATH CHANGES                          1
PCK217I TOTAL ACCESS PATH SAME                               1
PCK217I TOTAL NEW SQL STATEMENTS                            0
PCK217I TOTAL DELETED SQL STATEMENTS                        0

*****
*****
PCK218I PROGRAM TEST01      HAS A CHANGED ACCESS PATH
QUERYNO                      327
COLLECTION                    TESTCOLLX
NEW VERSION                   2005-04-11-18.34.53.754785
OLD VERSION                   2005-04-11-18.20.42.913225

*****
*****
PCK217I TOTAL DBRMS COMPARED                                1
PCK217I TOTAL STATEMENTS COMPARED                          2
PCK217I TOTAL ACCESS PATH CHANGES                          1
PCK217I TOTAL ACCESS PATH SAME                               1
PCK217I TOTAL NEW SQL STATEMENTS                            0
PCK217I TOTAL DELETED SQL STATEMENTS                        0
    
```

Analysis of the Comparison between Versions of DB2

	V6	V7	V8
Before MSUs	61	61	16
After MSUs	1	1	1
Access Type Change	Multiple Columns 2	Multiple Columns 2	Multiple Columns 2

The SQL changes the index match from match columns = 0 to match columns = 2. This is a noticeable improvement.

Note that all three end up with the same estimate of one MSU, while V8's initial estimate is much lower than that for V6 or V7.

The SQL Change

We changed the WHERE clause by removing TBCREATOR = :SYSCOL-SYSCOLUMNS.SYSCOL-TBCREATOR to make this a NON MATCHING INDEX since the first index column is not specified.

Query Summary

Database Alias: HLSP390 **Explain Time :** 2005-05-30 09:00:23.034824

DB2 Platform : Z/OS **DB2 Version:** v8

SQL Statement : DECLARE SELECT-1 CURSOR FOR SELECT NAME , TBNAME , COLNO , COLTYPE , LENGTH FROM SYSCOLUMNS WHERE TBNAME = : H AND TBCREATOR = : H

Attribute	Value	Explanation
Timestamp	2005-05-30 09:00:23.034824	Timestamp when the query is explained
Type	SELECT	Query type (SELECT, INSERT, UPDATE, DELETE, SELUPD, DELCUR, UPDCUR)
CPU Cost (ms)	1	Estimated CPU cost (in milliseconds)
CPU Cost (su)	2	Estimated CPU cost (in service units)
Cost Category	A	Cost estimation category (A=statistics; B=default)
Reason		Reason when the cost estimation category is B (HOST VARIABLES, TABLE CARDINALITY, UDF, TRIGGERS, REFERENTIAL CONSTRAINTS)
Group Member		

Case 2: Change SELECT to JOIN

Version 6 Comparison

```

11          OPTIONS CATALOGSQL NOMATCHCREATOR REPORTCOSTGT
11          CONNECT TO DB6G
11          COMPARE PACKAGE TESTCOLLX.TEST02 IN PUBLIC.PLAN_TABLE
              TO PREVIOUS
11          2005/04/11 SQL ID -          ACCESS PATH FOR TEST02          COLLID - TESTCOLLX
OLD PLAN_TABLE -
      IN QRYNO M CREATOR TNAME          TBNO AC MC CREATOR ACCESSNAME          IO
SORTUJGO LK PF QBNO PLNO MXSQ
PCK212I TIMESTAMP USED FOR PREVIOUS COMMAND = 2005041113364865 VERSION = 2005-04-11-
18.20.50.343441

      2 327 0 PUBLIC SYSTABLES 2 I 0 PUBLIC.DSNDTX01 N NNNNNNNN S 1 1
      2 327 1 PUBLIC SYSCOLUMNS I 2 PUBLIC.DSNDX01 N NNNNNNNN IS 1 2

1 327 0 PUBLIC SYSCOLUMNS 1 I 0 PUBLIC DSNDX01 N
NNNNNNNN IS S 1 1
PCK206I COMPARE COMPLETE FOR PROGRAM = TEST02 VERSION = 2005-04-11-18.35.13.673978
PREVIOUS VERSION = 2005-04-11-18.20.50.343441
PCK203I STATEMENTS WITH SAME ACCESS PATH 1 STATEMENTS WITH DIFFERENT ACCESS
PATH 0 FOR PROGRAM TEST02
PCK204I QUERIES WITH MATCHING EXPLAIN 1 QUERIES WITHOUT MATCHING
EXPLAIN 1 FOR PROGRAM TEST02
PCK217I TOTAL DBRMS COMPARED 1
PCK217I TOTAL STATEMENTS COMPARED 3
PCK217I TOTAL ACCESS PATH CHANGES 0
PCK217I TOTAL ACCESS PATH SAME 1
PCK217I TOTAL NEW SQL STATEMENTS 1
PCK217I TOTAL DELETED SQL STATEMENTS 1
PCK217I TOTAL DSN_STATEMNT COST INCR 0
COMPLETE RET CODE= 04
11          2005/04/11 SQL ID -          ACCESS PATH FOR TEST02          COLLID - TESTCOLLX
OLD PLAN_TABLE -

STATEMENT 327 THIS IS THE NEW SQL STATEMENT.

STATEMENT# 327 DECLARE SELECT-1 CURSOR FOR SELECT A . NAME , A . TBNAME , A
. COLNO , A . COLTYPE , A . LENGTH FROM SYSCOLUMNS A INNER
JOIN SYSTABLES B ON A . TBNAME = B . NAME AND A . TBcreator
= B . CREATOR WHERE A . TBNAME = : H WITH RR

STEP 1 ACCESSES TABLE PUBLIC .SYSTABLES B
USING INDEX PUBLIC .DSNDTX01 USING 0 COLUMN(S).
THE INTENT LOCK FOR THE TABLE IS S
THE TIMESTAMP FOR THIS EXPLAIN IS 2005041113370505
THE TABLE HAS 404 ROWS OF 542 BYTES.
THE NON-UNIQUE INDEX HAS 404 ENTRIES IN 2 LEVELS WITH
CLUSTER RATIO 72
STEP 2 ACCESSES TABLE PUBLIC .SYSCOLUMNS A
USING INDEX PUBLIC .DSNDX01 USING 2 COLUMN(S).
THE JOIN METHOD IS NESTED LOOP
THE INTENT LOCK FOR THE TABLE IS IS
THE TIMESTAMP FOR THIS EXPLAIN IS 2005041113370505
THE TABLE HAS 6,361 ROWS OF 969 BYTES.
THE NON-UNIQUE INDEX HAS 6,361 ENTRIES IN 2 LEVELS WITH
CLUSTER RATIO 81
DB2 ESTIMATES THIS QUERY WILL USE 2 MILLISECONDS OF CPU
TIME
DB2 ESTIMATES THIS QUERY WILL USE 5 SERVICE UNITS

STATEMENT 327 THIS IS THE SQL STATEMENT THAT WAS REMOVED.

STATEMENT# 327 DECLARE SELECT-1 CURSOR FOR SELECT NAME,TBNAME, COLNO,
COLTYPE , LENGTH FROM SYSCOLUMNS WHERE TBNAME = : H

```

```

STEP      1  ACCESSES TABLE      PUBLIC  .SYSCOLUMNS
              USING INDEX PUBLIC  .DSNDCX01      USING      0 COLUMN(S).
              THE ACCESS WILL USE SEQUENTIAL PREFETCH
              THE INTENT LOCK FOR THE TABLE IS IS
              THE TIMESTAMP FOR THIS EXPLAIN IS 2005041113364859
              THE TABLE HAS          6,361 ROWS OF      969 BYTES.
              THE NON-UNIQUE INDEX HAS 6,361 ENTRIES IN  2 LEVELS WITH CLUSTER

RATIO 81
              DB2 ESTIMATES THIS QUERY WILL USE          22 MILLISECONDS OF CPU
TIME
              DB2 ESTIMATES THIS QUERY WILL USE          61 SERVICE UNITS
PCK206I COMPARE COMPLETE FOR PROGRAM = TEST02  VERSION = 2005-04-11-18.35.13.673978
              PREVIOUS VERSION = 2005-04-11-18.20.50.343441
PCK217I TOTAL DBRMS COMPARED                      1
PCK217I TOTAL STATEMENTS COMPARED                  3
PCK217I TOTAL ACCESS PATH CHANGES                  0
PCK217I TOTAL ACCESS PATH SAME                     1
PCK217I TOTAL NEW SQL STATEMENTS                   1
PCK217I TOTAL DELETED SQL STATEMENTS               1

```

Version 7 Comparison

```

PCK031I EXECUTING LICENSED PATH CHECKER V2R2
11          OPTIONS CATALOGSQL REPORTCOSTGT
11          CONNECT TO DB7G
11          COMPARE PACKAGE TESTCOLLX.TEST02 IN PUBLIC.PLAN_TABLE
              TO PREVIOUS
11          2005/04/11  SQL ID -          ACCESS PATH FOR TEST02          COLLID - TESTCOLLX
OLD PLAN_TABLE -
IN QRYNO M  CREATOR  TNAME          TBNO AC MC CREATOR  ACCESSNAME          IO
SORTUJGO LK PF QBNO PLNO MXSQ
PCK212I TIMESTAMP USED FOR PREVIOUS COMMAND = 2005041112321454  VERSION = 2005-04-11-
18.20.50.343441

2  327 0 PUBLIC  SYSTABLES  2 I  0 PUBLIC.DSNDTX01  N NNNNNNNN  S  1  1
2  327 1 PUBLIC  SYSCOLUMNS 1 I  2 PUBLIC.DSNDX01  N NNNNNNNN  IS  1  2

1  327 0 PUBLIC  SYSCOLUMNS          1 I  0 PUBLIC  DSNDX01          N
NNNNNNNN  IS S  1  1
PCK206I COMPARE COMPLETE FOR PROGRAM = TEST02  VERSION = 2005-04-11-18.35.13.673978
              PREVIOUS  VERSION = 2005-04-11-18.20.50.343441
PCK203I STATEMENTS WITH SAME ACCESS PATH  1  STATEMENTS WITH DIFFERENT ACCESS
PATH  0  FOR PROGRAM TEST02
PCK204I QUERIES WITH MATCHING EXPLAIN  1  QUERIES WITHOUT MATCHING
EXPLAIN  1  FOR PROGRAM TEST02
PCK217I TOTAL DBRMS COMPARED  1
PCK217I TOTAL STATEMENTS COMPARED  3
PCK217I TOTAL ACCESS PATH CHANGES  0
PCK217I TOTAL ACCESS PATH SAME  1
PCK217I TOTAL NEW SQL STATEMENTS  1
PCK217I TOTAL DELETED SQL STATEMENTS  1
PCK217I TOTAL DSN_STATEMNT COST INCR  0
COMPLETE RET CODE= 04
11          2005/04/11  SQL ID -          ACCESS PATH FOR TEST02          COLLID - TESTCOLLX
OLD PLAN_TABLE -

STATEMENT 327 THIS IS THE NEW SQL STATEMENT.

STATEMENT# 327 DECLARE SELECT-1 CURSOR FOR SELECT A . NAME , A . TBNAME ,
A. COLNO , A . COLTYPE , A . LENGTH FROM SYSCOLUMNS A INNER
JOIN SYSTABLES B ON A . TBNAME = B . NAME AND A . TBcreator
= B . CREATOR WHERE A . TBNAME = : H WITH RR

STEP 1  ACCESSES TABLE PUBLIC .SYSTABLES B
USING INDEX PUBLIC .DSNDTX01 USING 0 COLUMN(S).
THE INTENT LOCK FOR THE TABLE IS S
THE TIMESTAMP FOR THIS EXPLAIN IS 2005041112393510
THIS OPERATION REFERENCES A TABLE
THE TABLE HAS 404 ROWS OF 542 BYTES.
THE NON-UNIQUE INDEX HAS 404 ENTRIES IN 2 LEVELS WITH
CLUSTER RATIO 72
STEP 2  ACCESSES TABLE PUBLIC .SYSCOLUMNS A
USING INDEX PUBLIC .DSNDX01 USING 2 COLUMN(S).
THE JOIN METHOD IS NESTED LOOP
THE INTENT LOCK FOR THE TABLE IS IS
THE TIMESTAMP FOR THIS EXPLAIN IS 2005041112393510
THIS OPERATION REFERENCES A TABLE
THE TABLE HAS 6,361 ROWS OF 969 BYTES.
THE NON-UNIQUE INDEX HAS 6,361 ENTRIES IN 2 LEVELS WITH CLUSTER
RATIO 81
TIME DB2 ESTIMATES THIS QUERY WILL USE 2 MILLISECONDS OF CPU
DB2 ESTIMATES THIS QUERY WILL USE 5 SERVICE UNITS

STATEMENT 327 THIS IS THE SQL STATEMENT THAT WAS REMOVED.

STATEMENT# 327 DECLARE SELECT-1 CURSOR FOR SELECT NAME , TBNAME , COLNO ,
COLTYPE , LENGTH FROM SYSCOLUMNS WHERE TBNAME = : H

```

```

STEP      1  ACCESSES TABLE      PUBLIC .SYSCOLUMNS
              USING INDEX PUBLIC .DSNDCX01      USING      0 COLUMN(S).
              THE ACCESS WILL USE SEQUENTIAL PREFETCH
              THE INTENT LOCK FOR THE TABLE IS IS
              THE TIMESTAMP FOR THIS EXPLAIN IS 2005041112321447
              THIS OPERATION REFERENCES A TABLE
              THE TABLE HAS          6,361 ROWS OF      969 BYTES.
              THE NON-UNIQUE INDEX HAS 6,361 ENTRIES IN  2 LEVELS WITH CLUSTER

RATIO 81
              DB2 ESTIMATES THIS QUERY WILL USE          22 MILLISECONDS OF CPU
TIME
              DB2 ESTIMATES THIS QUERY WILL USE          61 SERVICE UNITS
PCK206I COMPARE COMPLETE FOR PROGRAM = TEST02  VERSION = 2005-04-11-18.35.13.673978
              PREVIOUS VERSION = 2005-04-11-18.20.50.343441
PCK217I TOTAL DBRMS COMPARED                    1
PCK217I TOTAL STATEMENTS COMPARED              3
PCK217I TOTAL ACCESS PATH CHANGES             0
PCK217I TOTAL ACCESS PATH SAME                 1
PCK217I TOTAL NEW SQL STATEMENTS              1
PCK217I TOTAL DELETED SQL STATEMENTS          1

*****
*****
PCK218I PROGRAM TEST02      HAS A NEW SQL STATEMENT
QUERYNO                      327
COLLECTION                    TESTCOLLX
NEW VERSION                   2005-04-11-18.35.13.673978
OLD VERSION                   2005-04-11-18.20.50.343441

*****
*****
PCK218I PROGRAM TEST02      HAS A DELETED SQL STATEMENT
COLLECTION                    TESTCOLLX
NEW VERSION                   2005-04-11-18.35.13.673978
OLD VERSION                   2005-04-11-18.20.50.343441

*****
*****
PCK217I TOTAL DBRMS COMPARED                    1
PCK217I TOTAL STATEMENTS COMPARED              3
PCK217I TOTAL ACCESS PATH CHANGES             0
PCK217I TOTAL ACCESS PATH SAME                 1
PCK217I TOTAL NEW SQL STATEMENTS              1
PCK217I TOTAL DELETED SQL STATEMENTS          1

```

Version 8 Comparison

```

PCK031I EXECUTING LICENSED PATH CHECKER V2R2
11          OPTIONS CATALOGSQL REPORTCOSTGT
11          CONNECT TO DB8G
11          COMPARE PACKAGE TESTCOLLX.TEST02 IN PUBLIC.PLAN_TABLE
              TO PREVIOUS
11          2005/04/11  SQL ID -          ACCESS PATH FOR TEST02          COLLID - TESTCOLLX
OLD PLAN_TABLE -
          IN QRYNO M  CREATOR  TNAME          TBNO AC MC CREATOR  ACCESSNAME          IO
SORTUJGO LK PF QBNO PLNO MXSQ
PCK212I TIMESTAMP USED FOR PREVIOUS COMMAND = 2005041111435573  VERSION = 2005-04-11-
18.20.50.343441

          2   327 0 PUBLIC  SYSTABLES  2 I   0 PUBLIC.DSNDTX01  Y NNNNNNNN  S          1   1
          2   327 1 PUBLIC  SYSCOLUMNS 1 I   2 PUBLIC.DSNDX01  N NNNNNNNN  IS          1   2

          1   327 0 PUBLIC  SYSCOLUMNS 1 I   0 PUBLIC.DSNDX01  N NNNNNNNN  IS S          1   1
PCK206I COMPARE COMPLETE FOR PROGRAM = TEST02  VERSION = 2005-04-11-18.35.13.673978
          PREVIOUS VERSION = 2005-04-11-18.20.50.343441

PCK203I STATEMENTS WITH SAME ACCESS PATH          1          STATEMENTS WITH DIFFERENT ACCESS
PATH          0          FOR PROGRAM TEST02

PCK204I QUERIES WITH MATCHING EXPLAIN          1          QUERIES WITHOUT MATCHING
EXPLAIN          1          FOR PROGRAM TEST02

PCK217I TOTAL DBRMS COMPARED          1
PCK217I TOTAL STATEMENTS COMPARED          3
PCK217I TOTAL ACCESS PATH CHANGES          0
PCK217I TOTAL ACCESS PATH SAME          1
PCK217I TOTAL NEW SQL STATEMENTS          1
PCK217I TOTAL DELETED SQL STATEMENTS          1
PCK217I TOTAL DSN_STATEMNT COST INCR          0
          COMPLETE RET CODE=          04
11          2005/04/11  SQL ID -          ACCESS PATH FOR TEST02          COLLID - TESTCOLLX
OLD PLAN_TABLE -

STATEMENT          327 THIS IS THE NEW SQL STATEMENT.

STATEMENT#          327 DECLARE SELECT-1 CURSOR FOR SELECT A . NAME , A . TBNAME ,
          A . COLNO , A . COLTYPE , A . LENGTH FROM SYSCOLUMNS A INNER
          JOIN SYSTABLES B ON A . TBNAME = B . NAME AND A . TBcreator
          = B . CREATOR WHERE A . TBNAME = : H WITH RR

STEP          1  ACCESSES TABLE PUBLIC .SYSTABLES          B
          USING INDEX PUBLIC .DSNDTX01          USING 0 COLUMN(S).
          THE ACCESS ONLY READS THE INDEX NOT THE TABLE
          THE INTENT LOCK FOR THE TABLE IS S
          THE TIMESTAMP FOR THIS EXPLAIN IS 20050411114361228
          THIS OPERATION REFERENCES A TABLE
          THE TABLE HAS          404 ROWS OF          542 BYTES.
          THE NON-UNIQUE INDEX HAS          404 ENTRIES IN 2 LEVELS WITH
CLUSTER RATIO 72
STEP          2  ACCESSES TABLE PUBLIC .SYSCOLUMNS          A
          USING INDEX PUBLIC .DSNDX01          USING 2 COLUMN(S).
          THE JOIN METHOD IS NESTED LOOP
          THE INTENT LOCK FOR THE TABLE IS IS
          THE TIMESTAMP FOR THIS EXPLAIN IS 20050411114361228
          THIS OPERATION REFERENCES A TABLE
          THE TABLE HAS          6,361 ROWS OF          969 BYTES.
          THE NON-UNIQUE INDEX HAS 6,361 ENTRIES IN 2 LEVELS WITH CLUSTER
RATIO 81
TIME          DB2 ESTIMATES THIS QUERY WILL USE          1 MILLISECONDS OF CPU
          DB2 ESTIMATES THIS QUERY WILL USE          2 SERVICE UNITS

STATEMENT          327 THIS IS THE SQL STATEMENT THAT WAS REMOVED.

STATEMENT#          327 DECLARE SELECT-1 CURSOR FOR SELECT NAME , TBNAME , COLNO , C
          OLTYPE , LENGTH FROM SYSCOLUMNS WHERE TBNAME = : H

```

```

STEP      1  ACCESSES TABLE      PUBLIC .SYSCOLUMNS
              USING INDEX PUBLIC .DSNDCX01      USING      0 COLUMN(S).
              THE ACCESS WILL USE SEQUENTIAL PREFETCH
              THE INTENT LOCK FOR THE TABLE IS IS
              THE TIMESTAMP FOR THIS EXPLAIN IS 2005041114355561
              THIS OPERATION REFERENCES A TABLE
              THE TABLE HAS      6,361 ROWS OF      969 BYTES.
              THE NON-UNIQUE INDEX HAS      6,361 ENTRIES IN 2 LEVELS WITH
CLUSTER RATIO 81
              DB2 ESTIMATES THIS QUERY WILL USE      6 MILLISECONDS OF CPU
TIME
              DB2 ESTIMATES THIS QUERY WILL USE      16 SERVICE UNITS
PCK206I COMPARE COMPLETE FOR PROGRAM = TEST02  VERSION = 2005-04-11-18.35.13.673978
              PREVIOUS VERSION = 2005-04-11-18.20.50.343441
PCK217I TOTAL DBRMS COMPARED 1
PCK217I TOTAL STATEMENTS COMPARED 3
PCK217I TOTAL ACCESS PATH CHANGES 0
PCK217I TOTAL ACCESS PATH SAME 1
PCK217I TOTAL NEW SQL STATEMENTS 1
PCK217I TOTAL DELETED SQL STATEMENTS 1

*****
*****
PCK218I PROGRAM TEST02 HAS A NEW SQL STATEMENT
QUERYNO 327
COLLECTION TESTCOLLX
NEW VERSION 2005-04-11-18.35.13.673978
OLD VERSION 2005-04-11-18.20.50.343441

*****
*****
PCK218I PROGRAM TEST02 HAS A DELETED SQL STATEMENT
COLLECTION TESTCOLLX
NEW VERSION 2005-04-11-18.35.13.673978
OLD VERSION 2005-04-11-18.20.50.343441

*****
*****
PCK217I TOTAL DBRMS COMPARED 1
PCK217I TOTAL STATEMENTS COMPARED 3
PCK217I TOTAL ACCESS PATH CHANGES 0
PCK217I TOTAL ACCESS PATH SAME 1
PCK217I TOTAL NEW SQL STATEMENTS 1
PCK217I TOTAL DELETED SQL STATEMENTS 1

```

Analysis of the Comparison between Versions of DB2

	V6	V7	V8
Before MSUs	61	61	16
After MSUs	5	5	2
Access Type Change	From Nested Loop Join to Sequential Prefetch	From Nested Loop Join to Sequential Prefetch	From Nested Loop Join Sequential Prefetch

All Three Version of DB2, start with a Nested Loop Join and, because of the SQL change, switch to Sequential Prefetch. The cost estimates are the same for V6 and V7, but much lower for V8.

The SQL Change

We changed a single table SELECT to a JOIN.

```

SELECT
  OLD  NAME, TBNAME, COLNO, COLTYPE, LENGTH
NEW  A.NAME, A.TBNAME, A.COLNO, A.COLTYPE, A.LENGTH
NEW  INNER JOIN
      SYSIBM.SYSTABLES B
ON  A.TBNAME = B.NAME
   AND A.TBCREATOR = B.CREATOR
ADDED WITH RR

```

Query Summary

Database Alias: HLSP390 **Explain Time :** 2005-05-30 09:00:23.61577

DB2 Platform : Z/OS **DB2 Version:** v8

SQL Statement :
 DECLARE SELECT-1 CURSOR FOR SELECT A . NAME , A .
 TBNAME , A . COLNO , A . COLTYPE , A . LENGTH FROM
 SYSCOLUMNS A INNER JOIN SYSTABLES B ON A . TBNAME =
 B . NAME AND A . TBCREATOR = B . CREATOR WHERE A .
 TBNAME = : H WITH RR

Attribute	Value	Explanation
Type	SELECT	Query type (SELECT, INSERT, UPDATE, DELETE, SELUPD, DELCUR, UPDCUR)
CPU Cost (ms)	2	Estimated CPU cost (in milliseconds)
CPU Cost (su)	4	Estimated CPU cost (in service units)
Cost Category	A	Cost estimation category (A=statistics; B=default)
Reason		Reason when the cost estimation category is B (HOST VARIABLES, TABLE CARDINALITY, UDF, TRIGGERS, REFERENTIAL CONSTRAINTS)
Timestamp	2005-05-30 09:00:23.61577	Timestamp when the query is explained

Case 3: Change JOIN Criteria

Version 6 Comparison

```

PCK031I EXECUTING LICENSED PATH CHECKER V2R2
11          OPTIONS CATALOGSQL NOMATCHCREATOR REPORTCOSTGT
11          CONNECT TO DB6G
11          COMPARE PACKAGE TESTCOLLX.TEST03 IN PUBLIC.PLAN_TABLE
              TO PREVIOUS
11          2005/04/11 SQL ID -          ACCESS PATH FOR TEST03          COLLID - TESTCOLLX
OLD PLAN_TABLE -
  IN QRYNO M CREATOR TNAME          TBNO AC MC CREATOR ACCESSNAME          IO
SORTUJGO LK PF QBNO PLNO MXSQ
PCK212I TIMESTAMP USED FOR PREVIOUS COMMAND = 2005041113364903  VERSION = 2005-04-11-
18.23.24.953460

  1   327 0 PUBLIC SYSCOLUMNS 1 I   2 PUBLIC.DSNDCX01 N NNNNNNNN IS          1   1
  1   327 1 PUBLIC SYSTABLES 2 I   2 PUBLIC.DSNDTX01 N NNNNNNNN IS          1   2
  2   327 0 PUBLIC SYSTABLES 2 I   0 PUBLIC.DSNDTX01 N NNNNNNNN IS          1   1
  2   327 1 PUBLIC SYSCOLUMNS          1 I   2 PUBLIC DSNDCX01          N
NNNNNNNN IS          1   2
PCK206I COMPARE COMPLETE FOR PROGRAM = TEST03  VERSION = 2005-04-11-18.35.30.369555
              PREVIOUS VERSION = 2005-04-11-18.23.24.953460

PCK203I STATEMENTS WITH SAME ACCESS PATH          1 STATEMENTS WITH DIFFERENT ACCESS
PATH          1 FOR PROGRAM TEST03

PCK204I QUERIES WITH MATCHING EXPLAIN          2 QUERIES WITHOUT MATCHING
EXPLAIN          0 FOR PROGRAM TEST03

PCK217I TOTAL DBRMS COMPARED          1
PCK217I TOTAL STATEMENTS COMPARED          2
PCK217I TOTAL ACCESS PATH CHANGES          1
PCK217I TOTAL ACCESS PATH SAME          1
PCK217I TOTAL NEW SQL STATEMENTS          0
PCK217I TOTAL DELETED SQL STATEMENTS          0
PCK217I TOTAL DSN_STATEMNT COST INCR          0
COMPLETE RET CODE=          04
11          2005/04/11 SQL ID -          ACCESS PATH FOR TEST03          COLLID - TESTCOLLX
OLD PLAN_TABLE -

STATEMENT          327 THIS IS THE OLD ACCESS PATH.

STATEMENT#          327 DECLARE SELECT-1 CURSOR FOR SELECT A . NAME , A . TBNAME ,
A COLNO , A . COLTYPE , A . LENGTH FROM SYSCOLUMNS A INNER
JOIN SYSTABLES B ON A . TBNAME = B . NAME AND A . TBcreator
= B . CREATOR WHERE A . TBNAME = : H AND A . TBcreator = : H
WITH RR

STEP          1 ACCESSES TABLE PUBLIC .SYSCOLUMNS          A
USING INDEX PUBLIC .DSNDCX01          USING 2 COLUMN(S).
THE INTENT LOCK FOR THE TABLE IS IS
THE TIMESTAMP FOR THIS EXPLAIN IS 2005041113364890
THE TABLE HAS          6,361 ROWS OF          969 BYTES.
THE NON-UNIQUE INDEX HAS 6,361 ENTRIES IN 2 LEVELS WITH CLUSTER

RATIO 81
STEP          2 ACCESSES TABLE PUBLIC .SYSTABLES          B
USING INDEX PUBLIC .DSNDTX01          USING 2 COLUMN(S).
THE JOIN METHOD IS NESTED LOOP
THE INTENT LOCK FOR THE TABLE IS IS
THE TIMESTAMP FOR THIS EXPLAIN IS 2005041113364890
THE TABLE HAS          404 ROWS OF          542 BYTES.
THE NON-UNIQUE INDEX HAS 404 ENTRIES IN 2 LEVELS WITH CLUSTER

RATIO 72
TIME          DB2 ESTIMATES THIS QUERY WILL USE          1 MILLISECONDS OF CPU
TIME          DB2 ESTIMATES THIS QUERY WILL USE          2 SERVICE UNITS

STATEMENT          327 THIS IS THE NEW ACCESS PATH.

STATEMENT#          327 DECLARE SELECT-1 CURSOR FOR SELECT A . NAME , A . TBNAME ,

```

```

A. COLNO , A . COLTYPE , A . LENGTH FROM SYSCOLUMNS A INNER
JOIN SYSTABLES B ON A . TBNAME = B . NAME WHERE A . TBNAME =
: H AND A . TBcreator = : H

STEP          1  ACCESSES TABLE      PUBLIC .SYSTABLES      B
                USING INDEX PUBLIC .DSNDTX01      USING 0 COLUMN(S).
                THE INTENT LOCK FOR THE TABLE IS IS
                THE TIMESTAMP FOR THIS EXPLAIN IS 2005041113370539
                THE TABLE HAS          404 ROWS OF    542 BYTES.
                THE NON-UNIQUE INDEX HAS  404 ENTRIES IN 2 LEVELS WITH CLUSTER

RATIO 72
STEP          2  ACCESSES TABLE      PUBLIC .SYSCOLUMNS      A
                USING INDEX PUBLIC .DSNDCX01      USING 2 COLUMN(S).
                THE JOIN METHOD IS NESTED LOOP
                THE INTENT LOCK FOR THE TABLE IS IS
                THE TIMESTAMP FOR THIS EXPLAIN IS 2005041113370539
                THE TABLE HAS          6,361 ROWS OF  969 BYTES.
                THE NON-UNIQUE INDEX HAS 6,361 ENTRIES IN 2 LEVELS WITH CLUSTER

RATIO 81
                DB2 ESTIMATES THIS QUERY WILL USE          2 MILLISECONDS OF CPU
TIME
                DB2 ESTIMATES THIS QUERY WILL USE          5 SERVICE UNITS
PCK206I COMPARE COMPLETE FOR PROGRAM = TEST03  VERSION =    2005-04-11-18.35.30.369555
                PREVIOUS VERSION =    2005-04-11-18.23.24.953460
PCK217I TOTAL DBRMS COMPARED                  1
PCK217I TOTAL STATEMENTS COMPARED            2
PCK217I TOTAL ACCESS PATH CHANGES            1
PCK217I TOTAL ACCESS PATH SAME               1
PCK217I TOTAL NEW SQL STATEMENTS             0
PCK217I TOTAL DELETED SQL STATEMENTS         0

```

Version 7 Comparison

```

PCK031I EXECUTING LICENSED PATH CHECKER V2R2
11          OPTIONS CATALOGSQL REPORTCOSTGT
11          CONNECT TO DB7G
11          COMPARE PACKAGE TESTCOLLX.TEST03 IN PUBLIC.PLAN_TABLE
              TO PREVIOUS
11          2005/04/11  SQL ID -          ACCESS PATH FOR TEST03          COLLID - TESTCOLLX
OLD PLAN_TABLE -
IN QRYNO M  CREATOR  TNAME          TBNO AC MC CREATOR  ACCESSNAME          IO
SORTUJGO LK PF QBNO PLNO MXSQ
PCK212I TIMESTAMP USED FOR PREVIOUS COMMAND = 2005041112321488  VERSION = 2005-04-11-
18.23.24.953460

1  327 0 PUBLIC  SYSCOLUMNS 1 I  2 PUBLIC.DSNDCX01  N NNNNNNNN  IS  1  1
1  327 1 PUBLIC  SYSTABLES  2 I  2 PUBLIC.DSNDTX01  N NNNNNNNN  IS  1  2
PCK220I DATA CHANGE FOR COLUMN MATCHCOLS          WAS          2
2  327 0 PUBLIC  SYSCOLUMNS          1 I  2 PUBLIC  DSNDCX01          N
NNNNNNNN IS  1  1
2  327 1 PUBLIC  SYSTABLES          2 I  0 PUBLIC  DSNDTX01          N
NNNNNNNN IS  1  2
PCK221I DATA CHANGE FOR COLUMN MATCHCOLS          IS NOW          0
PCK206I COMPARE COMPLETE FOR PROGRAM = TEST03  VERSION = 2005-04-11-18.35.30.369555
PREVIOUS VERSION = 2005-04-11-18.23.24.953460

PCK203I STATEMENTS WITH SAME ACCESS PATH          1 STATEMENTS WITH DIFFERENT ACCESS
PATH          1 FOR PROGRAM TEST03
PCK204I QUERIES WITH MATCHING EXPLAIN          2 QUERIES WITHOUT MATCHING
EXPLAIN          0 FOR PROGRAM TEST03
PCK217I TOTAL DBRMS COMPARED          1
PCK217I TOTAL STATEMENTS COMPARED          2
PCK217I TOTAL ACCESS PATH CHANGES          1
PCK217I TOTAL ACCESS PATH SAME          1
PCK217I TOTAL NEW SQL STATEMENTS          0
PCK217I TOTAL DELETED SQL STATEMENTS          0
PCK217I TOTAL DSN_STATEMNT COST INCR          0
COMPLETE RET CODE=          04
11          2005/04/11  SQL ID -          ACCESS PATH FOR TEST03          COLLID - TESTCOLLX
OLD PLAN_TABLE -

STATEMENT          327 THIS IS THE OLD ACCESS PATH.

STATEMENT#          327 DECLARE SELECT-1 CURSOR FOR SELECT A . NAME , A . TBNAME ,
A . COLNO , A . COLTYPE , A . LENGTH FROM SYSCOLUMNS A INNER
JOIN SYSTABLES B ON A . TBNAME = B . NAME AND A . TBcreator
= B . CREATOR WHERE A . TBNAME = : H AND A . TBcreator = : H
WITH RR

STEP          1  ACCESSES TABLE PUBLIC .SYSCOLUMNS          A
USING INDEX PUBLIC .DSNDCX01          USING 2 COLUMN(S).
THE INTENT LOCK FOR THE TABLE IS IS
THE TIMESTAMP FOR THIS EXPLAIN IS 2005041112321479
THIS OPERATION REFERENCES A TABLE
THE TABLE HAS          6,361 ROWS OF          969 BYTES.
THE NON-UNIQUE INDEX HAS 6,361 ENTRIES IN 2 LEVELS WITH CLUSTER

RATIO 81
STEP          2  ACCESSES TABLE PUBLIC .SYSTABLES          B
USING INDEX PUBLIC .DSNDTX01          USING 2 COLUMN(S).
THE JOIN METHOD IS NESTED LOOP
THE INTENT LOCK FOR THE TABLE IS IS
THE TIMESTAMP FOR THIS EXPLAIN IS 2005041112321479
THIS OPERATION REFERENCES A TABLE
THE TABLE HAS          404 ROWS OF          542 BYTES.
THE NON-UNIQUE INDEX HAS 404 ENTRIES IN 2 LEVELS WITH CLUSTER

RATIO 72

DB2 ESTIMATES THIS QUERY WILL USE          1 MILLISECONDS OF CPU
TIME

DB2 ESTIMATES THIS QUERY WILL USE          1 SERVICE UNITS

STATEMENT          327 THIS IS THE NEW ACCESS PATH.

```

```

STATEMENT#      327 DECLARE SELECT-1 CURSOR FOR SELECT A . NAME , A . TBNAME ,
                A. COLNO , A . COLTYPE , A . LENGTH FROM SYSCOLUMNS A INNER
                JOIN SYSTABLES B ON A . TBNAME = B . NAME WHERE A . TBNAME =
                : H AND A . TBCREATOR = : H

STEP            1  ACCESSES TABLE PUBLIC .SYSCOLUMNS A
                USING INDEX PUBLIC .DSNDCX01 USING 2 COLUMN(S).
                THE INTENT LOCK FOR THE TABLE IS IS
                THE TIMESTAMP FOR THIS EXPLAIN IS 2005041112393541
                THIS OPERATION REFERENCES A TABLE
                THE TABLE HAS 6,361 ROWS OF 969 BYTES.
                THE NON-UNIQUE INDEX HAS 6,361 ENTRIES IN 2 LEVELS WITH CLUSTER

RATIO 81
STEP            2  ACCESSES TABLE PUBLIC .SYSTABLES B
                USING INDEX PUBLIC .DSNDTX01 USING 0 COLUMN(S).
                THE JOIN METHOD IS NESTED LOOP
                THE INTENT LOCK FOR THE TABLE IS IS
                THE TIMESTAMP FOR THIS EXPLAIN IS 2005041112393541
                THIS OPERATION REFERENCES A TABLE
                THE TABLE HAS 404 ROWS OF 542 BYTES.
                THE NON-UNIQUE INDEX HAS 404 ENTRIES IN 2 LEVELS WITH CLUSTER

RATIO 72
                DB2 ESTIMATES THIS QUERY WILL USE 2 MILLISECONDS OF CPU
TIME
                DB2 ESTIMATES THIS QUERY WILL USE 5 SERVICE UNITS
PCK206I COMPARE COMPLETE FOR PROGRAM = TEST03 VERSION = 2005-04-11-18.35.30.369555
                PREVIOUS VERSION = 2005-04-11-18.23.24.953460
PCK217I TOTAL DBRMS COMPARED 1
PCK217I TOTAL STATEMENTS COMPARED 2
PCK217I TOTAL ACCESS PATH CHANGES 1
11 2005/04/11 SQL ID - ACCESS PATH FOR TEST03 COLLID - TESTCOLLX
OLD PLAN_TABLE -

PCK217I TOTAL ACCESS PATH SAME 1
PCK217I TOTAL NEW SQL STATEMENTS 0
PCK217I TOTAL DELETED SQL STATEMENTS 0

*****
*****
PCK218I PROGRAM TEST03 HAS A CHANGED ACCESS PATH
QUERYNO 327
COLLECTION TESTCOLLX
NEW VERSION 2005-04-11-18.35.30.369555
OLD VERSION 2005-04-11-18.23.24.953460

*****
*****
PCK217I TOTAL DBRMS COMPARED 1
PCK217I TOTAL STATEMENTS COMPARED 2
PCK217I TOTAL ACCESS PATH CHANGES 1
PCK217I TOTAL ACCESS PATH SAME 1
PCK217I TOTAL NEW SQL STATEMENTS 0
PCK217I TOTAL DELETED SQL STATEMENTS 0

```

Version 8 Comparison

```

PCK031I EXECUTING LICENSED PATH CHECKER V2R2
11          OPTIONS CATALOGSQL REPORTCOSTGT
11          CONNECT TO DB8G
11          COMPARE PACKAGE TESTCOLLX.TEST03 IN PUBLIC.PLAN_TABLE
              TO PREVIOUS
11          2005/04/11  SQL ID -          ACCESS PATH FOR TEST03          COLLID - TESTCOLLX
OLD PLAN_TABLE -
IN QRYNO M  CREATOR  TNAME          TBNO AC MC CREATOR  ACCESSNAME          IO
SORTUJGO LK PF QBNO PLNO MXSQ
PCK212I TIMESTAMP USED FOR PREVIOUS COMMAND = 2005041114355655  VERSION = 2005-04-11-
18.23.24.953460

1  327 0 PUBLIC  SYSCOLUMNS 1 I  2 PUBLIC.DSNDCX01  N NNNNNNNN  IS  1  1
1  327 1 PUBLIC  SYSTABLES  2 I  2 PUBLIC.DSNDTX01  Y NNNNNNNN  IS  1  2
PCK220I DATA CHANGE FOR COLUMN MATCHCOLS          WAS          2
2  327 0 PUBLIC  SYSCOLUMNS          1 I  2 PUBLIC  DSNDCX01          N
NNNNNNNN IS  1  1
2  327 1 PUBLIC  SYSTABLES          2 I  0 PUBLIC  DSNDTX01          Y
NNNNNNNN IS  1  2
PCK221I DATA CHANGE FOR COLUMN MATCHCOLS          IS NOW          0
PCK206I COMPARE COMPLETE FOR PROGRAM = TEST03  VERSION = 2005-04-11-18.35.30.369555
PREVIOUS VERSION = 2005-04-11-18.23.24.953460

PCK203I STATEMENTS WITH SAME ACCESS PATH          1          STATEMENTS WITH DIFFERENT ACCESS
PATH          1          FOR PROGRAM TEST03
PCK204I  QUERIES WITH MATCHING EXPLAIN          2          QUERIES WITHOUT MATCHING
EXPLAIN          0          FOR PROGRAM TEST03
PCK217I TOTAL DBRMS COMPARED          1
PCK217I TOTAL STATEMENTS COMPARED          2
PCK217I TOTAL ACCESS PATH CHANGES          1
PCK217I TOTAL ACCESS PATH SAME          1
PCK217I TOTAL NEW SQL STATEMENTS          0
PCK217I TOTAL DELETED SQL STATEMENTS          0
PCK217I TOTAL DSN_STATEMNT COST INCR          0
COMPLETE RET CODE=          04
11          2005/04/11  SQL ID -          ACCESS PATH FOR TEST03          COLLID - TESTCOLLX
OLD PLAN_TABLE -

STATEMENT          327 THIS IS THE OLD ACCESS PATH.

STATEMENT#          327 DECLARE SELECT-1 CURSOR FOR SELECT A . NAME , A . TBNAME ,
A. COLNO , A . COLTYPE , A . LENGTH FROM SYSCOLUMNS A INNER
JOIN SYSTABLES B ON A . TBNAME = B . NAME AND A . TBcreator
= B . CREATOR WHERE A . TBNAME = : H AND A . TBcreator = : H
WITH RR

STEP          1  ACCESSES TABLE PUBLIC .SYSCOLUMNS          A
USING INDEX PUBLIC .DSNDCX01          USING 2 COLUMN(S).
THE INTENT LOCK FOR THE TABLE IS IS
THE TIMESTAMP FOR THIS EXPLAIN IS 2005041114355624
THIS OPERATION REFERENCES A TABLE
THE TABLE HAS          6,361 ROWS OF          969 BYTES.
THE NON-UNIQUE INDEX HAS 6,361 ENTRIES IN 2 LEVELS WITH CLUSTER

RATIO 81
STEP          2  ACCESSES TABLE PUBLIC .SYSTABLES          B
USING INDEX PUBLIC .DSNDTX01          USING 2 COLUMN(S).
THE JOIN METHOD IS NESTED LOOP
THE ACCESS ONLY READS THE INDEX NOT THE TABLE
THE INTENT LOCK FOR THE TABLE IS IS
THE TIMESTAMP FOR THIS EXPLAIN IS 2005041114355624
THIS OPERATION REFERENCES A TABLE
THE TABLE HAS          404 ROWS OF          542 BYTES.
THE NON-UNIQUE INDEX HAS 404 ENTRIES IN 2 LEVELS WITH CLUSTER

RATIO 72
TIME          DB2 ESTIMATES THIS QUERY WILL USE          1 MILLISECONDS OF CPU
TIME          DB2 ESTIMATES THIS QUERY WILL USE          2 SERVICE UNITS

```

```

STATEMENT          327 THIS IS THE NEW ACCESS PATH.

STATEMENT#        327 DECLARE SELECT-1 CURSOR FOR SELECT A . NAME , A . TBNAME ,
                   A. COLNO , A . COLTYPE , A . LENGTH FROM SYSCOLUMNS A INNER
                   JOIN SYSTABLES B ON A . TBNAME = B . NAME WHERE A . TBNAME =
                   : H AND A . TBCREATOR = : H

STEP              1  ACCESSES TABLE PUBLIC .SYSCOLUMNS A
                   USING INDEX PUBLIC .DSNDCX01 USING 2 COLUMN(S).
                   THE INTENT LOCK FOR THE TABLE IS IS
                   THE TIMESTAMP FOR THIS EXPLAIN IS 2005041114361273
                   THIS OPERATION REFERENCES A TABLE
                   THE TABLE HAS 6,361 ROWS OF 969 BYTES.
                   THE NON-UNIQUE INDEX HAS 6,361 ENTRIES IN 2 LEVELS WITH CLUSTER

RATIO 81
STEP              2  ACCESSES TABLE PUBLIC .SYSTABLES B
                   USING INDEX PUBLIC .DSNDTX01 USING 0 COLUMN(S).
                   THE JOIN METHOD IS NESTED LOOP
                   THE ACCESS ONLY READS THE INDEX NOT THE TABLE
                   THE INTENT LOCK FOR THE TABLE IS IS
                   THE TIMESTAMP FOR THIS EXPLAIN IS 2005041114361273
                   THIS OPERATION REFERENCES A TABLE
                   THE TABLE HAS 404 ROWS OF 542 BYTES.
                   THE NON-UNIQUE INDEX HAS 404 ENTRIES IN 2 LEVELS WITH CLUSTER

RATIO 72
DB2 ESTIMATES THIS QUERY WILL USE 1 MILLISECONDS OF CPU
TIME
DB2 ESTIMATES THIS QUERY WILL USE 2 SERVICE UNITS
PCK206I COMPARE COMPLETE FOR PROGRAM = TEST03 VERSION = 2005-04-11-18.35.30.369555
PREVIOUS VERSION = 2005-04-11-18.23.24.953460
PCK217I TOTAL DBRMS COMPARED 1
11 2005/04/11 SQL ID - ACCESS PATH FOR TEST03 COLLID - TESTCOLLX
OLD PLAN_TABLE -

PCK217I TOTAL STATEMENTS COMPARED 2
PCK217I TOTAL ACCESS PATH CHANGES 1
PCK217I TOTAL ACCESS PATH SAME 1
PCK217I TOTAL NEW SQL STATEMENTS 0
PCK217I TOTAL DELETED SQL STATEMENTS 0

*****
*****
PCK218I PROGRAM TEST03 HAS A CHANGED ACCESS PATH
QUERYNO 327
COLLECTION TESTCOLLX
NEW VERSION 2005-04-11-18.35.30.369555
OLD VERSION 2005-04-11-18.23.24.953460

*****
*****
PCK217I TOTAL DBRMS COMPARED 1
PCK217I TOTAL STATEMENTS COMPARED 2
PCK217I TOTAL ACCESS PATH CHANGES 1
PCK217I TOTAL ACCESS PATH SAME 1
PCK217I TOTAL NEW SQL STATEMENTS 0
PCK217I TOTAL DELETED SQL STATEMENTS 0
PCK031I EXECUTING LICENSED PATH CHECKER V2R2

```

Analysis of the Comparisons between Versions of DB2

	V6	V7	V8
Before MSUs	2	1	2
After MSUs	5	5	2
Access Type Change	MC=0	MC=0	MC=0

Both V6 and V7 have an increase in the estimated costs. V8 remains stable. The index is tbcreeator, tbcname so the match columns goes from 2 to 0 and will give a Cartesian product of all the columns with all the tables of that name.

The SQL Change

We changed the JOIN criteria by deleting
AND A.TBCREATOR = B.CREATOR
WITH RR
to make it a partial Cartesian.

Query Summary

Database Alias: HLSP390 **Explain Time :** 2005-05-30 09:00:24.126473

DB2 Platform : Z/OS **DB2 Version:** v8

SQL Statement : DECLARE SELECT-1 CURSOR FOR SELECT A . NAME , A .
 TBNAME , A . COLNO , A . COLTYPE , A . LENGTH FROM
 SYSCOLUMNS A INNER JOIN SYSTABLES B ON A . TBNAME =
 B . NAME WHERE A . TBNAME = : H AND A . TBCREATOR = : H

Attribute	Value	Explanation
Timestamp	2005-05-30 09:00:24.126473	Timestamp when the query is explained
Type	SELECT	Query type (SELECT, INSERT, UPDATE, DELETE, SELUPD, DELCUR, UPDCUR)
CPU Cost (ms)	2	Estimated CPU cost (in milliseconds)
CPU Cost (su)	4	Estimated CPU cost (in service units)
Cost Category	A	Cost estimation category (A=statistics; B=default)
Reason		Reason when the cost estimation category is B (HOST VARIABLES, TABLE CARDINALITY, UDF, TRIGGERS, REFERENTIAL CONSTRAINTS)
Group Member		

Case 4: Change Data List

Version 6 Comparison

```

PCK031I EXECUTING LICENSED PATH CHECKER V2R2
11          OPTIONS CATALOGSQL NOMATCHCREATOR REPORTCOSTGT
11          CONNECT TO DB6G
11          COMPARE PACKAGE TESTCOLLX.TEST04 IN PUBLIC.PLAN_TABLE
              TO PREVIOUS
11          2005/04/11  SQL ID -          ACCESS PATH FOR TEST04          COLLID - TESTCOLLX
OLD PLAN_TABLE -
  IN QRYNO M  CREATOR  TNAME          TBNO AC MC CREATOR  ACCESSNAME          IO
SORTUJGO LK PF QBNO PLNO MXSQ
PCK212I TIMESTAMP USED FOR PREVIOUS COMMAND = 2005041113364944  VERSION = 2005-04-11-
18.24.03.980449
PCK206I COMPARE COMPLETE FOR PROGRAM = TEST04  VERSION = 2005-04-11-18.35.44.634638
              PREVIOUS VERSION = 2005-04-11-18.24.03.980449
PCK203I STATEMENTS WITH SAME ACCESS PATH          2          STATEMENTS WITH DIFFERENT ACCESS
PATH          0          FOR PROGRAM TEST04
PCK204I QUERIES WITH MATCHING EXPLAIN          2          QUERIES WITHOUT MATCHING
EXPLAIN          0          FOR PROGRAM TEST04
PCK217I TOTAL DBRMS COMPARED          1
PCK217I TOTAL STATEMENTS COMPARED          2
PCK217I TOTAL ACCESS PATH CHANGES          0
PCK217I TOTAL ACCESS PATH SAME          2
PCK217I TOTAL NEW SQL STATEMENTS          0
PCK217I TOTAL DELETED SQL STATEMENTS          0
PCK217I TOTAL DSN_STATEMNT COST INCR          0
COMPLETE RET CODE=          00
11          2005/04/11  SQL ID -          ACCESS PATH FOR TEST04          COLLID - TESTCOLLX
OLD PLAN_TABLE -

PCK206I COMPARE COMPLETE FOR PROGRAM = TEST04  VERSION = 2005-04-11-18.35.44.634638
              PREVIOUS VERSION = 2005-04-11-18.24.03.980449
PCK217I TOTAL DBRMS COMPARED          1
PCK217I TOTAL STATEMENTS COMPARED          2
PCK217I TOTAL ACCESS PATH CHANGES          0
PCK217I TOTAL ACCESS PATH SAME          2
PCK217I TOTAL NEW SQL STATEMENTS          0
PCK217I TOTAL DELETED SQL STATEMENTS          0

```

Version 7 Comparison

```

PCK031I EXECUTING LICENSED PATH CHECKER V2R2
11          OPTIONS CATALOGSQL REPORTCOSTGT
11          CONNECT TO DB7G
11          COMPARE PACKAGE TESTCOLLX.TEST04 IN PUBLIC.PLAN_TABLE
              TO PREVIOUS
11          2005/04/11  SQL ID -          ACCESS PATH FOR TEST04          COLLID - TESTCOLLX
OLD PLAN_TABLE -
  IN QRYNO M  CREATOR  TNAME          TBNO AC MC CREATOR  ACCESSNAME          IO
SORTUJGO LK PF QBNO PLNO MXSQ
PCK212I TIMESTAMP USED FOR PREVIOUS COMMAND = 2005041112321517  VERSION = 2005-04-11-
18.24.03.980449
PCK206I COMPARE COMPLETE FOR PROGRAM = TEST04  VERSION = 2005-04-11-18.35.44.634638
              PREVIOUS VERSION = 2005-04-11-18.24.03.980449
PCK203I STATEMENTS WITH SAME ACCESS PATH          2          STATEMENTS WITH DIFFERENT ACCESS
PATH          0          FOR PROGRAM TEST04
PCK204I QUERIES WITH MATCHING EXPLAIN          2          QUERIES WITHOUT MATCHING
EXPLAIN          0          FOR PROGRAM TEST04
PCK217I TOTAL DBRMS COMPARED          1
PCK217I TOTAL STATEMENTS COMPARED          2
PCK217I TOTAL ACCESS PATH CHANGES          0
PCK217I TOTAL ACCESS PATH SAME          2
PCK217I TOTAL NEW SQL STATEMENTS          0
PCK217I TOTAL DELETED SQL STATEMENTS          0
PCK217I TOTAL DSN_STATEMNT COST INCR          0
COMPLETE RET CODE=          00
11          2005/04/11  SQL ID -          ACCESS PATH FOR TEST04          COLLID - TESTCOLLX
OLD PLAN_TABLE -

```

```
PCK206I COMPARE COMPLETE FOR PROGRAM = TEST04  VERSION = 2005-04-11-18.35.44.634638
                                         PREVIOUS  VERSION = 2005-04-11-18.24.03.980449
PCK217I TOTAL DBRMS COMPARED                1
PCK217I TOTAL STATEMENTS COMPARED           2
PCK217I TOTAL ACCESS PATH CHANGES          0
PCK217I TOTAL ACCESS PATH SAME              2
PCK217I TOTAL NEW SQL STATEMENTS            0
PCK217I TOTAL DELETED SQL STATEMENTS        0

*****
*****
PCK217I TOTAL DBRMS COMPARED                1
PCK217I TOTAL STATEMENTS COMPARED           2
PCK217I TOTAL ACCESS PATH CHANGES          0
PCK217I TOTAL ACCESS PATH SAME              2
PCK217I TOTAL NEW SQL STATEMENTS            0
PCK217I TOTAL DELETED SQL STATEMENTS        0
```

Version 8 Comparison

```

PCK031I EXECUTING LICENSED PATH CHECKER V2R2
11          OPTIONS CATALOGSQL REPORTCOSTGT
11          CONNECT TO DB8G
11          COMPARE PACKAGE TESTCOLLX.TEST04 IN PUBLIC.PLAN_TABLE
              TO PREVIOUS
11          2005/04/11  SQL ID -          ACCESS PATH FOR TEST04          COLLID - TESTCOLLX
OLD PLAN_TABLE -
IN QRYNO M  CREATOR  TNAME          TBNO AC MC CREATOR  ACCESSNAME          IO
SORTUJGO LK PF QBNO PLNO MXSQ
PCK212I TIMESTAMP USED FOR PREVIOUS COMMAND = 2005041114355701  VERSION = 2005-04-11-
18.24.03.980449

1  327 0 PUBLIC  SYSCOLUMNS 1 I  2 PUBLIC.DSNDXCX01  N NNNNNNNN  IS  1  1
1  327 1 PUBLIC  SYSTABLES  2 I  2 PUBLIC.DSNDTX01  Y NNNNNNNN  IS  1  2
PCK220I DATA CHANGE FOR COLUMN INDEXONLY          WAS  Y
2  327 0 PUBLIC  SYSCOLUMNS 1 I  2 PUBLIC.DSNDXCX01  N NNNNNNNN  IS  1  1
2  327 1 PUBLIC  SYSTABLES  2 I  2 PUBLIC.DSNDTX01  N NNNNNNNN  IS  1  2
PCK221I DATA CHANGE FOR COLUMN INDEXONLY          IS NOW N
PCK206I COMPARE COMPLETE FOR PROGRAM = TEST04  VERSION = 2005-04-11-18.35.44.634638
              PREVIOUS VERSION = 2005-04-11-18.24.03.980449

PCK203I STATEMENTS WITH SAME ACCESS PATH          1  STATEMENTS WITH DIFFERENT ACCESS
PATH          1  FOR PROGRAM TEST04
PCK204I  QUERIES WITH MATCHING EXPLAIN          2  QUERIES WITHOUT MATCHING
EXPLAIN          0  FOR PROGRAM TEST04
PCK217I TOTAL DBRMS COMPARED          1
PCK217I TOTAL STATEMENTS COMPARED          2
PCK217I TOTAL ACCESS PATH CHANGES          1
PCK217I TOTAL ACCESS PATH SAME          1
PCK217I TOTAL NEW SQL STATEMENTS          0
PCK217I TOTAL DELETED SQL STATEMENTS          0
PCK217I TOTAL DSN_STATEMNT COST INCR          0
COMPLETE RET CODE=          04
11          2005/04/11  SQL ID -          ACCESS PATH FOR TEST04          COLLID - TESTCOLLX
OLD PLAN_TABLE -

STATEMENT          327 THIS IS THE OLD ACCESS PATH.

STATEMENT#          327 DECLARE SELECT-1 CURSOR FOR SELECT A . NAME , A . TBNAME ,
A . COLNO , A . COLTYPE , A . LENGTH FROM SYSCOLUMNS A INNER
JOIN SYSTABLES B ON A . TBNAME = B . NAME AND A . TBcreator
= B . CREATOR WHERE A . TBNAME = : H AND A . TBcreator = : H

STEP          1  ACCESSES TABLE PUBLIC .SYSCOLUMNS          A
USING INDEX PUBLIC .DSNDXCX01          USING 2 COLUMN(S).
THE INTENT LOCK FOR THE TABLE IS IS
THE TIMESTAMP FOR THIS EXPLAIN IS 2005041114355683
THIS OPERATION REFERENCES A TABLE
THE TABLE HAS          6,361 ROWS OF          969 BYTES.
THE NON-UNIQUE INDEX HAS          6,361 ENTRIES IN 2 LEVELS WITH

CLUSTER RATIO 81
STEP          2  ACCESSES TABLE PUBLIC .SYSTABLES          B
USING INDEX PUBLIC .DSNDTX01          USING 2 COLUMN(S).
THE JOIN METHOD IS NESTED LOOP
THE ACCESS ONLY READS THE INDEX NOT THE TABLE
THE INTENT LOCK FOR THE TABLE IS IS
THE TIMESTAMP FOR THIS EXPLAIN IS 2005041114355683
THIS OPERATION REFERENCES A TABLE
THE TABLE HAS          404 ROWS OF          542 BYTES.
THE NON-UNIQUE INDEX HAS          404 ENTRIES IN 2 LEVELS WITH CLUSTER

RATIO 72
TIME
DB2 ESTIMATES THIS QUERY WILL USE          1 MILLISECONDS OF CPU
DB2 ESTIMATES THIS QUERY WILL USE          2 SERVICE UNITS

STATEMENT          327 THIS IS THE NEW ACCESS PATH.

```

```

STATEMENT#      327 DECLARE SELECT-1 CURSOR FOR SELECT A . NAME , A . TBNAME ,
                A . COLNO , A . COLTYPE , A . LENGTH , B . DBID FROM SYSCOLUM
                NS A INNER JOIN SYSTABLES B ON A . TBNAME = B . NAME AND A .
                TBCreator = B . CREATOR WHERE B . NAME = : H AND B . CREATO
                R = : H

STEP            1  ACCESSES TABLE      PUBLIC .SYSCOLUMNS      A
                USING INDEX PUBLIC .DSNDCX01      USING 2 COLUMN(S).
                THE INTENT LOCK FOR THE TABLE IS IS
                THE TIMESTAMP FOR THIS EXPLAIN IS 2005041114361320
                THIS OPERATION REFERENCES A TABLE
                THE TABLE HAS          6,361 ROWS OF      969 BYTES.
                THE NON-UNIQUE INDEX HAS 6,361 ENTRIES IN 2 LEVELS WITH CLUSTER

RATIO 81
STEP            2  ACCESSES TABLE      PUBLIC .SYSTABLES      B
                USING INDEX PUBLIC .DSNDTX01      USING 2 COLUMN(S).
                THE JOIN METHOD IS NESTED LOOP
                THE INTENT LOCK FOR THE TABLE IS IS
                THE TIMESTAMP FOR THIS EXPLAIN IS 2005041114361320
                THIS OPERATION REFERENCES A TABLE
                THE TABLE HAS          404 ROWS OF      542 BYTES.
                THE NON-UNIQUE INDEX HAS 404 ENTRIES IN 2 LEVELS WITH CLUSTER

RATIO 72
                DB2 ESTIMATES THIS QUERY WILL USE          1 MILLISECONDS OF CPU
TIME
                DB2 ESTIMATES THIS QUERY WILL USE          2 SERVICE UNITS
PCK206I COMPARE COMPLETE FOR PROGRAM = TEST04  VERSION = 2005-04-11-18.35.44.634638
                PREVIOUS VERSION = 2005-04-11-18.24.03.980449
PCK217I TOTAL DBRMS COMPARED          1
11 2005/04/11 SQL ID - ACCESS PATH FOR TEST04 COLLID - TESTCOLLX
OLD PLAN_TABLE -

PCK217I TOTAL STATEMENTS COMPARED          2
PCK217I TOTAL ACCESS PATH CHANGES          1
PCK217I TOTAL ACCESS PATH SAME            1
PCK217I TOTAL NEW SQL STATEMENTS          0
PCK217I TOTAL DELETED SQL STATEMENTS      0

*****
*****
PCK218I PROGRAM TEST04 HAS A CHANGED ACCESS PATH
QUERYNO          327
COLLECTION       TESTCOLLX
NEW VERSION      2005-04-11-18.35.44.634638
OLD VERSION      2005-04-11-18.24.03.980449

*****
*****
PCK217I TOTAL DBRMS COMPARED          1
PCK217I TOTAL STATEMENTS COMPARED          2
PCK217I TOTAL ACCESS PATH CHANGES          1
PCK217I TOTAL ACCESS PATH SAME            1
PCK217I TOTAL NEW SQL STATEMENTS          0
PCK217I TOTAL DELETED SQL STATEMENTS      0
    
```

Analysis of the Comparisons between Versions of DB2

	V6	V7	V8
Before MSUs			2
After MSUs			2
Access Type Change	No Change as the function is not supported	No change	Change from Index only to data

The SQL Change

We changed the Data List

```
ADDED ,B.DBID
CHG WHERE      = :SYSCOL-SYSCOLUMNS.SYSCOL-TBNAME
      B.NAME
      A.TBNAME
AND            = :SYSCOL-SYSCOLUMNS.SYSCOL-TBCREATOR
      B.CREATOR
      A.TBCREATOR
ADDED ,,SYSTAB-DBID
```

Query Summary

Database Alias: HLSP390 **Explain Time :** 2005-05-30 09:00:24.624402

DB2 Platform : Z/OS **DB2 Version:** v8

SQL Statement :
 DECLARE SELECT-1 CURSOR FOR SELECT A . NAME , A .
 TBNAME , A . COLNO , A . COLTYPE , A . LENGTH , B . DBID
 FROM SYSCOLUMNS A INNER JOIN SYSTABLES B ON A .
 TBNAME = B . NAME AND A . TBCREATOR = B . CREATOR
 WHERE B . NAME = : H AND B . CREATOR = : H

Attribute	Value	Explanation
Timestamp	2005-05-30 09:00:24.624402	Timestamp when the query is explained
Type	SELECT	Query type (SELECT, INSERT, UPDATE, DELETE, SELUPD, DELCUR, UPDCUR)
CPU Cost (ms)	1	Estimated CPU cost (in milliseconds)
CPU Cost (su)	3	Estimated CPU cost (in service units)
Cost Category	A	Cost estimation category (A=statistics; B=default)
Reason		Reason when the cost estimation category is B (HOST VARIABLES, TABLE CARDINALITY, UDF, TRIGGERS, REFERENTIAL CONSTRAINTS)
Group Member		

Case 5: Change JOIN to SUBSLELECT

Version 6 Comparison

```

PCK031I EXECUTING LICENSED PATH CHECKER V2R2
11          OPTIONS CATALOGSQL NOMATCHCREATOR REPORTCOSTGT
11          CONNECT TO DB6G
11          COMPARE PACKAGE TESTCOLLX.TEST05 IN PUBLIC.PLAN_TABLE
              TO PREVIOUS
11          2005/04/11 SQL ID - ACCESS PATH FOR TEST05 COLLID - TESTCOLLX
OLD PLAN_TABLE -
IN QRYNO M CREATOR TNAME TBNO AC MC CREATOR ACCESSNAME IO
SORTUJGO LK PF QBNO PLNO MXSQ
PCK212I TIMESTAMP USED FOR PREVIOUS COMMAND = 2005041113364981 VERSION = 2005-04-11-
18.24.20.251517

1 327 0 PUBLIC SYSCOLUMNS 1 I 2 PUBLIC.DSNDX01 N NNNNNNNN IS 1 1
1 327 1 PUBLIC SYSTABLES 2 I 2 PUBLIC.DSNDTX01 N NNNNNNNN IS 1 2
PCK220I DATA CHANGE FOR COLUMN METHOD WAS
PCK220I DATA CHANGE FOR COLUMN INDEXONLY WAS N
2 327 0 PUBLIC SYSCOLUMNS 1 I 2 PUBLIC DSNDX01 N
NNNNNNNN IS 1 1
2 327 0 PUBLIC SYSTABLES 2 I 2 PUBLIC DSNDTX01 Y
NNNNNNNN IS 2 1
PCK221I DATA CHANGE FOR COLUMN METHOD IS NOW
PCK221I DATA CHANGE FOR COLUMN INDEXONLY IS NOW Y
PCK206I COMPARE COMPLETE FOR PROGRAM = TEST05 VERSION = 2005-04-11-18.35.58.859750
PREVIOUS VERSION = 2005-04-11-18.24.20.251517

PCK203I STATEMENTS WITH SAME ACCESS PATH 1 STATEMENTS WITH DIFFERENT ACCESS
PATH 1 FOR PROGRAM TEST05
PCK204I QUERIES WITH MATCHING EXPLAIN 2 QUERIES WITHOUT MATCHING
EXPLAIN 0 FOR PROGRAM TEST05
PCK217I TOTAL DBRMS COMPARED 1
PCK217I TOTAL STATEMENTS COMPARED 2
PCK217I TOTAL ACCESS PATH CHANGES 1
PCK217I TOTAL ACCESS PATH SAME 1
PCK217I TOTAL NEW SQL STATEMENTS 0
PCK217I TOTAL DELETED SQL STATEMENTS 0
PCK217I TOTAL DSN_STATEMNT COST INCR 0
COMPLETE RET CODE= 04
11          2005/04/11 SQL ID - ACCESS PATH FOR TEST05 COLLID - TESTCOLLX
OLD PLAN_TABLE -

STATEMENT 327 THIS IS THE OLD ACCESS PATH.

STATEMENT# 327 DECLARE SELECT-1 CURSOR FOR SELECT A . NAME , A . TBNAME ,
A. COLNO , A . COLTYPE , A . LENGTH FROM SYSCOLUMNS A INNER
JOIN SYSTABLES B ON A . TBNAME = B . NAME AND A . TBcreator
= B . CREATOR WHERE A . TBNAME = : H AND A . TBcreator = : H

STEP 1 ACCESSES TABLE PUBLIC .SYSCOLUMNS A
USING INDEX PUBLIC .DSNDX01 USING 2 COLUMN(S).
THE INTENT LOCK FOR THE TABLE IS IS
THE TIMESTAMP FOR THIS EXPLAIN IS 2005041113364970
THE TABLE HAS 6,361 ROWS OF 969 BYTES.
THE NON-UNIQUE INDEX HAS 6,361 ENTRIES IN 2 LEVELS WITH CLUSTER

RATIO 81
STEP 2 ACCESSES TABLE PUBLIC .SYSTABLES B
USING INDEX PUBLIC .DSNDTX01 USING 2 COLUMN(S).
THE JOIN METHOD IS NESTED LOOP
THE INTENT LOCK FOR THE TABLE IS IS
THE TIMESTAMP FOR THIS EXPLAIN IS 2005041113364970
THE TABLE HAS 404 ROWS OF 542 BYTES.

```

```

THE NON-UNIQUE INDEX HAS 404 ENTRIES IN 2 LEVELS WITH CLUSTER
RATIO 72
DB2 ESTIMATES THIS QUERY WILL USE 1 MILLISECONDS OF CPU
TIME
DB2 ESTIMATES THIS QUERY WILL USE 2 SERVICE UNITS

STATEMENT 327 THIS IS THE NEW ACCESS PATH.

STATEMENT# 327 DECLARE SELECT-1 CURSOR FOR SELECT A . NAME , A . TBNAME ,
A . COLNO , A . COLTYPE , A . LENGTH FROM SYSCOLUMNS A WHERE
EXISTS ( SELECT B . NAME FROM SYSTABLES B WHERE A . TBNAME =
B . NAME AND A . TBCREATOR = B . CREATOR ) AND A . TBNAME =
: H AND A . TBCREATOR = : H

STEP 1 ACCESSES TABLE PUBLIC .SYSCOLUMNS A
USING INDEX PUBLIC .DSNDCX01 USING 2 COLUMN(S).
THE INTENT LOCK FOR THE TABLE IS IS
THE TIMESTAMP FOR THIS EXPLAIN IS 2005041113370602
THE TABLE HAS 6,361 ROWS OF 969 BYTES.
THE NON-UNIQUE INDEX HAS 6,361 ENTRIES IN 2 LEVELS WITH CLUSTER
RATIO 81
STEP 1 ACCESSES TABLE PUBLIC .SYSTABLES B
USING INDEX PUBLIC .DSNDTX01 USING 2 COLUMN(S).
THE ACCESS ONLY READS THE INDEX NOT THE TABLE
THE INTENT LOCK FOR THE TABLE IS IS
THE TIMESTAMP FOR THIS EXPLAIN IS 2005041113370602
THE TABLE HAS 404 ROWS OF 542 BYTES.
THE NON-UNIQUE INDEX HAS 404 ENTRIES IN 2 LEVELS WITH CLUSTER
RATIO 72
DB2 ESTIMATES THIS QUERY WILL USE 1 MILLISECONDS OF CPU
TIME
DB2 ESTIMATES THIS QUERY WILL USE 1 SERVICE UNITS
PCK206I COMPARE COMPLETE FOR PROGRAM = TEST05 VERSION = 2005-04-11-18.35.58.859750
PREVIOUS VERSION = 2005-04-11-18.24.20.251517
PCK217I TOTAL DBRMS COMPARED 1
PCK217I TOTAL STATEMENTS COMPARED 2
PCK217I TOTAL ACCESS PATH CHANGES 1
PCK217I TOTAL ACCESS PATH SAME 1
PCK217I TOTAL NEW SQL STATEMENTS 0
PCK217I TOTAL DELETED SQL STATEMENTS 0
11 2005/04/11 SQL ID - ACCESS PATH FOR TEST05 COLLID - TESTCOLLX
OLD PLAN_TABLE -

```

Version 7 Comparison

```

PCK031I EXECUTING LICENSED PATH CHECKER V2R2
11 OPTIONS CATALOGSQL REPORTCOSTGT
11 CONNECT TO DB7G
11 COMPARE PACKAGE TESTCOLLX.TEST05 IN PUBLIC.PLAN_TABLE
TO PREVIOUS
11 2005/04/11 SQL ID - ACCESS PATH FOR TEST05 COLLID - TESTCOLLX
OLD PLAN_TABLE -
IN QRYNO M CREATOR TNAME TBNO AC MC CREATOR ACCESSNAME IO
SORTUJGO LK PF QBNO PLNO MXSQ
PCK212I TIMESTAMP USED FOR PREVIOUS COMMAND = 2005041112321548 VERSION = 2005-04-11-
18.24.20.251517
PCK206I COMPARE COMPLETE FOR PROGRAM = TEST05 VERSION = 2005-04-11-18.35.58.859750
PREVIOUS VERSION = 2005-04-11-18.24.20.251517
PCK203I STATEMENTS WITH SAME ACCESS PATH 2 STATEMENTS WITH DIFFERENT ACCESS
PATH 0 FOR PROGRAM TEST05
PCK204I QUERIES WITH MATCHING EXPLAIN 2 QUERIES WITHOUT MATCHING
EXPLAIN 0 FOR PROGRAM TEST05
PCK217I TOTAL DBRMS COMPARED 1
PCK217I TOTAL STATEMENTS COMPARED 2
PCK217I TOTAL ACCESS PATH CHANGES 0
PCK217I TOTAL ACCESS PATH SAME 2
PCK217I TOTAL NEW SQL STATEMENTS 0
PCK217I TOTAL DELETED SQL STATEMENTS 0
PCK217I TOTAL DSN_STATEMNT COST INCR 0

```

```

COMPLETE RET CODE=          00
11      2005/04/11  SQL ID -          ACCESS PATH FOR TEST05          COLLID - TESTCOLLX
OLD PLAN_TABLE -

PCK206I COMPARE COMPLETE FOR PROGRAM = TEST05  VERSION =      2005-04-11-18.35.58.859750
                                           PREVIOUS VERSION =      2005-04-11-18.24.20.251517
PCK217I TOTAL DBRMS COMPARED                1
PCK217I TOTAL STATEMENTS COMPARED           2
PCK217I TOTAL ACCESS PATH CHANGES          0
PCK217I TOTAL ACCESS PATH SAME              2
PCK217I TOTAL NEW SQL STATEMENTS            0
PCK217I TOTAL DELETED SQL STATEMENTS        0

*****
*****
PCK217I TOTAL DBRMS COMPARED                1
PCK217I TOTAL STATEMENTS COMPARED           2
PCK217I TOTAL ACCESS PATH CHANGES          0
PCK217I TOTAL ACCESS PATH SAME              2
PCK217I TOTAL NEW SQL STATEMENTS            0
PCK217I TOTAL DELETED SQL STATEMENTS        0
PCK031I EXECUTING LICENSED PATH CHECKER V2R2

```

Version 8 Comparison

```

PCK031I EXECUTING LICENSED PATH CHECKER V2R2
11      OPTIONS CATALOGSQL REPORTCOSTGT
11      CONNECT TO DB8G
11      COMPARE PACKAGE TESTCOLLX.TEST05 IN PUBLIC.PLAN_TABLE
                                           TO PREVIOUS
11      2005/04/11  SQL ID -          ACCESS PATH FOR TEST05          COLLID - TESTCOLLX
OLD PLAN_TABLE -
IN QRYNO M CREATOR TNAME          TBNO AC MC CREATOR ACCESSNAME          IO
SORTUJGO LK PF QBNO PLNO MXSQ
PCK212I TIMESTAMP USED FOR PREVIOUS COMMAND = 2005041114355745  VERSION = 2005-04-11-
18.24.20.251517
PCK206I COMPARE COMPLETE FOR PROGRAM = TEST05  VERSION =      2005-04-11-18.35.58.859750
                                           PREVIOUS VERSION =      2005-04-11-18.24.20.251517
PCK203I STATEMENTS WITH SAME ACCESS PATH      2  STATEMENTS WITH DIFFERENT ACCESS
PATH      0  FOR PROGRAM TEST05
PCK204I QUERIES WITH MATCHING EXPLAIN        2  QUERIES WITHOUT MATCHING
EXPLAIN      0  FOR PROGRAM TEST05
PCK217I TOTAL DBRMS COMPARED                1
PCK217I TOTAL STATEMENTS COMPARED           2
PCK217I TOTAL ACCESS PATH CHANGES          0
PCK217I TOTAL ACCESS PATH SAME              2
PCK217I TOTAL NEW SQL STATEMENTS            0
PCK217I TOTAL DELETED SQL STATEMENTS        0
PCK217I TOTAL DSN_STATEMNT COST INCR        0
COMPLETE RET CODE=          00
11      2005/04/11  SQL ID -          ACCESS PATH FOR TEST05          COLLID - TESTCOLLX
OLD PLAN_TABLE -

PCK206I COMPARE COMPLETE FOR PROGRAM = TEST05  VERSION =      2005-04-11-18.35.58.859750
                                           PREVIOUS VERSION =      2005-04-11-18.24.20.251517
PCK217I TOTAL DBRMS COMPARED                1
PCK217I TOTAL STATEMENTS COMPARED           2
PCK217I TOTAL ACCESS PATH CHANGES          0
PCK217I TOTAL ACCESS PATH SAME              2
PCK217I TOTAL NEW SQL STATEMENTS            0
PCK217I TOTAL DELETED SQL STATEMENTS        0

*****
*****
PCK217I TOTAL DBRMS COMPARED                1
PCK217I TOTAL STATEMENTS COMPARED           2
PCK217I TOTAL ACCESS PATH CHANGES          0
PCK217I TOTAL ACCESS PATH SAME              2
PCK217I TOTAL NEW SQL STATEMENTS            0
PCK217I TOTAL DELETED SQL STATEMENTS        0

```

Analysis of the Comparisons between Versions of DB2

	V6	V7	V8
Before MSUs	2		
After MSUs	1		
Access Type Change	Change to Index Only	No Change	No Change

Two statements that return exactly the same data managed to get a different Access Path on V6 because the join columns were Varchar.

The SQL Change

We changed a JOIN to a SUBSELECT

```

REMOVED -- INNER JOIN  A.TBNAME = B.NAME
                AND A.TBCREATOR = B.CREATOR

INSERTED  WHERE EXISTS
                (SELECT B.NAME
                FROM SYSIBM.SYSTABLES B
                WHERE  A.TBNAME = B.NAME
                AND A.TBCREATOR = B.CREATOR)

```

This produces the same Access path because it has the same data requirements. These are statistics changes.

Query Summary

Database Alias: HLSP390 **Explain Time :** 2005-05-30 09:00:25.154784

DB2 Platform : Z/OS **DB2 Version:** v8

SQL Statement :
 DECLARE SELECT-1 CURSOR FOR SELECT A . NAME , A .
 TBNAME , A . COLNO , A . COLTYPE , A . LENGTH FROM
 SYSCOLUMNS A WHERE EXISTS (SELECT B . NAME FROM
 SYSTABLES B WHERE A . TBNAME = B . NAME AND A .
 TBCREATOR = B . CREATOR) AND A . TBNAME = : H AND A .
 TBCREATOR = : H

Attribute	Value	Explanation
Timestamp	2005-05-30 09:00:25.154784	Timestamp when the query is explained
Type	SELECT	Query type (SELECT, INSERT, UPDATE, DELETE, SELUPD, DELCUR, UPDCUR)
CPU Cost (ms)	1	Estimated CPU cost (in milliseconds)
CPU Cost (su)	2	Estimated CPU cost (in service units)
Cost Category	A	Cost estimation category (A=statistics; B=default)
Reason		Reason when the cost estimation category is B (HOST VARIABLES, TABLE CARDINALITY, UDF, TRIGGERS, REFERENTIAL CONSTRAINTS)
Group Member		

Case 6: Statistics Change (no runstats)

Version 6 Comparison

```

PCK031I EXECUTING LICENSED PATH CHECKER V2R2
11          OPTIONS CATALOGSQL NOMATCHCREATOR REPORTCOSTGT
11          CONNECT TO DB6G
11          COMPARE PACKAGE TESTCOLLX.TEST06 IN PUBLIC.PLAN_TABLE
          TO PREVIOUS
11          2005/04/11 SQL ID -          ACCESS PATH FOR TEST06          COLLID - TESTCOLLX
OLD PLAN_TABLE -
  IN QRYNO M CREATOR TNAME          TBNO AC MC CREATOR ACCESSNAME          IO
SORTUJGO LK PF QBNO PLNO MXSQ
PCK212I TIMESTAMP USED FOR PREVIOUS COMMAND = 2005041113365010 VERSION = 2004-02-25-
22.35.00.517271

  1   327 0 PUBLIC SYSCOLUMNS          1 I   2 PUBLIC DSNDCX01          N
NNNNNNNN IS          1   1
PCK220I DATA CHANGE FOR COLUMN PREFETCH =          WAS
  1   327 1 PUBLIC SYSTABLES          2 I   2 PUBLIC DSNDTX01          N
NNNNNNNN IS          1   2
PCK220I DATA CHANGE FOR COLUMN METHOD          WAS          1
PCK220I DATA CHANGE FOR COLUMN SORTN-JOIN          WAS          N
PCK220I DATA CHANGE FOR COLUMN SORTC-JOIN          WAS          N
PCK220I DATA CHANGE FOR COLUMN PREFETCH =          WAS
PCK220I DATA CHANGE FOR COLUMN MERGE-JOIN-COLS          WAS          0
  2   327 0 PUBLIC6 SYSCOLUMNS          1 I   2 PUBLIC6 DSNDCX01          N
NNNNNNNN IS L          1   1
PCK221I DATA CHANGE FOR COLUMN PREFETCH =          IS NOW L
  2   327 2 PUBLIC6 SYSTABLES          2 I   2 PUBLIC6 DSNDTX01          N
NYNNNYNN IS L          1   2
ACC-DEG  0 ACC-PGP  0 JN-DEG  0 JN-PGP  0 SRTC-PGP  0 SRTN-PGP  0 PRL-MD MRG-
JCL  2 PG-RNG JN-TYP WH-OPT
PCK221I DATA CHANGE FOR COLUMN METHOD          IS NOW 2
PCK221I DATA CHANGE FOR COLUMN SORTN-JOIN          IS NOW Y
PCK221I DATA CHANGE FOR COLUMN SORTC-JOIN          IS NOW Y
PCK221I DATA CHANGE FOR COLUMN PREFETCH =          IS NOW L
PCK221I DATA CHANGE FOR COLUMN MERGE-JOIN-COLS          IS NOW          2

*   338 0 PUBLIC6 SYSTABLES          1 I   1 PUBLIC6 DSNDTX01          N
NNNNNNNN IS L          1   1
PCK223I DSN_STATEMNT_TABLE ESTIMATED COST CHANGE - NEW EST SVC UNITS          137
PCK224I DSN_STATEMNT_TABLE ESTIMATED COST CHANGE - OLD EST SVC UNITS          4

PCK206I COMPARE COMPLETE FOR PROGRAM = TEST06 VERSION = 2004-02-26-16.08.45.116006
          PREVIOUS VERSION = 2004-02-25-22.35.00.517271
PCK203I STATEMENTS WITH SAME ACCESS PATH          1 STATEMENTS WITH DIFFERENT ACCESS
PATH          1 FOR PROGRAM TEST06
PCK204I QUERIES WITH MATCHING EXPLAIN          2 QUERIES WITHOUT MATCHING
EXPLAIN          0 FOR PROGRAM TEST06
PCK217I TOTAL DBRMS COMPARED          1
PCK217I TOTAL STATEMENTS COMPARED          2
PCK217I TOTAL ACCESS PATH CHANGES          1
PCK217I TOTAL ACCESS PATH SAME          1
PCK217I TOTAL NEW SQL STATEMENTS          0
PCK217I TOTAL DELETED SQL STATEMENTS          0
PCK217I TOTAL DSN_STATEMNT COST INCR          1
COMPLETE RET CODE=          04
11          2005/04/11 SQL ID -          ACCESS PATH FOR TEST06          COLLID - TESTCOLLX
OLD PLAN_TABLE -

STATEMENT          327 THIS IS THE OLD ACCESS PATH.

STATEMENT#          327 DECLARE SELECT-1 CURSOR FOR SELECT A . NAME , A . TBNAME ,
          A . COLNO , A . COLTYPE , A . LENGTH FROM SYSCOLUMNS A INNER
          JOIN SYSTABLES B ON A . TBNAME = B . NAME AND A . TBcreator
          = B . CREATOR WHERE A . TBNAME = : H AND A . TBcreator = : H

```

```

STEP          1  ACCESSES TABLE PUBLIC .SYSCOLUMNS A
                USING INDEX PUBLIC .DSNDCX01 USING 2 COLUMN(S).
                THE INTENT LOCK FOR THE TABLE IS IS
                THE TIMESTAMP FOR THIS EXPLAIN IS 2005041113365003
                THE TABLE HAS 6,361 ROWS OF 969 BYTES.
                THE NON-UNIQUE INDEX HAS 6,361 ENTRIES IN 2 LEVELS WITH CLUSTER
RATIO 81
STEP          2  ACCESSES TABLE PUBLIC .SYSTABLES B
                USING INDEX PUBLIC .DSNDTX01 USING 2 COLUMN(S).
                THE JOIN METHOD IS NESTED LOOP
                THE INTENT LOCK FOR THE TABLE IS IS
                THE TIMESTAMP FOR THIS EXPLAIN IS 2005041113365003
                THE TABLE HAS 404 ROWS OF 542 BYTES.
                THE NON-UNIQUE INDEX HAS 404 ENTRIES IN 2 LEVELS WITH CLUSTER
RATIO 72
                DB2 ESTIMATES THIS QUERY WILL USE 1 MILLISECONDS OF CPU
TIME
                DB2 ESTIMATES THIS QUERY WILL USE 2 SERVICE UNITS

STATEMENT      327 THIS IS THE NEW ACCESS PATH.

STATEMENT#     327 DECLARE SELECT-1 CURSOR FOR SELECT A . NAME , A . TBNAME ,
                A . COLNO , A . COLTYPE , A . LENGTH FROM SYSCOLUMNS A INNER
                JOIN SYSTABLES B ON A . TBNAME = B . NAME AND A . TBCREATOR
                = B . CREATOR WHERE A . TBNAME = : H AND A . TBCREATOR = : H

STEP          1  ACCESSES TABLE PUBLIC6 .SYSCOLUMNS A
                USING INDEX PUBLIC6 .DSNDCX01 USING 2 COLUMN(S).
                THE ACCESS WILL USE LIST PREFETCH
                THE INTENT LOCK FOR THE TABLE IS IS
                THE TIMESTAMP FOR THIS EXPLAIN IS 2005041113370633
                THE TABLE HAS -1 ROWS OF 969 BYTES.
                THE NON-UNIQUE INDEX HAS -1 ENTRIES IN -1 LEVELS WITH
CLUSTER RATIO 0
STEP          2  ACCESSES TABLE PUBLIC6 .SYSTABLES B
                USING INDEX PUBLIC6 .DSNDTX01 USING 2 COLUMN(S).
                THE JOIN METHOD IS MERGE SCAN
                USING 2 COLUMN(S).
                THE ACCESS WILL USE LIST PREFETCH
                THE NEW TABLE IS SORTED BY JOIN VALUES
                THE COMPOSITE TABLE IS SORTED BY JOIN VALUES
                THE INTENT LOCK FOR THE TABLE IS IS
                THE TIMESTAMP FOR THIS EXPLAIN IS 2005041113370633
                THE TABLE HAS -1 ROWS OF 542 BYTES.
                THE NON-UNIQUE INDEX HAS -1 ENTRIES IN -1 LEVELS WITH
CLUSTER RATIO 0
                DB2 ESTIMATES THIS QUERY WILL USE 12,341 MILLISECONDS OF CPU
TIME
                DB2 ESTIMATES THIS QUERY WILL USE 34,280 SERVICE UNITS
                DB2 WAS FORCED TO USE ESTIMATES BECAUSE OF
                TABLE CARDINALITY

11 2005/04/11 SQL ID - ACCESS PATH FOR TEST06 COLLID - TESTCOLLX
OLD PLAN_TABLE -

STATEMENT      338 SQL HAD THE SAME ACCESS PATH.

STATEMENT#     338 DECLARE SELECT-2 CURSOR FOR SELECT NAME , CREATOR , TYPE ,
                DBNAME , TSNAME FROM SYSTABLES WHERE CREATOR = : H

STEP          1  ACCESSES TABLE PUBLIC6 .SYSTABLES
                USING INDEX PUBLIC6 .DSNDTX01 USING 1 COLUMN(S).
                THE ACCESS WILL USE LIST PREFETCH
                THE INTENT LOCK FOR THE TABLE IS IS
                THE TIMESTAMP FOR THIS EXPLAIN IS 2005041113370641
                THE TABLE HAS -1 ROWS OF 542 BYTES.
                THE NON-UNIQUE INDEX HAS -1 ENTRIES IN -1 LEVELS WITH
CLUSTER RATIO 0

```

```

DSN_STATEMNT_TABLE NEW ESTIMATED COST
DB2 ESTIMATES THIS QUERY WILL USE          50 MILLISECONDS OF CPU
TIME

DB2 ESTIMATES THIS QUERY WILL USE          137 SERVICE UNITS
DB2 WAS FORCED TO USE ESTIMATES BECAUSE OF
TABLE CARDINALITY
DSN_STATEMNT_TABLE OLD ESTIMATED COST
DB2 ESTIMATES THIS QUERY WILL USE          2 MILLISECONDS OF CPU
TIME

DB2 ESTIMATES THIS QUERY WILL USE          4 SERVICE UNITS

PCK206I COMPARE COMPLETE FOR PROGRAM = TEST06  VERSION = 2004-02-26-16.08.45.116006
PREVIOUS VERSION = 2004-02-25-22.35.00.517271

PCK217I TOTAL DBRMS COMPARED 1
PCK217I TOTAL STATEMENTS COMPARED 2
PCK217I TOTAL ACCESS PATH CHANGES 1
PCK217I TOTAL ACCESS PATH SAME 1
PCK217I TOTAL NEW SQL STATEMENTS 0
PCK217I TOTAL DELETED SQL STATEMENTS 0

```

Version 7 Comparison

```

PCK031I EXECUTING LICENSED PATH CHECKER V2R2
11          OPTIONS CATALOGSQL NOMATCHCREATOR REPORTCOSTGT
11          CONNECT TO DB7G
11          COMPARE PACKAGE TESTCOLLX.TEST06 IN PUBLIC.PLAN_TABLE
          TO PREVIOUS
11          2005/04/11 SQL ID - ACCESS PATH FOR TEST06 COLLID - TESTCOLLX
OLD PLAN_TABLE -
IN QRYNO M CREATOR TNAME TBNO AC MC CREATOR ACCESSNAME IO
SORTUJGO LK PF QBNO PLNO MXSQ
PCK212I TIMESTAMP USED FOR PREVIOUS COMMAND = 2005041112321593 VERSION = 2004-02-25-
22.35.00.517271

1 327 0 PUBLIC SYSCOLUMNS 1 I 2 PUBLIC.DSNDCX01 N NNNNNNNN IS 1 1
PCK220I DATA CHANGE FOR COLUMN PREFETCH = WAS
1 327 1 PUBLIC SYSTABLES 2 I 2 PUBLIC.DSNDTX01 N NNNNNNNN IS 1 2
2 327 0 PUBLIC6 SYSCOLUMNS 1 I 2 PUBLIC6.DSNDCX01 N NNNNNNNN IS L 1 1
PCK221I DATA CHANGE FOR COLUMN PREFETCH = IS NOW L
2 327 1 PUBLIC6 SYSTABLES 2 I 2 PUBLIC6 DSNDTX01 N
NNNNNNNN IS 1 2

* 338 0 PUBLIC6 SYSTABLES 1 I 1 PUBLIC6 DSNDTX01 N
NNNNNNNN IS L 1 1
PCK223I DSN_STATEMNT_TABLE ESTIMATED COST CHANGE - NEW EST SVC UNITS 138
PCK224I DSN_STATEMNT_TABLE ESTIMATED COST CHANGE - OLD EST SVC UNITS 5

PCK206I COMPARE COMPLETE FOR PROGRAM = TEST06 VERSION = 2004-02-26-16.08.45.116006
PREVIOUS VERSION = 2004-02-25-22.35.00.517271

PCK203I STATEMENTS WITH SAME ACCESS PATH 1 STATEMENTS WITH DIFFERENT ACCESS
PATH 1 FOR PROGRAM TEST06
PCK204I QUERIES WITH MATCHING EXPLAIN 2 QUERIES WITHOUT MATCHING
EXPLAIN 0 FOR PROGRAM TEST06

PCK217I TOTAL DBRMS COMPARED 1
PCK217I TOTAL STATEMENTS COMPARED 2
PCK217I TOTAL ACCESS PATH CHANGES 1
PCK217I TOTAL ACCESS PATH SAME 1
PCK217I TOTAL NEW SQL STATEMENTS 0
PCK217I TOTAL DELETED SQL STATEMENTS 0
PCK217I TOTAL DSN_STATEMNT COST INCR 1
COMPLETE RET CODE= 04
11          2005/04/11 SQL ID - ACCESS PATH FOR TEST06 COLLID - TESTCOLLX
OLD PLAN_TABLE -

STATEMENT 327 THIS IS THE OLD ACCESS PATH.

STATEMENT# 327 DECLARE SELECT-1 CURSOR FOR SELECT A . NAME , A . TBNAME ,
A. COLNO , A . COLTYPE , A . LENGTH FROM SYSCOLUMNS A INNER
JOIN SYSTABLES B ON A . TBNAME = B . NAME AND A . TBCREATOR
= B . CREATOR WHERE A . TBNAME = : H AND A . TBCREATOR = : H

```

```

STEP          1  ACCESSES TABLE PUBLIC .SYSCOLUMNS A
                USING INDEX PUBLIC .DSNDCX01 USING 2 COLUMN(S).
                THE INTENT LOCK FOR THE TABLE IS IS
                THE TIMESTAMP FOR THIS EXPLAIN IS 2005041112321585
                THIS OPERATION REFERENCES A TABLE
                THE TABLE HAS 6,361 ROWS OF 969 BYTES.
                THE NON-UNIQUE INDEX HAS 6,361 ENTRIES IN 2 LEVELS WITH CLUSTER
RATIO 81
STEP          2  ACCESSES TABLE PUBLIC .SYSTABLES B
                USING INDEX PUBLIC .DSNDTX01 USING 2 COLUMN(S).
                THE JOIN METHOD IS NESTED LOOP
                THE INTENT LOCK FOR THE TABLE IS IS
                THE TIMESTAMP FOR THIS EXPLAIN IS 2005041112321585
                THIS OPERATION REFERENCES A TABLE
                THE TABLE HAS 404 ROWS OF 542 BYTES.
                THE NON-UNIQUE INDEX HAS 404 ENTRIES IN 2 LEVELS WITH
CLUSTER RATIO 72
TIME
                DB2 ESTIMATES THIS QUERY WILL USE 1 MILLISECONDS OF CPU
                DB2 ESTIMATES THIS QUERY WILL USE 1 SERVICE UNITS
STATEMENT     327 THIS IS THE NEW ACCESS PATH.
STATEMENT#    327 DECLARE SELECT-1 CURSOR FOR SELECT A . NAME , A . TBNAME , A
                . COLNO , A . COLTYPE , A . LENGTH FROM SYSCOLUMNS A INNER
                JOIN SYSTABLES B ON A . TBNAME = B . NAME AND A . TBCREATOR
                = B . CREATOR WHERE A . TBNAME = : H AND A . TBCREATOR = : H

STEP          1  ACCESSES TABLE PUBLIC6 .SYSCOLUMNS A
                USING INDEX PUBLIC6 .DSNDCX01 USING 2 COLUMN(S).
                THE ACCESS WILL USE LIST PREFETCH
                THE INTENT LOCK FOR THE TABLE IS IS
                THE TIMESTAMP FOR THIS EXPLAIN IS 2005041112393636
                THIS OPERATION REFERENCES A TABLE
                THE TABLE HAS -1 ROWS OF 969 BYTES.
                THE NON-UNIQUE INDEX HAS -1 ENTRIES IN -1 LEVELS WITH
CLUSTER RATIO 0
STEP          2  ACCESSES TABLE PUBLIC6 .SYSTABLES B
                USING INDEX PUBLIC6 .DSNDTX01 USING 2 COLUMN(S).
                THE JOIN METHOD IS NESTED LOOP
                THE INTENT LOCK FOR THE TABLE IS IS
                THE TIMESTAMP FOR THIS EXPLAIN IS 2005041112393636
                THIS OPERATION REFERENCES A TABLE
                THE TABLE HAS -1 ROWS OF 542 BYTES.
                THE NON-UNIQUE INDEX HAS -1 ENTRIES IN -1 LEVELS WITH
CLUSTER RATIO 0
TIME
                DB2 ESTIMATES THIS QUERY WILL USE 12,309 MILLISECONDS OF CPU
                DB2 ESTIMATES THIS QUERY WILL USE 34,192 SERVICE UNITS
                DB2 WAS FORCED TO USE ESTIMATES BECAUSE OF
                TABLE CARDINALITY
11 2005/04/11 SQL ID - ACCESS PATH FOR TEST06 COLLID - TESTCOLLX
OLD PLAN_TABLE -

STATEMENT     338 SQL HAD THE SAME ACCESS PATH.
STATEMENT#    338 DECLARE SELECT-2 CURSOR FOR SELECT NAME , CREATOR , TYPE , D
                BNAME , TSNAME FROM SYSTABLES WHERE CREATOR = : H

STEP          1  ACCESSES TABLE PUBLIC6 .SYSTABLES
                USING INDEX PUBLIC6 .DSNDTX01 USING 1 COLUMN(S).
                THE ACCESS WILL USE LIST PREFETCH
                THE INTENT LOCK FOR THE TABLE IS IS
                THE TIMESTAMP FOR THIS EXPLAIN IS 2005041112393645
                THIS OPERATION REFERENCES A TABLE
                THE TABLE HAS -1 ROWS OF 542 BYTES.

```

```

THE NON-UNIQUE INDEX HAS          -1 ENTRIES IN -1 LEVELS WITH
CLUSTER RATIO 0
DSN_STATEMNT_TABLE NEW ESTIMATED COST
DB2 ESTIMATES THIS QUERY WILL USE          50 MILLISECONDS OF CPU
TIME
DB2 ESTIMATES THIS QUERY WILL USE          138 SERVICE UNITS
DB2 WAS FORCED TO USE ESTIMATES BECAUSE OF
TABLE CARDINALITY
DSN_STATEMNT_TABLE OLD ESTIMATED COST
DB2 ESTIMATES THIS QUERY WILL USE          2 MILLISECONDS OF CPU
TIME
DB2 ESTIMATES THIS QUERY WILL USE          5 SERVICE UNITS

PCK206I COMPARE COMPLETE FOR PROGRAM = TEST06   VERSION =   2004-02-26-16.08.45.116006
                                           PREVIOUS VERSION = 2004-02-25-22.35.00.517271
PCK217I TOTAL DBRMS COMPARED                1
PCK217I TOTAL STATEMENTS COMPARED           2
PCK217I TOTAL ACCESS PATH CHANGES          1
PCK217I TOTAL ACCESS PATH SAME              1
PCK217I TOTAL NEW SQL STATEMENTS            0
PCK217I TOTAL DELETED SQL STATEMENTS        0

*****
*****
PCK218I PROGRAM TEST06   HAS A CHANGED ACCESS PATH
QUERYNO                   327
COLLECTION                 TESTCOLLX
NEW VERSION                2004-02-26-16.08.45.116006
OLD VERSION                2004-02-25-22.35.00.517271

*****
*****
PCK217I TOTAL DBRMS COMPARED                1
PCK217I TOTAL STATEMENTS COMPARED           2
PCK217I TOTAL ACCESS PATH CHANGES          1
PCK217I TOTAL ACCESS PATH SAME              1
PCK217I TOTAL NEW SQL STATEMENTS            0
PCK217I TOTAL DELETED SQL STATEMENTS        0

```

Version 8 Comparison

```

PCK031I EXECUTING LICENSED PATH CHECKER V2R2
11          OPTIONS CATALOGSQL NOMATCHCREATOR REPORTCOSTGT
11          CONNECT TO DB8G
11          COMPARE PACKAGE TESTCOLLX.TEST06 IN PUBLIC.PLAN_TABLE
              TO PREVIOUS
11          2005/04/11  SQL ID -          ACCESS PATH FOR TEST06          COLLID - TESTCOLLX
OLD PLAN_TABLE -
IN QRYNO M  CREATOR  TNAME          TBNO AC MC CREATOR  ACCESSNAME          IO
SORTUJGO LK PF QBNO PLNO MXSQ
PCK212I TIMESTAMP USED FOR PREVIOUS COMMAND = 2005041114355798  VERSION = 2004-02-25-
22.35.00.517271

1   327 0 PUBLIC  SYSCOLUMNS 1 I   2 PUBLIC.DSNDCX01  N NNNNNNNN  IS          1   1
PCK220I DATA CHANGE FOR COLUMN PREFETCH = WAS
1   327 1 PUBLIC  SYSTABLES  2 I   2 PUBLIC.DSNCTX01  Y NNNNNNNN  IS          1   2
2   327 0 PUBLIC6 SYSCOLUMNS 1 I   2 PUBLIC6.DSNDCX01 N NNNNNNNN  IS L        1   1
PCK221I DATA CHANGE FOR COLUMN PREFETCH = IS NOW L
2   327 1 PUBLIC6 SYSTABLES  2 I   2 PUBLIC6.DSNCTX01 Y NNNNNNNN  IS          1   2

*   338 0 PUBLIC6 SYSTABLES  1 I   1 PUBLIC6.DSNCTX01 N NNNNNNNN  IS L        1   1
PCK223I DSN_STATEMNT_TABLE ESTIMATED COST CHANGE - NEW EST SVC UNITS          245
PCK224I DSN_STATEMNT_TABLE ESTIMATED COST CHANGE - OLD EST SVC UNITS          4

PCK206I COMPARE COMPLETE FOR PROGRAM = TEST06  VERSION = 2004-02-26-16.08.45.116006
              PREVIOUS VERSION = 2004-02-25-22.35.00.517271
PCK203I STATEMENTS WITH SAME ACCESS PATH 1 STATEMENTS WITH DIFFERENT ACCESS
PATH 1 FOR PROGRAM TEST06
PCK204I QUERIES WITH MATCHING EXPLAIN 2 QUERIES WITHOUT MATCHING
EXPLAIN 0 FOR PROGRAM TEST06
PCK217I TOTAL DBRMS COMPARED 1
PCK217I TOTAL STATEMENTS COMPARED 2
PCK217I TOTAL ACCESS PATH CHANGES 1
PCK217I TOTAL ACCESS PATH SAME 1
PCK217I TOTAL NEW SQL STATEMENTS 0
PCK217I TOTAL DELETED SQL STATEMENTS 0
PCK217I TOTAL DSN_STATEMNT COST INCR 1
COMPLETE RET CODE= 04
11          2005/04/11  SQL ID -          ACCESS PATH FOR TEST06          COLLID - TESTCOLLX
OLD PLAN_TABLE -

STATEMENT          327 THIS IS THE OLD ACCESS PATH.

STATEMENT#          327 DECLARE SELECT-1 CURSOR FOR SELECT A . NAME , A . TBNAME ,
A COLNO , A . COLTYPE , A . LENGTH FROM SYSCOLUMNS A INNER
JOIN SYSTABLES B ON A . TBNAME = B . NAME AND A . TBREATOR
= B . CREATOR WHERE A . TBNAME = : H AND A . TBREATOR = : H

STEP          1  ACCESSES TABLE PUBLIC .SYSCOLUMNS A
USING INDEX PUBLIC .DSNDCX01 USING 2 COLUMN(S).
THE INTENT LOCK FOR THE TABLE IS IS
THE TIMESTAMP FOR THIS EXPLAIN IS 2005041114355781
THIS OPERATION REFERENCES A TABLE
THE TABLE HAS 6,361 ROWS OF 969 BYTES.
THE NON-UNIQUE INDEX HAS 6,361 ENTRIES IN 2 LEVELS WITH CLUSTER

RATIO 81
STEP          2  ACCESSES TABLE PUBLIC .SYSTABLES B
USING INDEX PUBLIC .DSNCTX01 USING 2 COLUMN(S).
THE JOIN METHOD IS NESTED LOOP
THE ACCESS ONLY READS THE INDEX NOT THE TABLE
THE INTENT LOCK FOR THE TABLE IS IS
THE TIMESTAMP FOR THIS EXPLAIN IS 2005041114355781
THIS OPERATION REFERENCES A TABLE
THE TABLE HAS 404 ROWS OF 542 BYTES.
THE NON-UNIQUE INDEX HAS 404 ENTRIES IN 2 LEVELS WITH CLUSTER

RATIO 72

```

```

TIME          DB2 ESTIMATES THIS QUERY WILL USE          1 MILLISECONDS OF CPU
STATEMENT     327 THIS IS THE NEW ACCESS PATH.
STATEMENT#    327 DECLARE SELECT-1 CURSOR FOR SELECT A . NAME , A . TBNAME , A
              . COLNO , A . COLTYPE , A . LENGTH FROM SYSCOLUMNS A INNER
              JOIN SYSTABLES B ON A . TBNAME = B . NAME AND A . TBCREATOR
              = B . CREATOR WHERE A . TBNAME = : H AND A . TBCREATOR = : H

STEP          1  ACCESSES TABLE      PUBLIC6 .SYSCOLUMNS      A
              USING INDEX PUBLIC6 .DSNDCX01      USING 2 COLUMN(S).
              THE ACCESS WILL USE LIST PREFETCH
              THE INTENT LOCK FOR THE TABLE IS IS
              THE TIMESTAMP FOR THIS EXPLAIN IS 2005041114361419
              THIS OPERATION REFERENCES A TABLE
              THE TABLE HAS          -1 ROWS OF      969 BYTES.
              THE NON-UNIQUE INDEX HAS          -1 ENTRIES IN -1 LEVELS WITH
CLUSTER RATIO 0
STEP          2  ACCESSES TABLE      PUBLIC6 .SYSTABLES      B
              USING INDEX PUBLIC6 .DSNDTX01      USING 2 COLUMN(S).
              THE JOIN METHOD IS NESTED LOOP
              THE ACCESS ONLY READS THE INDEX NOT THE TABLE
              THE INTENT LOCK FOR THE TABLE IS IS
              THE TIMESTAMP FOR THIS EXPLAIN IS 2005041114361419
              THIS OPERATION REFERENCES A TABLE
              THE TABLE HAS          -1 ROWS OF      542 BYTES.
              THE NON-UNIQUE INDEX HAS          -1 ENTRIES IN -1 LEVELS WITH
CLUSTER RATIO 0
TIME          DB2 ESTIMATES THIS QUERY WILL USE          12,348 MILLISECONDS OF CPU
STATEMENT     DB2 ESTIMATES THIS QUERY WILL USE          34,299 SERVICE UNITS
              DB2 WAS FORCED TO USE ESTIMATES BECAUSE OF
11           2005/04/11 SQL ID -          ACCESS PATH FOR TEST06          COLLID - TESTCOLLX
OLD PLAN_TABLE -

              TABLE CARDINALITY

STATEMENT     338 SQL HAD THE SAME ACCESS PATH.
STATEMENT#    338 DECLARE SELECT-2 CURSOR FOR SELECT NAME , CREATOR , TYPE , D
              BNAME , TSNAME FROM SYSTABLES WHERE CREATOR = : H

STEP          1  ACCESSES TABLE      PUBLIC6 .SYSTABLES
              USING INDEX PUBLIC6 .DSNDTX01      USING 1 COLUMN(S).
              THE ACCESS WILL USE LIST PREFETCH
              THE INTENT LOCK FOR THE TABLE IS IS
              THE TIMESTAMP FOR THIS EXPLAIN IS 2005041114361435
              THIS OPERATION REFERENCES A TABLE
              THE TABLE HAS          -1 ROWS OF      542 BYTES.
              THE NON-UNIQUE INDEX HAS          -1 ENTRIES IN -1 LEVELS WITH
CLUSTER RATIO 0
DSN_STATEMNT_TABLE NEW ESTIMATED COST
TIME          DB2 ESTIMATES THIS QUERY WILL USE          89 MILLISECONDS OF CPU
STATEMENT     DB2 ESTIMATES THIS QUERY WILL USE          245 SERVICE UNITS
              DB2 WAS FORCED TO USE ESTIMATES BECAUSE OF
              TABLE CARDINALITY
              DSN_STATEMNT_TABLE OLD ESTIMATED COST
TIME          DB2 ESTIMATES THIS QUERY WILL USE          2 MILLISECONDS OF CPU
STATEMENT     DB2 ESTIMATES THIS QUERY WILL USE          4 SERVICE UNITS

PCK206I COMPARE COMPLETE FOR PROGRAM = TEST06  VERSION = 2004-02-26-16.08.45.116006
              PREVIOUS VERSION = 2004-02-25-22.35.00.517271
PCK217I TOTAL DBRMS COMPARED 1
PCK217I TOTAL STATEMENTS COMPARED 2
PCK217I TOTAL ACCESS PATH CHANGES 1

```

```

PCK217I TOTAL ACCESS PATH SAME                1
PCK217I TOTAL NEW SQL STATEMENTS             0
PCK217I TOTAL DELETED SQL STATEMENTS        0

*****
*****
PCK218I PROGRAM TEST06      HAS A CHANGED ACCESS PATH
QUERYNO                     327
COLLECTION                   TESTCOLLX
NEW VERSION                  2004-02-26-16.08.45.116006
OLD VERSION                  2004-02-25-22.35.00.517271

*****
*****
PCK217I TOTAL DBRMS COMPARED                1
PCK217I TOTAL STATEMENTS COMPARED          2
PCK217I TOTAL ACCESS PATH CHANGES         1
PCK217I TOTAL ACCESS PATH SAME            1
PCK217I TOTAL NEW SQL STATEMENTS          0
PCK217I TOTAL DELETED SQL STATEMENTS      0

```

Analysis of the Comparisons between Versions of DB2

	V6	V7	V8
Before MSUs	4	5	4
After MSUs	137	138	245
Access Type Change	Nested loop Join to merge scan + List Prefetch	Merge Scan + List Prefetch	Merge Scan + List Prefetch

The absence of runstats creates obstacles even for the Optimizer.

The Change

The statistics values are -1. This is without runstats.

Query Summary

Database Alias: HLSP390 **Explain Time :** 2005-05-30 09:00:25.672483

DB2 Platform : Z/OS **DB2 Version:** v8

SQL Statement :
 DECLARE SELECT-1 CURSOR FOR SELECT A . NAME , A .
 TBNAME , A . COLNO , A . COLTYPE , A . LENGTH FROM
 SYSCOLUMNS A INNER JOIN SYSTABLES B ON A . TBNAME =
 B . NAME AND A . TBCREATOR = B . CREATOR WHERE A .
 TBNAME = : H AND A . TBCREATOR = : H

Attribute	Value	Explanation
Timestamp	2005-05-30 09:00:25.672483	Timestamp when the query is explained
Type	SELECT	Query type (SELECT, INSERT, UPDATE, DELETE, SELUPD, DELCUR, UPDCUR)
CPU Cost (ms)	12211	Estimated CPU cost (in milliseconds)
CPU Cost (su)	34203	Estimated CPU cost (in service units)
Cost Category	B	Cost estimation category (A=statistics; B=default)
Reason	TABLE CARDINALITY	Reason when the cost estimation category is B (HOST VARIABLES, TABLE CARDINALITY, UDF, TRIGGERS, REFERENTIAL CONSTRAINTS)
Group Member		

Case 7: Tables are emptied

Version 6 Comparison

```

PCK031I EXECUTING LICENSED PATH CHECKER V2R2
11          OPTIONS CATALOGSQL NOMATCHCREATOR REPORTCOSTGT
11          CONNECT TO DB6G
11          COMPARE PACKAGE TESTCOLLX.TEST07 IN PUBLIC.PLAN_TABLE
              TO PREVIOUS
11          2005/04/11  SQL ID -          ACCESS PATH FOR TEST07          COLLID - TESTCOLLX
OLD PLAN_TABLE -
  IN QRYNO M  CREATOR  TNAME          TBNO AC MC CREATOR  ACCESSNAME          IO
SORTUJGO LK PF QBNO PLNO MXSQ
PCK212I TIMESTAMP USED FOR PREVIOUS COMMAND = 2005041113365041  VERSION = 2004-02-25-
22.55.53.186647

  1   327 0 PUBLIC  SYSCOLUMNS          1 I   2 PUBLIC  DSNDXC01          N
NNNNNNNN IS      1   1
  1   327 1 PUBLIC  SYSTABLES            2 I   2 PUBLIC  DSNDTX01          N
NNNNNNNN IS      1   2
  2   327 0 PUBLIC7 SYSTABLES            2 I   2 PUBLIC7 DSNDTX01          N
NNNNNNNN IS      1   1
  2   327 1 PUBLIC7 SYSCOLUMNS          1 I   2 PUBLIC7 DSNDXC01          N
NNNNNNNN IS      1   2

  1   338 0 PUBLIC  SYSTABLES            1 I   1 PUBLIC  DSNDTX01          N
NNNNNNNN IS L    1   1
PCK220I DATA CHANGE FOR COLUMN PREFETCH =          WAS          L
  2   338 0 PUBLIC7 SYSTABLES            1 I   1 PUBLIC7 DSNDTX01          N
NNNNNNNN IS      1   1
PCK221I DATA CHANGE FOR COLUMN PREFETCH =          IS NOW
PCK206I COMPARE COMPLETE FOR PROGRAM = TEST07  VERSION =          2004-02-26-16.10.37.482737
              PREVIOUS  VERSION =          2004-02-25-22.55.53.186647

PCK203I STATEMENTS WITH SAME ACCESS PATH      0 STATEMENTS WITH DIFFERENT ACCESS
PATH      2 FOR PROGRAM TEST07
PCK204I QUERIES WITH MATCHING EXPLAIN        2 QUERIES WITHOUT MATCHING
EXPLAIN   0 FOR PROGRAM TEST07
PCK217I TOTAL DBRMS COMPARED                  1
PCK217I TOTAL STATEMENTS COMPARED            2
PCK217I TOTAL ACCESS PATH CHANGES           2
PCK217I TOTAL ACCESS PATH SAME               0
PCK217I TOTAL NEW SQL STATEMENTS            0
PCK217I TOTAL DELETED SQL STATEMENTS        0
PCK217I TOTAL DSN_STATEMNT COST INCR        0
COMPLETE RET CODE=          04
11          2005/04/11  SQL ID -          ACCESS PATH FOR TEST07          COLLID - TESTCOLLX
OLD PLAN_TABLE -

STATEMENT      327 THIS IS THE OLD ACCESS PATH.

STATEMENT#    327 DECLARE SELECT-1 CURSOR FOR SELECT A . NAME , A . TBNAME , A
              . COLNO , A . COLTYPE , A . LENGTH FROM SYSCOLUMNS A INNER
              JOIN SYSTABLES B ON A . TBNAME = B . NAME AND A . TBCREATOR
              = B . CREATOR WHERE A . TBNAME = : H AND A . TBCREATOR = : H

STEP          1  ACCESSES TABLE PUBLIC .SYSCOLUMNS          A
              USING INDEX PUBLIC .DSNDXC01          USING 2 COLUMN(S).
              THE INTENT LOCK FOR THE TABLE IS IS
              THE TIMESTAMP FOR THIS EXPLAIN IS 2005041113365033
              THE TABLE HAS          6,361 ROWS OF          969 BYTES.
              THE NON-UNIQUE INDEX HAS          6,361 ENTRIES IN 2 LEVELS WITH
CLUSTER RATIO 81
STEP          2  ACCESSES TABLE PUBLIC .SYSTABLES          B
              USING INDEX PUBLIC .DSNDTX01          USING 2 COLUMN(S).
              THE JOIN METHOD IS NESTED LOOP
              THE INTENT LOCK FOR THE TABLE IS IS
              THE TIMESTAMP FOR THIS EXPLAIN IS 2005041113365033

```

```

THE TABLE HAS          404 ROWS OF    542 BYTES.
THE NON-UNIQUE INDEX HAS          404 ENTRIES IN  2 LEVELS WITH
CLUSTER RATIO 72
DB2 ESTIMATES THIS QUERY WILL USE          1 MILLISECONDS OF CPU
TIME
DB2 ESTIMATES THIS QUERY WILL USE          2 SERVICE UNITS

STATEMENT      327 THIS IS THE NEW ACCESS PATH.

STATEMENT#     327 DECLARE SELECT-1 CURSOR FOR SELECT A . NAME , A . TBNAME , A
. COLNO , A . COLTYPE , A . LENGTH FROM SYSCOLUMNS A INNER
JOIN SYSTABLES B ON A . TBNAME = B . NAME AND A . TBCREATOR
= B . CREATOR WHERE A . TBNAME = : H AND A . TBCREATOR = : H

STEP          1  ACCESSES TABLE    PUBLIC7 .SYSTABLES          B
USING INDEX  PUBLIC7 .DSNDTX01          USING    2 COLUMN(S).
THE INTENT LOCK FOR THE TABLE IS IS
THE TIMESTAMP FOR THIS EXPLAIN IS 2005041113370666
THE TABLE HAS          0 ROWS OF    542 BYTES.
THE NON-UNIQUE INDEX HAS          0 ENTRIES IN  0 LEVELS WITH
CLUSTER RATIO 0
STEP          2  ACCESSES TABLE    PUBLIC7 .SYSCOLUMNS          A
USING INDEX  PUBLIC7 .DSNDCX01          USING    2 COLUMN(S).
THE JOIN METHOD IS NESTED LOOP
THE INTENT LOCK FOR THE TABLE IS IS
THE TIMESTAMP FOR THIS EXPLAIN IS 2005041113370666
THE TABLE HAS          0 ROWS OF    969 BYTES.
THE NON-UNIQUE INDEX HAS          0 ENTRIES IN  0 LEVELS WITH
CLUSTER RATIO 0
DB2 ESTIMATES THIS QUERY WILL USE          1 MILLISECONDS OF CPU
TIME
DB2 ESTIMATES THIS QUERY WILL USE          1 SERVICE UNITS

STATEMENT      338 THIS IS THE OLD ACCESS PATH.

STATEMENT#     338 DECLARE SELECT-2 CURSOR FOR SELECT NAME , CREATOR , TYPE , D
BNAME , TSNAME FROM SYSTABLES WHERE CREATOR = : H

STEP          1  ACCESSES TABLE    PUBLIC .SYSTABLES
USING INDEX  PUBLIC .DSNDTX01          USING    1 COLUMN(S).
11      2005/04/11  SQL ID -          ACCESS PATH FOR TEST07          COLLID - TESTCOLLX
OLD PLAN_TABLE -

THE ACCESS WILL USE LIST PREFETCH
THE INTENT LOCK FOR THE TABLE IS IS
THE TIMESTAMP FOR THIS EXPLAIN IS 2005041113365041
THE TABLE HAS          404 ROWS OF    542 BYTES.
THE NON-UNIQUE INDEX HAS          404 ENTRIES IN  2 LEVELS WITH
CLUSTER RATIO 72
DB2 ESTIMATES THIS QUERY WILL USE          2 MILLISECONDS OF CPU
TIME
DB2 ESTIMATES THIS QUERY WILL USE          4 SERVICE UNITS

STATEMENT      338 THIS IS THE NEW ACCESS PATH.

STATEMENT#     338 DECLARE SELECT-2 CURSOR FOR SELECT NAME , CREATOR , TYPE , D
BNAME , TSNAME FROM SYSTABLES WHERE CREATOR = : H

STEP          1  ACCESSES TABLE    PUBLIC7 .SYSTABLES
USING INDEX  PUBLIC7 .DSNDTX01          USING    1 COLUMN(S).
THE INTENT LOCK FOR THE TABLE IS IS
THE TIMESTAMP FOR THIS EXPLAIN IS 2005041113370673
THE TABLE HAS          0 ROWS OF    542 BYTES.
THE NON-UNIQUE INDEX HAS          0 ENTRIES IN  0 LEVELS WITH
CLUSTER RATIO 0
DB2 ESTIMATES THIS QUERY WILL USE          1 MILLISECONDS OF CPU
TIME
DB2 ESTIMATES THIS QUERY WILL USE          1 SERVICE UNITS
PCK206I COMPARE COMPLETE FOR PROGRAM = TEST07  VERSION =    2004-02-26-16.10.37.482737
PREVIOUS VERSION =    2004-02-25-22.55.53.186647

```

```

PCK217I TOTAL DBRMS COMPARED 1
PCK217I TOTAL STATEMENTS COMPARED 2
PCK217I TOTAL ACCESS PATH CHANGES 2
PCK217I TOTAL ACCESS PATH SAME 0
PCK217I TOTAL NEW SQL STATEMENTS 0
PCK217I TOTAL DELETED SQL STATEMENTS 0

```

Version 7 Comparison

```

PCK031I EXECUTING LICENSED PATH CHECKER V2R2
11          OPTIONS CATALOGSQL NOMATCHCREATOR REPORTCOSTGT
11          CONNECT TO DB7G
11          COMPARE PACKAGE TESTCOLLX.TEST07 IN PUBLIC.PLAN_TABLE
          TO PREVIOUS
11          2005/04/11 SQL ID - ACCESS PATH FOR TEST07 COLLID - TESTCOLLX
OLD PLAN_TABLE -
IN QRYNO M CREATOR TNAME TBNO AC MC CREATOR ACCESSNAME IO
SORTUJGO LK PF QBNO PLNO MXSQ
PCK212I TIMESTAMP USED FOR PREVIOUS COMMAND = 2005041112321627 VERSION = 2004-02-25-
22.55.53.186647

1 327 0 PUBLIC SYSCOLUMNS 1 I 2 PUBLIC DSNDX01 N
NNNNNNNN IS 1 1
1 327 1 PUBLIC SYSTABLES 2 I 2 PUBLIC DSNDTX01 N
NNNNNNNN IS 1 2
2 327 0 PUBLIC7 SYSTABLES 2 I 2 PUBLIC7 DSNDTX01 N
NNNNNNNN IS 1 1
2 327 1 PUBLIC7 SYSCOLUMNS 1 I 2 PUBLIC7 DSNDX01 N
NNNNNNNN IS 1 2

1 338 0 PUBLIC SYSTABLES 1 I 1 PUBLIC DSNDTX01 N
NNNNNNNN IS L 1 1
PCK220I DATA CHANGE FOR COLUMN PREFETCH = WAS L
2 338 0 PUBLIC7 SYSTABLES 1 I 1 PUBLIC7 DSNDTX01 N
NNNNNNNN IS 1 1
PCK221I DATA CHANGE FOR COLUMN PREFETCH = IS NOW
PCK206I COMPARE COMPLETE FOR PROGRAM = TEST07 VERSION = 2004-02-26-16.10.37.482737
PREVIOUS VERSION = 2004-02-25-22.55.53.186647

PCK203I STATEMENTS WITH SAME ACCESS PATH 0 STATEMENTS WITH DIFFERENT ACCESS
PATH 2 FOR PROGRAM TEST07
PCK204I QUERIES WITH MATCHING EXPLAIN 2 QUERIES WITHOUT MATCHING
EXPLAIN 0 FOR PROGRAM TEST07
PCK217I TOTAL DBRMS COMPARED 1
PCK217I TOTAL STATEMENTS COMPARED 2
PCK217I TOTAL ACCESS PATH CHANGES 2
PCK217I TOTAL ACCESS PATH SAME 0
PCK217I TOTAL NEW SQL STATEMENTS 0
PCK217I TOTAL DELETED SQL STATEMENTS 0
PCK217I TOTAL DSN_STATEMNT COST INCR 0
COMPLETE RET CODE= 04
11          2005/04/11 SQL ID - ACCESS PATH FOR TEST07 COLLID - TESTCOLLX
OLD PLAN_TABLE -

```

STATEMENT 327 THIS IS THE OLD ACCESS PATH.

STATEMENT# 327 DECLARE SELECT-1 CURSOR FOR SELECT A . NAME , A . TBNAME , A
. COLNO , A . COLTYPE , A . LENGTH FROM SYSCOLUMNS A INNER
JOIN SYSTABLES B ON A . TBNAME = B . NAME AND A . TBcreator
= B . creator WHERE A . TBNAME = : H AND A . TBcreator = : H

```

STEP 1 ACCESSES TABLE PUBLIC .SYSCOLUMNS A
      USING INDEX PUBLIC .DSNDX01 USING 2 COLUMN(S).
      THE INTENT LOCK FOR THE TABLE IS IS
      THE TIMESTAMP FOR THIS EXPLAIN IS 2005041112321620
      THIS OPERATION REFERENCES A TABLE
      THE TABLE HAS 6,361 ROWS OF 969 BYTES.
      THE NON-UNIQUE INDEX HAS 6,361 ENTRIES IN 2 LEVELS WITH
CLUSTER RATIO 81
STEP 2 ACCESSES TABLE PUBLIC .SYSTABLES B

```

```

        USING INDEX PUBLIC .DSNDTX01          USING  2 COLUMN(S).
        THE JOIN METHOD IS NESTED LOOP
        THE INTENT LOCK FOR THE TABLE IS IS
        THE TIMESTAMP FOR THIS EXPLAIN IS 2005041112321620
        THIS OPERATION REFERENCES A TABLE
        THE TABLE HAS          404 ROWS OF    542 BYTES.
        THE NON-UNIQUE INDEX HAS          404 ENTRIES IN  2 LEVELS WITH
CLUSTER RATIO 72
TIME
        DB2 ESTIMATES THIS QUERY WILL USE          1 MILLISECONDS OF CPU
        DB2 ESTIMATES THIS QUERY WILL USE          1 SERVICE UNITS

STATEMENT      327 THIS IS THE NEW ACCESS PATH.

STATEMENT#     327 DECLARE SELECT-1 CURSOR FOR SELECT A . NAME , A . TBNAME , A
                . COLNO , A . COLTYPE , A . LENGTH FROM SYSCOLUMNS A INNER
                JOIN SYSTABLES B ON A . TBNAME = B . NAME AND A . TBCREATOR
                = B . CREATOR WHERE A . TBNAME = : H AND A . TBCREATOR = : H

STEP           1  ACCESSES TABLE PUBLIC7 .SYSTABLES          B
                USING INDEX PUBLIC7 .DSNDTX01          USING  2 COLUMN(S).
                THE INTENT LOCK FOR THE TABLE IS IS
                THE TIMESTAMP FOR THIS EXPLAIN IS 2005041112393668
                THIS OPERATION REFERENCES A TABLE
                THE TABLE HAS          0 ROWS OF    542 BYTES.
                THE NON-UNIQUE INDEX HAS          0 ENTRIES IN  0 LEVELS WITH
CLUSTER RATIO 0
STEP           2  ACCESSES TABLE PUBLIC7 .SYSCOLUMNS          A
                USING INDEX PUBLIC7 .DSNDCX01          USING  2 COLUMN(S).
                THE JOIN METHOD IS NESTED LOOP
                THE INTENT LOCK FOR THE TABLE IS IS
                THE TIMESTAMP FOR THIS EXPLAIN IS 2005041112393668
                THIS OPERATION REFERENCES A TABLE
                THE TABLE HAS          0 ROWS OF    969 BYTES.
                THE NON-UNIQUE INDEX HAS          0 ENTRIES IN  0 LEVELS WITH
CLUSTER RATIO 0
TIME
        DB2 ESTIMATES THIS QUERY WILL USE          1 MILLISECONDS OF CPU
        DB2 ESTIMATES THIS QUERY WILL USE          1 SERVICE UNITS

STATEMENT      338 THIS IS THE OLD ACCESS PATH.

STATEMENT#     338 DECLARE SELECT-2 CURSOR FOR SELECT NAME , CREATOR , TYPE , D
11 2005/04/11 SQL ID -          ACCESS PATH FOR TEST07          COLLID - TESTCOLLX
OLD PLAN_TABLE -

                BNAME , TSNAME FROM SYSTABLES WHERE CREATOR = : H

STEP           1  ACCESSES TABLE PUBLIC .SYSTABLES
                USING INDEX PUBLIC .DSNDTX01          USING  1 COLUMN(S).
                THE ACCESS WILL USE LIST PREFETCH
                THE INTENT LOCK FOR THE TABLE IS IS
                THE TIMESTAMP FOR THIS EXPLAIN IS 2005041112321627
                THIS OPERATION REFERENCES A TABLE
                THE TABLE HAS          404 ROWS OF    542 BYTES.
                THE NON-UNIQUE INDEX HAS          404 ENTRIES IN  2 LEVELS WITH
CLUSTER RATIO 72
TIME
        DB2 ESTIMATES THIS QUERY WILL USE          2 MILLISECONDS OF CPU
        DB2 ESTIMATES THIS QUERY WILL USE          5 SERVICE UNITS

STATEMENT      338 THIS IS THE NEW ACCESS PATH.

STATEMENT#     338 DECLARE SELECT-2 CURSOR FOR SELECT NAME , CREATOR , TYPE , D
                BNAME , TSNAME FROM SYSTABLES WHERE CREATOR = : H

STEP           1  ACCESSES TABLE PUBLIC7 .SYSTABLES
                USING INDEX PUBLIC7 .DSNDTX01          USING  1 COLUMN(S).
                THE INTENT LOCK FOR THE TABLE IS IS
                THE TIMESTAMP FOR THIS EXPLAIN IS 2005041112393676

```

```

THIS OPERATION REFERENCES A TABLE
THE TABLE HAS 0 ROWS OF 542 BYTES.
THE NON-UNIQUE INDEX HAS 0 ENTRIES IN 0 LEVELS WITH
CLUSTER RATIO 0
DB2 ESTIMATES THIS QUERY WILL USE 1 MILLISECOND OF CPU
TIME
DB2 ESTIMATES THIS QUERY WILL USE 1 SERVICE UNITS
PCK206I COMPARE COMPLETE FOR PROGRAM = TEST07 VERSION = 2004-02-26-16.10.37.482737
PREVIOUS VERSION = 2004-02-25-22.55.53.186647
PCK217I TOTAL DBRMS COMPARED 1
PCK217I TOTAL STATEMENTS COMPARED 2
PCK217I TOTAL ACCESS PATH CHANGES 2
PCK217I TOTAL ACCESS PATH SAME 0
PCK217I TOTAL NEW SQL STATEMENTS 0
PCK217I TOTAL DELETED SQL STATEMENTS 0
*****
*****
PCK218I PROGRAM TEST07 HAS A CHANGED ACCESS PATH
QUERYNO 327
COLLECTION TESTCOLLX
NEW VERSION 2004-02-26-16.10.37.482737
OLD VERSION 2004-02-25-22.55.53.186647
*****
*****
PCK218I PROGRAM TEST07 HAS A CHANGED ACCESS PATH
QUERYNO 338
COLLECTION TESTCOLLX
NEW VERSION 2004-02-26-16.10.37.482737
OLD VERSION 2004-02-25-22.55.53.186647
*****
*****
PCK217I TOTAL DBRMS COMPARED 1
PCK217I TOTAL STATEMENTS COMPARED 2
PCK217I TOTAL ACCESS PATH CHANGES 2
PCK217I TOTAL ACCESS PATH SAME 0
PCK217I TOTAL NEW SQL STATEMENTS 0
PCK217I TOTAL DELETED SQL STATEMENTS 0

```

Version 8 Comparison

```

PCK031I EXECUTING LICENSED PATH CHECKER V2R2
11 OPTIONS CATALOGSQL NOMATCHCREATOR REPORTCOSTGT
11 CONNECT TO DB8G
11 COMPARE PACKAGE TESTCOLLX.TEST07 IN PUBLIC.PLAN_TABLE
TO PREVIOUS
11 2005/04/11 SQL ID - ACCESS PATH FOR TEST07 COLLID - TESTCOLLX
OLD PLAN_TABLE -
IN QRYNO M CREATOR TNAME TBNO AC MC CREATOR ACCESSNAME IO
SORTUJGO LK PF QBNO PLNO MXSQ
PCK212I TIMESTAMP USED FOR PREVIOUS COMMAND = 2005041114355851 VERSION = 2004-02-25-
22.55.53.186647
1 327 0 PUBLIC SYSCOLUMNS 1 I 2 PUBLIC DSNDX01 N
NNNNNNNN IS 1 1
1 327 1 PUBLIC SYSTABLES 2 I 2 PUBLIC DSNDTX01 Y
NNNNNNNN IS 1 2
2 327 0 PUBLIC7 SYSTABLES 2 I 2 PUBLIC7 DSNDTX01 Y
NNNNNNNN IS 1 1
2 327 1 PUBLIC7 SYSCOLUMNS 1 I 2 PUBLIC7 DSNDX01 N
NNNNNNNN IS 1 2
1 338 0 PUBLIC SYSTABLES 1 I 1 PUBLIC DSNDTX01 N
NNNNNNNN IS L 1 1
PCK220I DATA CHANGE FOR COLUMN PREFETCH = WAS L
2 338 0 PUBLIC7 SYSTABLES 1 I 1 PUBLIC7 DSNDTX01 N
NNNNNNNN IS 1 1
PCK221I DATA CHANGE FOR COLUMN PREFETCH = IS NOW
PCK206I COMPARE COMPLETE FOR PROGRAM = TEST07 VERSION = 2004-02-26-16.10.37.482737

```

```

PREVIOUS VERSION = 2004-02-25-22.55.53.186647
PCK203I STATEMENTS WITH SAME ACCESS PATH 0 STATEMENTS WITH DIFFERENT ACCESS
PATH 2 FOR PROGRAM TEST07
PCK204I QUERIES WITH MATCHING EXPLAIN 2 QUERIES WITHOUT MATCHING
EXPLAIN 0 FOR PROGRAM TEST07
PCK217I TOTAL DBRMS COMPARED 1
PCK217I TOTAL STATEMENTS COMPARED 2
PCK217I TOTAL ACCESS PATH CHANGES 2
PCK217I TOTAL ACCESS PATH SAME 0
PCK217I TOTAL NEW SQL STATEMENTS 0
PCK217I TOTAL DELETED SQL STATEMENTS 0
PCK217I TOTAL DSN_STATEMNT COST INCR 0
COMPLETE RET CODE= 04
11 2005/04/11 SQL ID - ACCESS PATH FOR TEST07 COLLID - TESTCOLLX
OLD PLAN_TABLE -

```

```

STATEMENT 327 THIS IS THE OLD ACCESS PATH.

STATEMENT# 327 DECLARE SELECT-1 CURSOR FOR SELECT A . NAME , A . TBNAME , A
. COLNO , A . COLTYPE , A . LENGTH FROM SYSCOLUMNS A INNER
JOIN SYSTABLES B ON A . TBNAME = B . NAME AND A . TBCREATOR
= B . CREATOR WHERE A . TBNAME = : H AND A . TBCREATOR = : H

STEP 1 ACCESSES TABLE PUBLIC .SYSCOLUMNS A
USING INDEX PUBLIC .DSNDCX01 USING 2 COLUMN(S).
THE INTENT LOCK FOR THE TABLE IS IS
THE TIMESTAMP FOR THIS EXPLAIN IS 2005041114355834
THIS OPERATION REFERENCES A TABLE
THE TABLE HAS 6,361 ROWS OF 969 BYTES.
THE NON-UNIQUE INDEX HAS 6,361 ENTRIES IN 2 LEVELS WITH
CLUSTER RATIO 81
STEP 2 ACCESSES TABLE PUBLIC .SYSTABLES B
USING INDEX PUBLIC .DSNDTX01 USING 2 COLUMN(S).
THE JOIN METHOD IS NESTED LOOP
THE ACCESS ONLY READS THE INDEX NOT THE TABLE
THE INTENT LOCK FOR THE TABLE IS IS
THE TIMESTAMP FOR THIS EXPLAIN IS 2005041114355834
THIS OPERATION REFERENCES A TABLE
THE TABLE HAS 404 ROWS OF 542 BYTES.
THE NON-UNIQUE INDEX HAS 404 ENTRIES IN 2 LEVELS WITH
CLUSTER RATIO 72
DB2 ESTIMATES THIS QUERY WILL USE 1 MILLISECONDS OF CPU
TIME
DB2 ESTIMATES THIS QUERY WILL USE 2 SERVICE UNITS

STATEMENT 327 THIS IS THE NEW ACCESS PATH.

STATEMENT# 327 DECLARE SELECT-1 CURSOR FOR SELECT A . NAME , A . TBNAME , A
. COLNO , A . COLTYPE , A . LENGTH FROM SYSCOLUMNS A INNER
JOIN SYSTABLES B ON A . TBNAME = B . NAME AND A . TBCREATOR
= B . CREATOR WHERE A . TBNAME = : H AND A . TBCREATOR = : H

STEP 1 ACCESSES TABLE PUBLIC7 .SYSTABLES B
USING INDEX PUBLIC7 .DSNDTX01 USING 2 COLUMN(S).
THE ACCESS ONLY READS THE INDEX NOT THE TABLE
THE INTENT LOCK FOR THE TABLE IS IS
THE TIMESTAMP FOR THIS EXPLAIN IS 2005041114361467
THIS OPERATION REFERENCES A TABLE
THE TABLE HAS 0 ROWS OF 542 BYTES.
THE NON-UNIQUE INDEX HAS 0 ENTRIES IN 0 LEVELS WITH
CLUSTER RATIO 0
STEP 2 ACCESSES TABLE PUBLIC7 .SYSCOLUMNS A
USING INDEX PUBLIC7 .DSNDCX01 USING 2 COLUMN(S).
THE JOIN METHOD IS NESTED LOOP
THE INTENT LOCK FOR THE TABLE IS IS
THE TIMESTAMP FOR THIS EXPLAIN IS 2005041114361467
THIS OPERATION REFERENCES A TABLE
THE TABLE HAS 0 ROWS OF 969 BYTES.

```

```

THE NON-UNIQUE INDEX HAS          0 ENTRIES IN  0 LEVELS WITH
CLUSTER RATIO  0
DB2 ESTIMATES THIS QUERY WILL USE          1 MILLISECONDS OF CPU
TIME
DB2 ESTIMATES THIS QUERY WILL USE          1 SERVICE UNITS

```

```

STATEMENT      338 THIS IS THE OLD ACCESS PATH.
11      2005/04/11 SQL ID -          ACCESS PATH FOR TEST07      COLLID - TESTCOLLX
OLD PLAN_TABLE -

```

```

STATEMENT#      338 DECLARE SELECT-2 CURSOR FOR SELECT NAME , CREATOR , TYPE , D
          BNAME , TSNAME FROM SYSTABLES WHERE CREATOR = : H

```

```

STEP           1  ACCESSES TABLE      PUBLIC .SYSTABLES
          USING INDEX PUBLIC .DSNDTX01          USING  1 COLUMN(S).
          THE ACCESS WILL USE LIST PREFETCH
          THE INTENT LOCK FOR THE TABLE IS IS
          THE TIMESTAMP FOR THIS EXPLAIN IS 2005041114355851
          THIS OPERATION REFERENCES A TABLE
          THE TABLE HAS          404 ROWS OF    542 BYTES.
          THE NON-UNIQUE INDEX HAS          404 ENTRIES IN  2 LEVELS WITH
CLUSTER RATIO 72
DB2 ESTIMATES THIS QUERY WILL USE          2 MILLISECONDS OF CPU
TIME
DB2 ESTIMATES THIS QUERY WILL USE          4 SERVICE UNITS

```

```

STATEMENT      338 THIS IS THE NEW ACCESS PATH.

```

```

STATEMENT#      338 DECLARE SELECT-2 CURSOR FOR SELECT NAME , CREATOR , TYPE , D
          BNAME , TSNAME FROM SYSTABLES WHERE CREATOR = : H

```

```

STEP           1  ACCESSES TABLE      PUBLIC7 .SYSTABLES
          USING INDEX PUBLIC7 .DSNDTX01          USING  1 COLUMN(S).
          THE INTENT LOCK FOR THE TABLE IS IS
          THE TIMESTAMP FOR THIS EXPLAIN IS 2005041114361483
          THIS OPERATION REFERENCES A TABLE
          THE TABLE HAS          0 ROWS OF    542 BYTES.
          THE NON-UNIQUE INDEX HAS          0 ENTRIES IN  0 LEVELS WITH
CLUSTER RATIO  0
DB2 ESTIMATES THIS QUERY WILL USE          1 MILLISECONDS OF CPU
TIME
DB2 ESTIMATES THIS QUERY WILL USE          1 SERVICE UNITS

```

```

PCK206I COMPARE COMPLETE FOR PROGRAM = TEST07  VERSION =    2004-02-26-16.10.37.482737
          PREVIOUS VERSION =    2004-02-25-22.55.53.186647

```

```

PCK217I TOTAL DBRMS COMPARED          1
PCK217I TOTAL STATEMENTS COMPARED     2
PCK217I TOTAL ACCESS PATH CHANGES    2
PCK217I TOTAL ACCESS PATH SAME        0
PCK217I TOTAL NEW SQL STATEMENTS     0
PCK217I TOTAL DELETED SQL STATEMENTS  0

```

```

*****
*****

```

```

PCK218I PROGRAM TEST07      HAS A CHANGED ACCESS PATH
QUERYNO          327
COLLECTION      TESTCOLLX
NEW VERSION     2004-02-26-16.10.37.482737
OLD VERSION     2004-02-25-22.55.53.186647

```

```

*****
*****

```

```

PCK218I PROGRAM TEST07      HAS A CHANGED ACCESS PATH
QUERYNO          338
COLLECTION      TESTCOLLX
NEW VERSION     2004-02-26-16.10.37.482737
OLD VERSION     2004-02-25-22.55.53.186647

```

```

*****
*****

```

```

PCK217I TOTAL DBRMS COMPARED          1

```

```

PCK217I TOTAL STATEMENTS COMPARED          2
PCK217I TOTAL ACCESS PATH CHANGES         2
PCK217I TOTAL ACCESS PATH SAME            0
PCK217I TOTAL NEW SQL STATEMENTS          0
PCK217I TOTAL DELETED SQL STATEMENTS      0

```

Analysis of the Comparisons between Versions of DB2 – Cursor 1

	V6	V7	V8
Before MSUs	2	1	2
After MSUs	1	1	1
Access Type Change	Change Join Sequence	Change Join Sequence	Change Join Sequence

Analysis of the Comparisons between Versions of DB2 – Cursor 2

	V6	V7	V8
Before MSUs	4	5	4
After MSUs	1	1	1
Access Type Change	List Prefetch	List Prefetch	List Prefetch

Runstats that don't accurately reflect the table contents will also cause access path changes. DB2 does not know from the table definitions which table should be accessed first. The access path with SYSCOLUMNS first will cause DB2 to access SYSTABLES for each row in SYSCOLUMNS. This would greatly increase the number of get pages required to process this query.

The second cursor is a single table select and used list prefetch even though runstats shows 0 data rows.

The Change

We did runstats but with 0 rows and 0 pages in the tables.

Query Summary

Database Alias: HLSP390 **Explain Time :** 2005-05-30 09:00:26.660359

DB2 Platform : Z/OS **DB2 Version:** v8

SQL Statement :
 DECLARE SELECT-1 CURSOR FOR SELECT A . NAME , A .
 TBNAME , A . COLNO , A . COLTYPE , A . LENGTH FROM
 SYSCOLUMNS A INNER JOIN SYSTABLES B ON A . TBNAME =
 B . NAME AND A . TBCREATOR = B . CREATOR WHERE A .
 TBNAME = : H AND A . TBCREATOR = : H

Attribute	Value	Explanation
Timestamp	2005-05-30 09:00:26.660359	Timestamp when the query is explained
Type	SELECT	Query type (SELECT, INSERT, UPDATE, DELETE, SELUPD, DELCUR, UPDCUR)
CPU Cost (ms)	1	Estimated CPU cost (in milliseconds)
CPU Cost (su)	2	Estimated CPU cost (in service units)
Cost Category	A	Cost estimation category (A=statistics; B=default)
Reason		Reason when the cost estimation category is B (HOST VARIABLES, TABLE CARDINALITY, UDF, TRIGGERS, REFERENTIAL CONSTRAINTS)
Group Member		

Query Summary

Database Alias: HLSP390 **Explain Time :** 2005-05-30 09:00:26.660359

DB2 Platform : Z/OS **DB2 Version:** v8

SQL Statement : DECLARE SELECT-2 CURSOR FOR SELECT NAME , CREATOR
, TYPE , DBNAME , TSNAME FROM SYSTABLES WHERE
CREATOR = : H

Attribute	Value	Explanation
Timestamp	2005-05-30 09:00:26.660359	Timestamp when the query is explained
Type	SELECT	Query type (SELECT, INSERT, UPDATE, DELETE, SELUPD, DELCUR, UPDCUR)
CPU Cost (ms)	2	Estimated CPU cost (in milliseconds)
CPU Cost (su)	5	Estimated CPU cost (in service units)
Cost Category	A	Cost estimation category (A=statistics; B=default)
Reason		Reason when the cost estimation category is B (HOST VARIABLES, TABLE CARDINALITY, UDF, TRIGGERS, REFERENTIAL CONSTRAINTS)
Group Member		

Case 8: Case 8: Cluster Ratio Change

Version 6 Comparison

```

PCK031I EXECUTING LICENSED PATH CHECKER V2R2
11          OPTIONS CATALOGSQL NOMATCHCREATOR REPORTCOSTGT
11          CONNECT TO DB6G
11          COMPARE PACKAGE TESTCOLLX.TEST08 IN PUBLIC.PLAN_TABLE
              TO PREVIOUS
11          2005/04/11  SQL ID -          ACCESS PATH FOR TEST08          COLLID - TESTCOLLX
OLD PLAN_TABLE -
  IN QRYNO M  CREATOR  TNAME          TBNO AC MC CREATOR  ACCESSNAME          IO
SORTUJGO LK PF QBNO PLNO MXSQ
PCK212I TIMESTAMP USED FOR PREVIOUS COMMAND = 2005041113365074  VERSION = 2004-02-25-
23.08.52.526193

  1   327 0 PUBLIC  SYSCOLUMNS          1 I   2 PUBLIC  DSNDXC01          N
NNNNNNNN IS          1   1
  1   327 1 PUBLIC  SYSTABLES            2 I   2 PUBLIC  DSNDTX01          N
NNNNNNNN IS          1   2
  2   327 0 PUBLIC8 SYSTABLES            2 I   2 PUBLIC8 DSNDTX01          N
NNNNNNNN IS          1   1
  2   327 1 PUBLIC8 SYSCOLUMNS          1 I   2 PUBLIC8 DSNDXC01          N
NNNNNNNN IS          1   2
PCK206I COMPARE COMPLETE FOR PROGRAM = TEST08  VERSION = 2004-02-26-16.11.27.295103
              PREVIOUS VERSION = 2004-02-25-23.08.52.526193
PCK203I STATEMENTS WITH SAME ACCESS PATH      1 STATEMENTS WITH DIFFERENT ACCESS
PATH          1 FOR PROGRAM TEST08
PCK204I QUERIES WITH MATCHING EXPLAIN        2 QUERIES WITHOUT MATCHING
EXPLAIN      0 FOR PROGRAM TEST08
PCK217I TOTAL DBRMS COMPARED                  1
PCK217I TOTAL STATEMENTS COMPARED            2
PCK217I TOTAL ACCESS PATH CHANGES           1
PCK217I TOTAL ACCESS PATH SAME               1
PCK217I TOTAL NEW SQL STATEMENTS            0
PCK217I TOTAL DELETED SQL STATEMENTS        0
PCK217I TOTAL DSN_STATEMNT COST INCR        0
COMPLETE RET CODE= 04
11          2005/04/11  SQL ID -          ACCESS PATH FOR TEST08          COLLID - TESTCOLLX
OLD PLAN_TABLE -

STATEMENT          327 THIS IS THE OLD ACCESS PATH.

STATEMENT#        327 DECLARE SELECT-1 CURSOR FOR SELECT A . NAME , A . TBNAME , A
              . COLNO , A . COLTYPE , A . LENGTH FROM SYSCOLUMNS A INNER
              JOIN SYSTABLES B ON A . TBNAME = B . NAME AND A . TBcreator
              = B . CREATOR WHERE A . TBNAME = : H AND A . TBcreator = : H

STEP              1  ACCESSES TABLE PUBLIC .SYSCOLUMNS          A
              USING INDEX PUBLIC .DSNDXC01          USING 2 COLUMN(S).
              THE INTENT LOCK FOR THE TABLE IS IS
              THE TIMESTAMP FOR THIS EXPLAIN IS 2005041113365064
              THE TABLE HAS 6,361 ROWS OF 969 BYTES.
              THE NON-UNIQUE INDEX HAS 6,361 ENTRIES IN 2 LEVELS WITH
CLUSTER RATIO 81
STEP              2  ACCESSES TABLE PUBLIC .SYSTABLES          B
              USING INDEX PUBLIC .DSNDTX01          USING 2 COLUMN(S).
              THE JOIN METHOD IS NESTED LOOP
              THE INTENT LOCK FOR THE TABLE IS IS
              THE TIMESTAMP FOR THIS EXPLAIN IS 2005041113365064
              THE TABLE HAS 404 ROWS OF 542 BYTES.
              THE NON-UNIQUE INDEX HAS 404 ENTRIES IN 2 LEVELS WITH
CLUSTER RATIO 72
TIME
DB2 ESTIMATES THIS QUERY WILL USE          1 MILLISECONDS OF CPU
DB2 ESTIMATES THIS QUERY WILL USE          2 SERVICE UNITS

```

```

STATEMENT          327 THIS IS THE NEW ACCESS PATH.

STATEMENT#        327 DECLARE SELECT-1 CURSOR FOR SELECT A . NAME , A . TBNAME , A
                   . COLNO , A . COLTYPE , A . LENGTH FROM SYSCOLUMNS A INNER
                   JOIN SYSTABLES B ON A . TBNAME = B . NAME AND A . TBCREATOR
                   = B . CREATOR WHERE A . TBNAME = : H AND A . TBCREATOR = : H

STEP              1  ACCESSES TABLE PUBLIC8 .SYSTABLES B
                   USING INDEX PUBLIC8 .DSNDTX01 USING 2 COLUMN(S).
                   THE INTENT LOCK FOR THE TABLE IS IS
                   THE TIMESTAMP FOR THIS EXPLAIN IS 2005041113370697
                   THE TABLE HAS 404 ROWS OF 542 BYTES.
                   THE NON-UNIQUE INDEX HAS 404 ENTRIES IN 2 LEVELS WITH

CLUSTER RATIO 73
STEP              2  ACCESSES TABLE PUBLIC8 .SYSCOLUMNS A
                   USING INDEX PUBLIC8 .DSNDCX01 USING 2 COLUMN(S).
                   THE JOIN METHOD IS NESTED LOOP
                   THE INTENT LOCK FOR THE TABLE IS IS
                   THE TIMESTAMP FOR THIS EXPLAIN IS 2005041113370697
                   THE TABLE HAS 6,361 ROWS OF 969 BYTES.
                   THE NON-UNIQUE INDEX HAS 6,361 ENTRIES IN 3 LEVELS WITH

CLUSTER RATIO 81
DB2 ESTIMATES THIS QUERY WILL USE 1 MILLISECONDS OF CPU
TIME
DB2 ESTIMATES THIS QUERY WILL USE 2 SERVICE UNITS
PCK206I COMPARE COMPLETE FOR PROGRAM = TEST08 VERSION = 2004-02-26-16.11.27.295103
PREVIOUS VERSION = 2004-02-25-23.08.52.526193
PCK217I TOTAL DBRMS COMPARED 1
PCK217I TOTAL STATEMENTS COMPARED 2
PCK217I TOTAL ACCESS PATH CHANGES 1
PCK217I TOTAL ACCESS PATH SAME 1
PCK217I TOTAL NEW SQL STATEMENTS 0
PCK217I TOTAL DELETED SQL STATEMENTS 0
11 2005/04/11 SQL ID - ACCESS PATH FOR TEST08 COLLID - TESTCOLLX
OLD PLAN_TABLE -

```

Version 7 Comparison

```

PCK031I EXECUTING LICENSED PATH CHECKER V2R2
11 OPTIONS CATALOGSQL NOMATCHCREATOR REPORTCOSTGT
11 CONNECT TO DB7G
11 PACKAGE TESTCOLLX.TEST07 IN PUBLIC.PLAN_TABLE
   TO PREVIOUS
11 2005/04/11 SQL ID - ACCESS PATH FOR TEST07 COLLID - TESTCOLLX
OLD PLAN_TABLE -
IN QRYNO M CREATOR TNAME TBNO AC MC CREATOR ACCESSNAME IO
SORTUJGO LK PF QBNO PLNO MXSQ
PCK212I TIMESTAMP USED FOR PREVIOUS COMMAND = 2005041112321627 VERSION = 2004-02-25-
22.55.53.186647

1 327 0 PUBLIC SYSCOLUMNS 1 I 2 PUBLIC DSNDCX01 N
NNNNNNNN IS 1 1
1 327 1 PUBLIC SYSTABLES 2 I 2 PUBLIC DSNDTX01 N
NNNNNNNN IS 1 2
2 327 0 PUBLIC7 SYSTABLES 2 I 2 PUBLIC7 DSNDTX01 N
NNNNNNNN IS 1 1
2 327 1 PUBLIC7 SYSCOLUMNS 1 I 2 PUBLIC7 DSNDCX01 N
NNNNNNNN IS 1 2

1 338 0 PUBLIC SYSTABLES 1 I 1 PUBLIC DSNDTX01 N
NNNNNNNN IS L 1 1
PCK220I DATA CHANGE FOR COLUMN PREFETCH = WAS L
2 338 0 PUBLIC7 SYSTABLES 1 I 1 PUBLIC7 DSNDTX01 N
NNNNNNNN IS 1 1
PCK221I DATA CHANGE FOR COLUMN PREFETCH = IS NOW
PCK206I COMPARE COMPLETE FOR PROGRAM = TEST07 VERSION = 2004-02-26-16.10.37.482737
PREVIOUS VERSION = 2004-02-25-22.55.53.186647
PCK203I STATEMENTS WITH SAME ACCESS PATH 0 STATEMENTS WITH DIFFERENT ACCESS
PATH 2 FOR PROGRAM TEST07

```

```

PCK204I   QUERIES WITH MATCHING EXPLAIN          2          QUERIES WITHOUT MATCHING
EXPLAIN   0          FOR PROGRAM TEST07
PCK217I TOTAL DBRMS COMPARED                    1
PCK217I TOTAL STATEMENTS COMPARED              2
PCK217I TOTAL ACCESS PATH CHANGES            2
PCK217I TOTAL ACCESS PATH SAME                0
PCK217I TOTAL NEW SQL STATEMENTS              0
PCK217I TOTAL DELETED SQL STATEMENTS          0
PCK217I TOTAL DSN_STATEMNT COST INCR          0
COMPLETE RET CODE=                               04
11      2005/04/11  SQL ID -          ACCESS PATH FOR TEST07          COLLID - TESTCOLLX
OLD PLAN_TABLE -

```

```

STATEMENT      327 THIS IS THE OLD ACCESS PATH.

STATEMENT#     327 DECLARE SELECT-1 CURSOR FOR SELECT A . NAME , A . TBNAME , A
                . COLNO , A . COLTYPE , A . LENGTH FROM SYSCOLUMNS A INNER
                JOIN SYSTABLES B ON A . TBNAME = B . NAME AND A . TBCREATOR
                = B . CREATOR WHERE A . TBNAME = : H AND A . TBCREATOR = : H

STEP           1  ACCESSES TABLE      PUBLIC .SYSCOLUMNS          A
                USING INDEX PUBLIC .DSNDCX01          USING 2 COLUMN(S).
                THE INTENT LOCK FOR THE TABLE IS IS
                THE TIMESTAMP FOR THIS EXPLAIN IS 2005041112321620
                THIS OPERATION REFERENCES A TABLE
                THE TABLE HAS          6,361 ROWS OF    969 BYTES.
                THE NON-UNIQUE INDEX HAS          6,361 ENTRIES IN 2 LEVELS WITH
CLUSTER RATIO 81
STEP           2  ACCESSES TABLE      PUBLIC .SYSTABLES          B
                USING INDEX PUBLIC .DSNDTX01          USING 2 COLUMN(S).
                THE JOIN METHOD IS NESTED LOOP
                THE INTENT LOCK FOR THE TABLE IS IS
                THE TIMESTAMP FOR THIS EXPLAIN IS 2005041112321620
                THIS OPERATION REFERENCES A TABLE
                THE TABLE HAS          404 ROWS OF    542 BYTES.
                THE NON-UNIQUE INDEX HAS          404 ENTRIES IN 2 LEVELS WITH
CLUSTER RATIO 72
                DB2 ESTIMATES THIS QUERY WILL USE          1 MILLISECONDS OF CPU
TIME
                DB2 ESTIMATES THIS QUERY WILL USE          1 SERVICE UNITS

STATEMENT      327 THIS IS THE NEW ACCESS PATH.

STATEMENT#     327 DECLARE SELECT-1 CURSOR FOR SELECT A . NAME , A . TBNAME , A
                . COLNO , A . COLTYPE , A . LENGTH FROM SYSCOLUMNS A INNER
                JOIN SYSTABLES B ON A . TBNAME = B . NAME AND A . TBCREATOR
                = B . CREATOR WHERE A . TBNAME = : H AND A . TBCREATOR = : H

STEP           1  ACCESSES TABLE      PUBLIC7 .SYSTABLES          B
                USING INDEX PUBLIC7 .DSNDTX01          USING 2 COLUMN(S).
                THE INTENT LOCK FOR THE TABLE IS IS
                THE TIMESTAMP FOR THIS EXPLAIN IS 2005041112393668
                THIS OPERATION REFERENCES A TABLE
                THE TABLE HAS          0 ROWS OF    542 BYTES.
                THE NON-UNIQUE INDEX HAS          0 ENTRIES IN 0 LEVELS WITH
CLUSTER RATIO 0
STEP           2  ACCESSES TABLE      PUBLIC7 .SYSCOLUMNS          A
                USING INDEX PUBLIC7 .DSNDCX01          USING 2 COLUMN(S).
                THE JOIN METHOD IS NESTED LOOP
                THE INTENT LOCK FOR THE TABLE IS IS
                THE TIMESTAMP FOR THIS EXPLAIN IS 2005041112393668
                THIS OPERATION REFERENCES A TABLE
                THE TABLE HAS          0 ROWS OF    969 BYTES.
                THE NON-UNIQUE INDEX HAS          0 ENTRIES IN 0 LEVELS WITH
CLUSTER RATIO 0
                DB2 ESTIMATES THIS QUERY WILL USE          1 MILLISECONDS OF CPU
TIME
                DB2 ESTIMATES THIS QUERY WILL USE          1 SERVICE UNITS

```

```

STATEMENT          338 THIS IS THE OLD ACCESS PATH.

STATEMENT#        338 DECLARE SELECT-2 CURSOR FOR SELECT NAME , CREATOR , TYPE , D
11      2005/04/11  SQL ID -          ACCESS PATH FOR TEST07          COLLID - TESTCOLLX
OLD PLAN_TABLE -

                BNAME , TSNAME FROM SYSTABLES WHERE CREATOR = : H

STEP              1  ACCESSES TABLE      PUBLIC .SYSTABLES
                USING INDEX PUBLIC .DSNDTX01          USING  1 COLUMN(S).
                THE ACCESS WILL USE LIST PREFETCH
                THE INTENT LOCK FOR THE TABLE IS IS
                THE TIMESTAMP FOR THIS EXPLAIN IS 2005041112321627
                THIS OPERATION REFERENCES A TABLE
                THE TABLE HAS              404 ROWS OF      542 BYTES.
                THE NON-UNIQUE INDEX HAS    404 ENTRIES IN  2 LEVELS WITH
CLUSTER RATIO 72
                DB2 ESTIMATES THIS QUERY WILL USE          2 MILLISECONDS OF CPU
TIME
                DB2 ESTIMATES THIS QUERY WILL USE          5 SERVICE UNITS

STATEMENT          338 THIS IS THE NEW ACCESS PATH.

STATEMENT#        338 DECLARE SELECT-2 CURSOR FOR SELECT NAME , CREATOR , TYPE , D
                BNAME , TSNAME FROM SYSTABLES WHERE CREATOR = : H

STEP              1  ACCESSES TABLE      PUBLIC7 .SYSTABLES
                USING INDEX PUBLIC7 .DSNDTX01          USING  1 COLUMN(S).
                THE INTENT LOCK FOR THE TABLE IS IS
                THE TIMESTAMP FOR THIS EXPLAIN IS 2005041112393676
                THIS OPERATION REFERENCES A TABLE
                THE TABLE HAS              0 ROWS OF      542 BYTES.
                THE NON-UNIQUE INDEX HAS    0 ENTRIES IN  0 LEVELS WITH
CLUSTER RATIO 0
                DB2 ESTIMATES THIS QUERY WILL USE          1 MILLISECONDS OF CPU
TIME
                DB2 ESTIMATES THIS QUERY WILL USE          1 SERVICE UNITS
PCK206I COMPARE COMPLETE FOR PROGRAM = TEST07  VERSION =    2004-02-26-16.10.37.482737
                PREVIOUS VERSION =    2004-02-25-22.55.53.186647
PCK217I TOTAL DBRMS COMPARED                    1
PCK217I TOTAL STATEMENTS COMPARED                2
PCK217I TOTAL ACCESS PATH CHANGES                2
PCK217I TOTAL ACCESS PATH SAME                    0
PCK217I TOTAL NEW SQL STATEMENTS                  0
PCK217I TOTAL DELETED SQL STATEMENTS              0

*****
*****
PCK218I PROGRAM TEST07      HAS A CHANGED ACCESS PATH
QUERYNO                      327
COLLECTION                    TESTCOLLX
NEW VERSION                    2004-02-26-16.10.37.482737
OLD VERSION                    2004-02-25-22.55.53.186647

*****
*****
PCK218I PROGRAM TEST07      HAS A CHANGED ACCESS PATH
QUERYNO                      338
COLLECTION                    TESTCOLLX
NEW VERSION                    2004-02-26-16.10.37.482737
OLD VERSION                    2004-02-25-22.55.53.186647

*****
*****
PCK217I TOTAL DBRMS COMPARED                    1
PCK217I TOTAL STATEMENTS COMPARED                2
PCK217I TOTAL ACCESS PATH CHANGES                2
PCK217I TOTAL ACCESS PATH SAME                    0
PCK217I TOTAL NEW SQL STATEMENTS                  0
PCK217I TOTAL DELETED SQL STATEMENTS              0

```

```

PCK031I EXECUTING LICENSED PATH CHECKER V2R2
11          OPTIONS CATALOGSQL NOMATCHCREATOR REPORTCOSTGT
11          CONNECT TO DB7G
11          COMPARE PACKAGE TESTCOLLX.TEST08 IN PUBLIC.PLAN_TABLE
              TO PREVIOUS
11          2005/04/11  SQL ID -          ACCESS PATH FOR TEST08          COLLID - TESTCOLLX
OLD PLAN_TABLE -
IN QRYNO M  CREATOR  TNAME          TBNO AC MC CREATOR  ACCESSNAME          IO
SORTUJGO LK PF QBNO PLNO MXSQ
PCK212I TIMESTAMP USED FOR PREVIOUS COMMAND = 2005041112321683  VERSION = 2004-02-25-
23.08.52.526193
PCK206I COMPARE COMPLETE FOR PROGRAM = TEST08  VERSION = 2004-02-26-16.11.27.295103
              PREVIOUS VERSION = 2004-02-25-23.08.52.526193
PCK203I STATEMENTS WITH SAME ACCESS PATH      2  STATEMENTS WITH DIFFERENT ACCESS
PATH      0  FOR PROGRAM TEST08
PCK204I QUERIES WITH MATCHING EXPLAIN        2  QUERIES WITHOUT MATCHING
EXPLAIN   0  FOR PROGRAM TEST08
PCK217I TOTAL DBRMS COMPARED                  1
PCK217I TOTAL STATEMENTS COMPARED            2
PCK217I TOTAL ACCESS PATH CHANGES           0
PCK217I TOTAL ACCESS PATH SAME               2
PCK217I TOTAL NEW SQL STATEMENTS            0
PCK217I TOTAL DELETED SQL STATEMENTS        0
PCK217I TOTAL DSN_STATEMNT COST INCR        0
COMPLETE RET CODE= 00
11          2005/04/11  SQL ID -          ACCESS PATH FOR TEST08          COLLID - TESTCOLLX
OLD PLAN_TABLE -
PCK206I COMPARE COMPLETE FOR PROGRAM = TEST08  VERSION = 2004-02-26-16.11.27.295103
              PREVIOUS VERSION = 2004-02-25-23.08.52.526193
PCK217I TOTAL DBRMS COMPARED                  1
PCK217I TOTAL STATEMENTS COMPARED            2
PCK217I TOTAL ACCESS PATH CHANGES           0
PCK217I TOTAL ACCESS PATH SAME               2
PCK217I TOTAL NEW SQL STATEMENTS            0
PCK217I TOTAL DELETED SQL STATEMENTS        0

```

```

*****
*****
PCK217I TOTAL DBRMS COMPARED                  1
PCK217I TOTAL STATEMENTS COMPARED            2
PCK217I TOTAL ACCESS PATH CHANGES           0
PCK217I TOTAL ACCESS PATH SAME               2
PCK217I TOTAL NEW SQL STATEMENTS            0
PCK217I TOTAL DELETED SQL STATEMENTS        0

```

Version 8 Comparison

```

PCK031I EXECUTING LICENSED PATH CHECKER V2R2
11          OPTIONS CATALOGSQL NOMATCHCREATOR REPORTCOSTGT
11          CONNECT TO DB8G
11          COMPARE PACKAGE TESTCOLLX.TEST08 IN PUBLIC.PLAN_TABLE
              TO PREVIOUS
11          2005/04/11  SQL ID -          ACCESS PATH FOR TEST08          COLLID - TESTCOLLX
OLD PLAN_TABLE -
IN QRYNO M  CREATOR  TNAME          TBNO AC MC CREATOR  ACCESSNAME          IO
SORTUJGO LK PF QBNO PLNO MXSQ
PCK212I TIMESTAMP USED FOR PREVIOUS COMMAND = 2005041114355909  VERSION = 2004-02-25-
23.08.52.526193

```

1	327	0	PUBLIC	SYSCOLUMNS	1	I	2	PUBLIC	DSNDCX01	N
NNNNNNNN	IS	1	1							
1	327	1	PUBLIC	SYSTABLES	2	I	2	PUBLIC	DSNDTX01	Y
NNNNNNNN	IS	1	2							
2	327	0	PUBLIC8	SYSTABLES	2	I	2	PUBLIC8	DSNDTX01	Y
NNNNNNNN	IS	1	1							
2	327	1	PUBLIC8	SYSCOLUMNS	1	I	2	PUBLIC8	DSNDCX01	N
NNNNNNNN	IS	1	2							
1	338	0	PUBLIC	SYSTABLES	1	I	1	PUBLIC	DSNDTX01	N
NNNNNNNN	IS L	1	1							

```

PCK220I DATA CHANGE FOR COLUMN PREFETCH = WAS L
2 338 0 PUBLIC8 SYSTABLES 1 I 1 PUBLIC8 DSNDTX01 N
NNNNNNNN IS 1 1
PCK221I DATA CHANGE FOR COLUMN PREFETCH = IS NOW
PCK206I COMPARE COMPLETE FOR PROGRAM = TEST08 VERSION = 2004-02-26-16.11.27.295103
PREVIOUS VERSION = 2004-02-25-23.08.52.526193
PCK203I STATEMENTS WITH SAME ACCESS PATH 0 STATEMENTS WITH DIFFERENT ACCESS
PATH 2 FOR PROGRAM TEST08
PCK204I QUERIES WITH MATCHING EXPLAIN 2 QUERIES WITHOUT MATCHING
EXPLAIN 0 FOR PROGRAM TEST08
PCK217I TOTAL DBRMS COMPARED 1
PCK217I TOTAL STATEMENTS COMPARED 2
PCK217I TOTAL ACCESS PATH CHANGES 2
PCK217I TOTAL ACCESS PATH SAME 0
PCK217I TOTAL NEW SQL STATEMENTS 0
PCK217I TOTAL DELETED SQL STATEMENTS 0
PCK217I TOTAL DSN_STATEMNT COST INCR 0
COMPLETE RET CODE= 04
11 2005/04/11 SQL ID - ACCESS PATH FOR TEST08 COLLID - TESTCOLLX
OLD PLAN_TABLE -

```

```

STATEMENT 327 THIS IS THE OLD ACCESS PATH.

STATEMENT# 327 DECLARE SELECT-1 CURSOR FOR SELECT A . NAME , A . TBNAME , A
. COLNO , A . COLTYPE , A . LENGTH FROM SYSCOLUMNS A INNER
JOIN SYSTABLES B ON A . TBNAME = B . NAME AND A . TBCREATOR
= B . CREATOR WHERE A . TBNAME = : H AND A . TBCREATOR = : H

STEP 1 ACCESSES TABLE PUBLIC .SYSCOLUMNS A
USING INDEX PUBLIC .DSNDX01 USING 2 COLUMN(S).
THE INTENT LOCK FOR THE TABLE IS IS
THE TIMESTAMP FOR THIS EXPLAIN IS 2005041114355892
THIS OPERATION REFERENCES A TABLE
THE TABLE HAS 6,361 ROWS OF 969 BYTES.
THE NON-UNIQUE INDEX HAS 6,361 ENTRIES IN 2 LEVELS WITH
CLUSTER RATIO 81
STEP 2 ACCESSES TABLE PUBLIC .SYSTABLES B
USING INDEX PUBLIC .DSNDTX01 USING 2 COLUMN(S).
THE JOIN METHOD IS NESTED LOOP
THE ACCESS ONLY READS THE INDEX NOT THE TABLE
THE INTENT LOCK FOR THE TABLE IS IS
THE TIMESTAMP FOR THIS EXPLAIN IS 2005041114355892
THIS OPERATION REFERENCES A TABLE
THE TABLE HAS 404 ROWS OF 542 BYTES.
THE NON-UNIQUE INDEX HAS 404 ENTRIES IN 2 LEVELS WITH
CLUSTER RATIO 72
DB2 ESTIMATES THIS QUERY WILL USE 1 MILLISECONDS OF CPU
TIME
DB2 ESTIMATES THIS QUERY WILL USE 2 SERVICE UNITS

STATEMENT 327 THIS IS THE NEW ACCESS PATH.

STATEMENT# 327 DECLARE SELECT-1 CURSOR FOR SELECT A . NAME , A . TBNAME , A
. COLNO , A . COLTYPE , A . LENGTH FROM SYSCOLUMNS A INNER
JOIN SYSTABLES B ON A . TBNAME = B . NAME AND A . TBCREATOR
= B . CREATOR WHERE A . TBNAME = : H AND A . TBCREATOR = : H

STEP 1 ACCESSES TABLE PUBLIC8 .SYSTABLES B
USING INDEX PUBLIC8 .DSNDTX01 USING 2 COLUMN(S).
THE ACCESS ONLY READS THE INDEX NOT THE TABLE
THE INTENT LOCK FOR THE TABLE IS IS
THE TIMESTAMP FOR THIS EXPLAIN IS 2005041114361513
THIS OPERATION REFERENCES A TABLE
THE TABLE HAS 404 ROWS OF 542 BYTES.
THE NON-UNIQUE INDEX HAS 404 ENTRIES IN 2 LEVELS WITH
CLUSTER RATIO 94
STEP 2 ACCESSES TABLE PUBLIC8 .SYSCOLUMNS A
USING INDEX PUBLIC8 .DSNDX01 USING 2 COLUMN(S).

```

```

THE JOIN METHOD IS NESTED LOOP
THE INTENT LOCK FOR THE TABLE IS IS
THE TIMESTAMP FOR THIS EXPLAIN IS 2005041114361513
THIS OPERATION REFERENCES A TABLE
THE TABLE HAS          6,361 ROWS OF    969 BYTES.
THE NON-UNIQUE INDEX HAS          6,361 ENTRIES IN  2 LEVELS WITH
CLUSTER RATIO 94
TIME
DB2 ESTIMATES THIS QUERY WILL USE          1 MILLISECONDS OF CPU
DB2 ESTIMATES THIS QUERY WILL USE          2 SERVICE UNITS

STATEMENT      338 THIS IS THE OLD ACCESS PATH.
11      2005/04/11 SQL ID -          ACCESS PATH FOR TEST08          COLLID - TESTCOLLX
OLD PLAN_TABLE -

STATEMENT#      338 DECLARE SELECT-2 CURSOR FOR SELECT NAME , CREATOR , TYPE , D
          BNAME , TSNAME FROM SYSTABLES WHERE CREATOR = : H

STEP      1      ACCESSES TABLE      PUBLIC .SYSTABLES
          USING INDEX PUBLIC .DSNDTX01          USING  1 COLUMN(S).
          THE ACCESS WILL USE LIST PREFETCH
          THE INTENT LOCK FOR THE TABLE IS IS
          THE TIMESTAMP FOR THIS EXPLAIN IS 2005041114355909
          THIS OPERATION REFERENCES A TABLE
          THE TABLE HAS          404 ROWS OF    542 BYTES.
          THE NON-UNIQUE INDEX HAS          404 ENTRIES IN  2 LEVELS WITH
CLUSTER RATIO 72
TIME
DB2 ESTIMATES THIS QUERY WILL USE          2 MILLISECONDS OF CPU
DB2 ESTIMATES THIS QUERY WILL USE          4 SERVICE UNITS

STATEMENT      338 THIS IS THE NEW ACCESS PATH.

STATEMENT#      338 DECLARE SELECT-2 CURSOR FOR SELECT NAME , CREATOR , TYPE , D
          BNAME , TSNAME FROM SYSTABLES WHERE CREATOR = : H

STEP      1      ACCESSES TABLE      PUBLIC8 .SYSTABLES
          USING INDEX PUBLIC8 .DSNDTX01          USING  1 COLUMN(S).
          THE INTENT LOCK FOR THE TABLE IS IS
          THE TIMESTAMP FOR THIS EXPLAIN IS 2005041114361531
          THIS OPERATION REFERENCES A TABLE
          THE TABLE HAS          404 ROWS OF    542 BYTES.
          THE NON-UNIQUE INDEX HAS          404 ENTRIES IN  2 LEVELS WITH
CLUSTER RATIO 94
TIME
DB2 ESTIMATES THIS QUERY WILL USE          2 MILLISECONDS OF CPU
DB2 ESTIMATES THIS QUERY WILL USE          4 SERVICE UNITS
PCK206I COMPARE COMPLETE FOR PROGRAM = TEST08  VERSION =    2004-02-26-16.11.27.295103
          PREVIOUS VERSION =    2004-02-25-23.08.52.526193
PCK217I TOTAL DBRMS COMPARED                    1
PCK217I TOTAL STATEMENTS COMPARED                2
PCK217I TOTAL ACCESS PATH CHANGES                2
PCK217I TOTAL ACCESS PATH SAME                    0
PCK217I TOTAL NEW SQL STATEMENTS                  0
PCK217I TOTAL DELETED SQL STATEMENTS              0

*****
*****
PCK218I PROGRAM TEST08      HAS A CHANGED ACCESS PATH
QUERYNO                    327
COLLECTION                  TESTCOLLX
NEW VERSION                  2004-02-26-16.11.27.295103
OLD VERSION                  2004-02-25-23.08.52.526193

*****
*****
PCK218I PROGRAM TEST08      HAS A CHANGED ACCESS PATH
QUERYNO                    338
COLLECTION                  TESTCOLLX
NEW VERSION                  2004-02-26-16.11.27.295103

```

OLD VERSION 2004-02-25-23.08.52.526193

```
*****
*****
PCK217I TOTAL DBRMS COMPARED 1
PCK217I TOTAL STATEMENTS COMPARED 2
PCK217I TOTAL ACCESS PATH CHANGES 2
PCK217I TOTAL ACCESS PATH SAME 0
PCK217I TOTAL NEW SQL STATEMENTS 0
PCK217I TOTAL DELETED SQL STATEMENTS 0
```

Analysis of the Comparisons between Versions of DB2

	V6	V7	V8
Before MSUs	2	No Change	2
After MSUs	2	No Change	2
Access Type Change	Change Join Sequence		Change Join Sequence

DB2 does not know from the table definitions which table should be accessed first. The access path with SYSCOLUMNS first will cause DB2 to access SYSTABLES for each row in SYSCOLUMNS. This would greatly increase the number of get pages required to process this query.

The Change

The Cluster Ratio was changed to less than 80%

```
UPDATE SYSIBM.SYSTABLES
  SET CARD = 2000
     ,CARDF = +0.2000000000000000E+03
     ,NPAGES = 1200
 WHERE CREATOR = 'PUBLIC8'
    AND NAME = 'SYSCOLUMNS'
;
UPDATE SYSIBM.SYSINDEXES
  SET CLUSTERRATIO = 50
     ,CLUSTERRATIOF = +0.0500000000000000E+01
     ,FIRSTKEYCARD = 300
     ,FULLKEYCARD = 300
     ,FIRSTKEYCARDF = +0.2000000000000000E+03
     ,FULLKEYCARDF = +0.2000000000000000E+03
 WHERE CREATOR = 'PUBLIC8'
    AND NAME = 'DSNDCX01'
```

Query Summary

Database Alias: HLSP390 **Explain Time :** 2005-05-30 09:00:26.660359

DB2 Platform : Z/OS **DB2 Version:** v8

SQL Statement : DECLARE SELECT-2 CURSOR FOR SELECT NAME , CREATOR
, TYPE , DBNAME , TSNAME FROM SYSTABLES WHERE
CREATOR = : H

Attribute	Value	Explanation
Timestamp	2005-05-30 09:00:26.660359	Timestamp when the query is explained
Type	SELECT	Query type (SELECT, INSERT, UPDATE, DELETE, SELUPD, DELCUR, UPDCUR)
CPU Cost (ms)	2	Estimated CPU cost (in milliseconds)
CPU Cost (su)	5	Estimated CPU cost (in service units)
Cost Category	A	Cost estimation category (A=statistics; B=default)
Reason		Reason when the cost estimation category is B (HOST VARIABLES, TABLE CARDINALITY, UDF, TRIGGERS, REFERENTIAL CONSTRAINTS)
Group Member		

Case 9: Change Host Variable to not match the table

Version 6 Comparison

```

PCK031I EXECUTING LICENSED PATH CHECKER V2R2
11          OPTIONS CATALOGSQL NOMATCHCREATOR REPORTCOSTGT
11          CONNECT TO DB6G
11          COMPARE PACKAGE TESTCOLLX.TEST09 IN PUBLIC.PLAN_TABLE
          TO PREVIOUS
11          2005/04/11 SQL ID -          ACCESS PATH FOR TEST09          COLLID - TESTCOLLX
OLD PLAN_TABLE -
  IN QRYNO M CREATOR TNAME          TBNO AC MC CREATOR ACCESSNAME          IO
SORTUJGO LK PF QBNO PLNO MXSQ
PCK212I TIMESTAMP USED FOR PREVIOUS COMMAND = 2005041113365106 VERSION = 2004-02-25-
23.09.23.473815

  1  327 0 PUBLIC SYSCOLUMNS          1 I  2 PUBLIC DSNDXC01          N
NNNNNNNN IS          1  1
  1  327 1 PUBLIC SYSTABLES          2 I  2 PUBLIC DSNDTX01          N
NNNNNNNN IS          1  2
  2  328 0 PUBLIC9 SYSTABLES          2 I  0 PUBLIC9 DSNDTX01          N
NNNNNNNN IS          1  1
  2  328 1 PUBLIC9 SYSCOLUMNS          1 I  2 PUBLIC9 DSNDXC01          N
NNNNNNNN IS          1  2
PCK206I COMPARE COMPLETE FOR PROGRAM = TEST09 VERSION = 2004-02-26-16.15.53.355019
          PREVIOUS VERSION = 2004-02-25-23.09.23.473815
PCK203I STATEMENTS WITH SAME ACCESS PATH          1 STATEMENTS WITH DIFFERENT ACCESS
PATH          1 FOR PROGRAM TEST09
PCK204I QUERIES WITH MATCHING EXPLAIN          2 QUERIES WITHOUT MATCHING
EXPLAIN          0 FOR PROGRAM TEST09
PCK217I TOTAL DBRMS COMPARED          1
PCK217I TOTAL STATEMENTS COMPARED          2
PCK217I TOTAL ACCESS PATH CHANGES          1
PCK217I TOTAL ACCESS PATH SAME          1
PCK217I TOTAL NEW SQL STATEMENTS          0
PCK217I TOTAL DELETED SQL STATEMENTS          0
PCK217I TOTAL DSN_STATEMNT COST INCR          0
COMPLETE RET CODE=          04
11          2005/04/11 SQL ID -          ACCESS PATH FOR TEST09          COLLID - TESTCOLLX
OLD PLAN_TABLE -

STATEMENT          327 THIS IS THE OLD ACCESS PATH.

STATEMENT#          327 DECLARE SELECT-1 CURSOR FOR SELECT A . NAME , A . TBNAME , A
          . COLNO , A . COLTYPE , A . LENGTH FROM SYSCOLUMNS A INNER
          JOIN SYSTABLES B ON A . TBNAME = B . NAME AND A . TBcreator
          = B . CREATOR WHERE A . TBNAME = : H AND A . TBcreator = : H

STEP          1 ACCESSES TABLE PUBLIC .SYSCOLUMNS          A
          USING INDEX PUBLIC .DSNDXC01          USING 2 COLUMN(S).
          THE INTENT LOCK FOR THE TABLE IS IS
          THE TIMESTAMP FOR THIS EXPLAIN IS 2005041113365098
          THE TABLE HAS          6,361 ROWS OF          969 BYTES.
          THE NON-UNIQUE INDEX HAS          6,361 ENTRIES IN 2 LEVELS WITH
CLUSTER RATIO 81
STEP          2 ACCESSES TABLE PUBLIC .SYSTABLES          B
          USING INDEX PUBLIC .DSNDTX01          USING 2 COLUMN(S).
          THE JOIN METHOD IS NESTED LOOP
          THE INTENT LOCK FOR THE TABLE IS IS
          THE TIMESTAMP FOR THIS EXPLAIN IS 2005041113365098
          THE TABLE HAS          404 ROWS OF          542 BYTES.
          THE NON-UNIQUE INDEX HAS          404 ENTRIES IN 2 LEVELS WITH
CLUSTER RATIO 72
TIME          DB2 ESTIMATES THIS QUERY WILL USE          1 MILLISECONDS OF CPU
          DB2 ESTIMATES THIS QUERY WILL USE          2 SERVICE UNITS

```

```

STATEMENT          328 THIS IS THE NEW ACCESS PATH.

STATEMENT#        328 DECLARE SELECT-1 CURSOR FOR SELECT A . NAME , A . TBNAME , A
                   . COLNO , A . COLTYPE , A . LENGTH FROM SYSCOLUMNS A INNER
                   JOIN SYSTABLES B ON A . TBNAME = B . NAME AND A . TBCREATOR
                   = B . CREATOR WHERE A . TBNAME = : H AND A . TBCREATOR = : H

STEP              1  ACCESSES TABLE      PUBLIC9 .SYSTABLES      B
                   USING INDEX PUBLIC9 .DSNDTX01      USING 0 COLUMN(S).
                   THE INTENT LOCK FOR THE TABLE IS IS
                   THE TIMESTAMP FOR THIS EXPLAIN IS 2005041113370727
                   THE TABLE HAS              404 ROWS OF      542 BYTES.
                   THE NON-UNIQUE INDEX HAS          404 ENTRIES IN 2 LEVELS WITH

CLUSTER RATIO 73
STEP              2  ACCESSES TABLE      PUBLIC9 .SYSCOLUMNS      A
                   USING INDEX PUBLIC9 .DSNDCX01      USING 2 COLUMN(S).
                   THE JOIN METHOD IS NESTED LOOP
                   THE INTENT LOCK FOR THE TABLE IS IS
                   THE TIMESTAMP FOR THIS EXPLAIN IS 2005041113370727
                   THE TABLE HAS              6,361 ROWS OF    969 BYTES.
                   THE NON-UNIQUE INDEX HAS          6,361 ENTRIES IN 3 LEVELS WITH

CLUSTER RATIO 81
DB2 ESTIMATES THIS QUERY WILL USE          9 MILLISECONDS OF CPU
TIME
DB2 ESTIMATES THIS QUERY WILL USE          23 SERVICE UNITS
PCK206I COMPARE COMPLETE FOR PROGRAM = TEST09  VERSION = 2004-02-26-16.15.53.355019
PREVIOUS VERSION = 2004-02-25-23.09.23.473815
PCK217I TOTAL DBRMS COMPARED                1
PCK217I TOTAL STATEMENTS COMPARED           2
PCK217I TOTAL ACCESS PATH CHANGES           1
PCK217I TOTAL ACCESS PATH SAME              1
PCK217I TOTAL NEW SQL STATEMENTS            0
PCK217I TOTAL DELETED SQL STATEMENTS        0
11      2005/04/11  SQL ID -                ACCESS PATH FOR TEST09      COLLID - TESTCOLLX
OLD PLAN_TABLE -

```

Version 7 Comparison

```

PCK031I EXECUTING LICENSED PATH CHECKER V2R2
11      OPTIONS CATALOGSQL NOMATCHCREATOR REPORTCOSTGT
11      CONNECT TO DB7G
11      COMPARE PACKAGE TESTCOLLX.TEST09 IN PUBLIC.PLAN_TABLE
                   TO PREVIOUS
11      2005/04/11  SQL ID -                ACCESS PATH FOR TEST09      COLLID - TESTCOLLX
OLD PLAN_TABLE -
IN QRYNO M  CREATOR  TNAME                TBNO AC MC CREATOR  ACCESSNAME      IO
SORTUJGO LK PF QBNO PLNO MXSQ
PCK212I TIMESTAMP USED FOR PREVIOUS COMMAND = 2005041112321719  VERSION = 2004-02-25-
23.09.23.473815

1      327 0 PUBLIC  SYSCOLUMNS          1 I  2 PUBLIC  DSNDXCX01      N
NNNNNNNN IS          1  1
1      327 1 PUBLIC  SYSTABLES            2 I  2 PUBLIC  DSNDTX01      N
NNNNNNNN IS          1  2
2      328 0 PUBLIC9 SYSTABLES            2 I  0 PUBLIC9 DSNDTX01      N
NNNNNNNN IS          1  1
2      328 1 PUBLIC9 SYSCOLUMNS          1 I  2 PUBLIC9 DSNDXCX01      N
NNNNNNNN IS          1  2
PCK206I COMPARE COMPLETE FOR PROGRAM = TEST09  VERSION = 2004-02-26-16.15.53.355019
PREVIOUS VERSION = 2004-02-25-23.09.23.473815
PCK203I STATEMENTS WITH SAME ACCESS PATH      1  STATEMENTS WITH DIFFERENT ACCESS
PATH      1  FOR PROGRAM TEST09
PCK204I  QUERIES WITH MATCHING EXPLAIN        2  QUERIES WITHOUT MATCHING
EXPLAIN      0  FOR PROGRAM TEST09
PCK217I TOTAL DBRMS COMPARED                1
PCK217I TOTAL STATEMENTS COMPARED           2
PCK217I TOTAL ACCESS PATH CHANGES           1
PCK217I TOTAL ACCESS PATH SAME              1
PCK217I TOTAL NEW SQL STATEMENTS            0
PCK217I TOTAL DELETED SQL STATEMENTS        0

```

```

PCK217I TOTAL DSN_STATEMNT COST INCR                                0
COMPLETE RET CODE=                                04
11      2005/04/11  SQL ID -                ACCESS PATH FOR TEST09      COLLID - TESTCOLLX
OLD PLAN_TABLE -

STATEMENT      327 THIS IS THE OLD ACCESS PATH.

STATEMENT#     327 DECLARE SELECT-1 CURSOR FOR SELECT A . NAME , A . TBNAME , A
               . COLNO , A . COLTYPE , A . LENGTH FROM SYSCOLUMNS A INNER
               JOIN SYSTABLES B ON A . TBNAME = B . NAME AND A . TBCREATOR
               = B . CREATOR WHERE A . TBNAME = : H AND A . TBCREATOR = : H

STEP           1  ACCESSES TABLE      PUBLIC .SYSCOLUMNS      A
               USING INDEX PUBLIC .DSNDCX01      USING 2 COLUMN(S).
               THE INTENT LOCK FOR THE TABLE IS IS
               THE TIMESTAMP FOR THIS EXPLAIN IS 2005041112321711
               THIS OPERATION REFERENCES A TABLE
               THE TABLE HAS          6,361 ROWS OF      969 BYTES.
               THE NON-UNIQUE INDEX HAS      6,361 ENTRIES IN 2 LEVELS WITH

CLUSTER RATIO 81
STEP           2  ACCESSES TABLE      PUBLIC .SYSTABLES      B
               USING INDEX PUBLIC .DSNDTX01      USING 2 COLUMN(S).
               THE JOIN METHOD IS NESTED LOOP
               THE INTENT LOCK FOR THE TABLE IS IS
               THE TIMESTAMP FOR THIS EXPLAIN IS 2005041112321711
               THIS OPERATION REFERENCES A TABLE
               THE TABLE HAS          404 ROWS OF      542 BYTES.
               THE NON-UNIQUE INDEX HAS      404 ENTRIES IN 2 LEVELS WITH

CLUSTER RATIO 72
TIME
               DB2 ESTIMATES THIS QUERY WILL USE          1 MILLISECONDS OF CPU
               DB2 ESTIMATES THIS QUERY WILL USE          1 SERVICE UNITS

STATEMENT      328 THIS IS THE NEW ACCESS PATH.

STATEMENT#     328 DECLARE SELECT-1 CURSOR FOR SELECT A . NAME , A . TBNAME , A
               . COLNO , A . COLTYPE , A . LENGTH FROM SYSCOLUMNS A INNER
               JOIN SYSTABLES B ON A . TBNAME = B . NAME AND A . TBCREATOR
               = B . CREATOR WHERE A . TBNAME = : H AND A . TBCREATOR = : H

STEP           1  ACCESSES TABLE      PUBLIC9 .SYSTABLES      B
               USING INDEX PUBLIC9 .DSNDTX01      USING 0 COLUMN(S).
               THE INTENT LOCK FOR THE TABLE IS IS
               THE TIMESTAMP FOR THIS EXPLAIN IS 2005041112393730
               THIS OPERATION REFERENCES A TABLE
               THE TABLE HAS          404 ROWS OF      542 BYTES.
               THE NON-UNIQUE INDEX HAS      404 ENTRIES IN 2 LEVELS WITH

CLUSTER RATIO 73
STEP           2  ACCESSES TABLE      PUBLIC9 .SYSCOLUMNS      A
               USING INDEX PUBLIC9 .DSNDCX01      USING 2 COLUMN(S).
               THE JOIN METHOD IS NESTED LOOP
               THE INTENT LOCK FOR THE TABLE IS IS
               THE TIMESTAMP FOR THIS EXPLAIN IS 2005041112393730
               THIS OPERATION REFERENCES A TABLE
               THE TABLE HAS          6,361 ROWS OF      969 BYTES.
               THE NON-UNIQUE INDEX HAS      6,361 ENTRIES IN 3 LEVELS WITH

CLUSTER RATIO 81
TIME
               DB2 ESTIMATES THIS QUERY WILL USE          2 MILLISECONDS OF CPU
               DB2 ESTIMATES THIS QUERY WILL USE          5 SERVICE UNITS
PCK206I COMPARE COMPLETE FOR PROGRAM = TEST09  VERSION =      2004-02-26-16.15.53.355019
               PREVIOUS VERSION =      2004-02-25-23.09.23.473815

PCK217I TOTAL DBRMS COMPARED                                1
PCK217I TOTAL STATEMENTS COMPARED                        2
11      2005/04/11  SQL ID -                ACCESS PATH FOR TEST09      COLLID - TESTCOLLX
OLD PLAN_TABLE -

PCK217I TOTAL ACCESS PATH CHANGES                                1

```

```

PCK217I TOTAL ACCESS PATH SAME                1
PCK217I TOTAL NEW SQL STATEMENTS             0
PCK217I TOTAL DELETED SQL STATEMENTS        0

*****
*****
PCK218I PROGRAM TEST09      HAS A CHANGED ACCESS PATH
QUERYNO                     328
COLLECTION                   TESTCOLLX
NEW VERSION                  2004-02-26-16.15.53.355019
OLD VERSION                  2004-02-25-23.09.23.473815

*****
*****
PCK217I TOTAL DBRMS COMPARED                1
PCK217I TOTAL STATEMENTS COMPARED          2
PCK217I TOTAL ACCESS PATH CHANGES         1
PCK217I TOTAL ACCESS PATH SAME             1
PCK217I TOTAL NEW SQL STATEMENTS           0
PCK217I TOTAL DELETED SQL STATEMENTS       0
    
```

Version 8 Comparison

```

PCK031I EXECUTING LICENSED PATH CHECKER V2R2
11          OPTIONS CATALOGSQL NOMATCHCREATOR REPORTCOSTGT
11          CONNECT TO DB8G
11          COMPARE PACKAGE TESTCOLLX.TEST09 IN PUBLIC.PLAN_TABLE
              TO PREVIOUS
11          2005/04/11  SQL ID -          ACCESS PATH FOR TEST09          COLLID - TESTCOLLX
OLD PLAN_TABLE -
IN QRYNO M  CREATOR  TNAME          TBNO AC MC CREATOR  ACCESSNAME          IO
SORTUJGO LK PF QBNO PLNO MXSQ
PCK212I TIMESTAMP USED FOR PREVIOUS COMMAND = 2005041114355959  VERSION = 2004-02-25-
23.09.23.473815

1  327 0 PUBLIC  SYSCOLUMNS          1 I  2 PUBLIC  DSNDX01          N
NNNNNNNN IS 1 1
1  327 1 PUBLIC  SYSTABLES            2 I  2 PUBLIC  DSNDTX01         Y
NNNNNNNN IS 1 2
2  328 0 PUBLIC9 SYSTABLES            2 I  2 PUBLIC9 DSNDTX01         Y
NNNNNNNN IS 1 1
2  328 1 PUBLIC9 SYSCOLUMNS          1 I  2 PUBLIC9 DSNDX01          N
NNNNNNNN IS 1 2

1  338 0 PUBLIC  SYSTABLES            1 I  1 PUBLIC  DSNDTX01         N
NNNNNNNN IS L 1 1
PCK220I DATA CHANGE FOR COLUMN PREFETCH = WAS L
2  339 0 PUBLIC9 SYSTABLES            1 I  1 PUBLIC9 DSNDTX01         N
NNNNNNNN IS 1 1
PCK221I DATA CHANGE FOR COLUMN PREFETCH = IS NOW
PCK206I COMPARE COMPLETE FOR PROGRAM = TEST09 VERSION = 2004-02-26-16.15.53.355019
PREVIOUS VERSION = 2004-02-25-23.09.23.473815

PCK203I STATEMENTS WITH SAME ACCESS PATH 0 STATEMENTS WITH DIFFERENT ACCESS
PATH 2 FOR PROGRAM TEST09
PCK204I QUERIES WITH MATCHING EXPLAIN 2 QUERIES WITHOUT MATCHING
EXPLAIN 0 FOR PROGRAM TEST09
PCK217I TOTAL DBRMS COMPARED 1
PCK217I TOTAL STATEMENTS COMPARED 2
PCK217I TOTAL ACCESS PATH CHANGES 2
PCK217I TOTAL ACCESS PATH SAME 0
PCK217I TOTAL NEW SQL STATEMENTS 0
PCK217I TOTAL DELETED SQL STATEMENTS 0
PCK217I TOTAL DSN_STATEMNT COST INCR 0
COMPLETE RET CODE= 04
11          2005/04/11  SQL ID -          ACCESS PATH FOR TEST09          COLLID - TESTCOLLX
OLD PLAN_TABLE -

STATEMENT 327 THIS IS THE OLD ACCESS PATH.

STATEMENT# 327 DECLARE SELECT-1 CURSOR FOR SELECT A . NAME , A . TBNAME , A
    
```

```

      . COLNO , A . COLTYPE , A . LENGTH FROM SYSCOLUMNS A INNER
JOIN SYSTABLES B ON A . TBNAME = B . NAME AND A . TBCREATOR
= B . CREATOR WHERE A . TBNAME = : H AND A . TBCREATOR = : H

STEP      1  ACCESSES TABLE      PUBLIC .SYSCOLUMNS      A
            USING INDEX PUBLIC .DSNDCX01      USING 2 COLUMN(S).
            THE INTENT LOCK FOR THE TABLE IS IS
            THE TIMESTAMP FOR THIS EXPLAIN IS 2005041114355942
            THIS OPERATION REFERENCES A TABLE
            THE TABLE HAS          6,361 ROWS OF    969 BYTES.
            THE NON-UNIQUE INDEX HAS          6,361 ENTRIES IN 2 LEVELS WITH
CLUSTER RATIO 81
STEP      2  ACCESSES TABLE      PUBLIC .SYSTABLES      B
            USING INDEX PUBLIC .DSNDTX01      USING 2 COLUMN(S).
            THE JOIN METHOD IS NESTED LOOP
            THE ACCESS ONLY READS THE INDEX NOT THE TABLE
            THE INTENT LOCK FOR THE TABLE IS IS
            THE TIMESTAMP FOR THIS EXPLAIN IS 2005041114355942
            THIS OPERATION REFERENCES A TABLE
            THE TABLE HAS          404 ROWS OF    542 BYTES.
            THE NON-UNIQUE INDEX HAS          404 ENTRIES IN 2 LEVELS WITH
CLUSTER RATIO 72
TIME
            DB2 ESTIMATES THIS QUERY WILL USE          1 MILLISECONDS OF CPU
            DB2 ESTIMATES THIS QUERY WILL USE          2 SERVICE UNITS

STATEMENT      328 THIS IS THE NEW ACCESS PATH.

STATEMENT#     328 DECLARE SELECT-1 CURSOR FOR SELECT A . NAME , A . TBNAME , A
      . COLNO , A . COLTYPE , A . LENGTH FROM SYSCOLUMNS A INNER
JOIN SYSTABLES B ON A . TBNAME = B . NAME AND A . TBCREATOR
= B . CREATOR WHERE A . TBNAME = : H AND A . TBCREATOR = : H

STEP      1  ACCESSES TABLE      PUBLIC9 .SYSTABLES      B
            USING INDEX PUBLIC9 .DSNDTX01      USING 2 COLUMN(S).
            THE ACCESS ONLY READS THE INDEX NOT THE TABLE
            THE INTENT LOCK FOR THE TABLE IS IS
            THE TIMESTAMP FOR THIS EXPLAIN IS 2005041114361562
            THIS OPERATION REFERENCES A TABLE
            THE TABLE HAS          404 ROWS OF    542 BYTES.
            THE NON-UNIQUE INDEX HAS          404 ENTRIES IN 2 LEVELS WITH
CLUSTER RATIO 94
STEP      2  ACCESSES TABLE      PUBLIC9 .SYSCOLUMNS      A
            USING INDEX PUBLIC9 .DSNDCX01      USING 2 COLUMN(S).
            THE JOIN METHOD IS NESTED LOOP
            THE INTENT LOCK FOR THE TABLE IS IS
            THE TIMESTAMP FOR THIS EXPLAIN IS 2005041114361562
            THIS OPERATION REFERENCES A TABLE
            THE TABLE HAS          6,361 ROWS OF    969 BYTES.
            THE NON-UNIQUE INDEX HAS          6,361 ENTRIES IN 2 LEVELS WITH
CLUSTER RATIO 94
TIME
            DB2 ESTIMATES THIS QUERY WILL USE          1 MILLISECONDS OF CPU
            DB2 ESTIMATES THIS QUERY WILL USE          1 SERVICE UNITS

STATEMENT      338 THIS IS THE OLD ACCESS PATH.
11      2005/04/11 SQL ID -          ACCESS PATH FOR TEST09      COLLID - TESTCOLLX
OLD PLAN_TABLE -

STATEMENT#     338 DECLARE SELECT-2 CURSOR FOR SELECT NAME , CREATOR , TYPE , D
      BNAME , TSNAME FROM SYSTABLES WHERE CREATOR = : H

STEP      1  ACCESSES TABLE      PUBLIC .SYSTABLES
            USING INDEX PUBLIC .DSNDTX01      USING 1 COLUMN(S).
            THE ACCESS WILL USE LIST PREFETCH
            THE INTENT LOCK FOR THE TABLE IS IS
            THE TIMESTAMP FOR THIS EXPLAIN IS 2005041114355959
            THIS OPERATION REFERENCES A TABLE

```

```

THE TABLE HAS          404 ROWS OF    542 BYTES.
THE NON-UNIQUE INDEX HAS          404 ENTRIES IN  2 LEVELS WITH
CLUSTER RATIO 72
DB2 ESTIMATES THIS QUERY WILL USE          2 MILLISECONDS OF CPU
TIME
DB2 ESTIMATES THIS QUERY WILL USE          4 SERVICE UNITS

STATEMENT      339 THIS IS THE NEW ACCESS PATH.

STATEMENT#     339 DECLARE SELECT-2 CURSOR FOR SELECT NAME , CREATOR , TYPE , D
                BNAME , TSNAME FROM SYSTABLES WHERE CREATOR = : H

STEP           1  ACCESSES TABLE    PUBLIC9 .SYSTABLES
                USING INDEX PUBLIC9 .DSNDTX01          USING  1 COLUMN(S).
                THE INTENT LOCK FOR THE TABLE IS IS
                THE TIMESTAMP FOR THIS EXPLAIN IS 2005041114361579
                THIS OPERATION REFERENCES A TABLE
                THE TABLE HAS          404 ROWS OF    542 BYTES.
                THE NON-UNIQUE INDEX HAS          404 ENTRIES IN  2 LEVELS WITH
CLUSTER RATIO 94
DB2 ESTIMATES THIS QUERY WILL USE          2 MILLISECONDS OF CPU
TIME
DB2 ESTIMATES THIS QUERY WILL USE          4 SERVICE UNITS
PCK206I COMPARE COMPLETE FOR PROGRAM = TEST09  VERSION =    2004-02-26-16.15.53.355019
                PREVIOUS VERSION =    2004-02-25-23.09.23.473815

PCK217I TOTAL DBRMS COMPARED                1
PCK217I TOTAL STATEMENTS COMPARED          2
PCK217I TOTAL ACCESS PATH CHANGES        2
PCK217I TOTAL ACCESS PATH SAME            0
PCK217I TOTAL NEW SQL STATEMENTS          0
PCK217I TOTAL DELETED SQL STATEMENTS      0
    
```


```

PCK218I PROGRAM TEST09      HAS A CHANGED ACCESS PATH
QUERYNO                     328
COLLECTION                   TESTCOLLX
NEW VERSION                  2004-02-26-16.15.53.355019
OLD VERSION                  2004-02-25-23.09.23.473815
    
```


```

PCK218I PROGRAM TEST09      HAS A CHANGED ACCESS PATH
QUERYNO                     339
COLLECTION                   TESTCOLLX
NEW VERSION                  2004-02-26-16.15.53.355019
OLD VERSION                  2004-02-25-23.09.23.473815
    
```


```

PCK217I TOTAL DBRMS COMPARED                1
PCK217I TOTAL STATEMENTS COMPARED          2
PCK217I TOTAL ACCESS PATH CHANGES        2
PCK217I TOTAL ACCESS PATH SAME            0
PCK217I TOTAL NEW SQL STATEMENTS          0
PCK217I TOTAL DELETED SQL STATEMENTS      0
    
```

Analysis of the Comparisons between Versions of DB2 – Cursor 1

	V6	V7	V8
Before MSUs	2	1	2
After MSUs	23	5	1
Access Type Change	Change in Join Sequence	Change in Join Sequence	Change in Join Sequence

The Change

We changed the host variable to not match the column.

```
OLD
EXEC SQL
DECLARE SELECT-1 CURSOR FOR
  SELECT A.NAME, A.TBNAME, A.COLNO, A.COLTYPE, A.LENGTH
  FROM   SYSCOLUMNS A
        INNER JOIN
          SYSTABLES B
        ON  A.TBNAME = B.NAME
          AND A.TBCREATOR = B.CREATOR
  WHERE  A.TBNAME = :SYSCOL-SYSCOLUMNS.SYSCOL-TBNAME
        AND A.TBCREATOR = :SYSCOL-SYSCOLUMNS.SYSCOL-TBCREATOR
END-EXEC.
NEW
05 WS-PARM-VALUEC   PIC X(20).
EXEC SQL
DECLARE SELECT-1 CURSOR FOR
  SELECT A.NAME, A.TBNAME, A.COLNO, A.COLTYPE, A.LENGTH
  FROM   SYSCOLUMNS A
        INNER JOIN
          SYSTABLES B
        ON  A.TBNAME = B.NAME
          AND A.TBCREATOR = B.CREATOR
  WHERE  A.TBNAME = :SYSCOL-SYSCOLUMNS.SYSCOL-TBNAME
        AND A.TBCREATOR = :WS-PARM-VALUEC
END-EXEC.
```

Query Summary

Database Alias: HLSP390 **Explain Time :** 2005-05-30 09:00:27.166199

DB2 Platform : Z/OS **DB2 Version:** v8

SQL Statement : DECLARE SELECT-2 CURSOR FOR SELECT NAME , CREATOR
, TYPE , DBNAME , TSNAME FROM SYSTABLES WHERE
CREATOR = : H

Attribute	Value	Explanation
Timestamp	2005-05-30 09:00:27.166199	Timestamp when the query is explained
Type	SELECT	Query type (SELECT, INSERT, UPDATE, DELETE, SELUPD, DELCUR, UPDCUR)
CPU Cost (ms)	2	Estimated CPU cost (in milliseconds)
CPU Cost (su)	5	Estimated CPU cost (in service units)
Cost Category	A	Cost estimation category (A=statistics; B=default)
Reason		Reason when the cost estimation category is B (HOST VARIABLES, TABLE CARDINALITY, UDF, TRIGGERS, REFERENTIAL CONSTRAINTS)
Group Member		

Case 10: Create new Index and expect switch in Index used

Version 6 Comparison

```

PCK031I EXECUTING LICENSED PATH CHECKER V2R2
11          OPTIONS CATALOGSQL NOMATCHCREATOR REPORTCOSTGT
11          CONNECT TO DB6G
11          COMPARE PACKAGE TESTCOLLX.TEST10 IN PUBLIC.PLAN_TABLE
              TO PREVIOUS
11          2005/04/11  SQL ID -          ACCESS PATH FOR TEST10          COLLID - TESTCOLLX
OLD PLAN_TABLE -
IN QRYNO M CREATOR TNAME          TBNO AC MC CREATOR ACCESSNAME          IO
SORTUJGO LK PF QBNO PLNO MXSQ
PCK212I TIMESTAMP USED FOR PREVIOUS COMMAND = 2005041113365139  VERSION = 2004-02-25-
23.09.57.127041

1  327 0 PUBLIC SYSCOLUMNS          1 I  2 PUBLIC DSNDCX01          N
NNNNNNNN IS          1  1
1  327 1 PUBLIC SYSTABLES          2 I  2 PUBLIC DSNDTX01          N
NNNNNNNN IS          1  2
2  327 0 PUBLIC10 SYSTABLES          2 I  2 PUBLIC10 DSNDTX01          N
NNNNNNNN IS          1  1
2  327 1 PUBLIC10 SYSCOLUMNS          1 I  2 PUBLIC10 DSNDCXX1          N
NNNNNNNN IS L          1  2
PCK206I COMPARE COMPLETE FOR PROGRAM = TEST10  VERSION = 2004-02-26-16.16.07.887167
              PREVIOUS VERSION = 2004-02-25-23.09.57.127041
PCK203I STATEMENTS WITH SAME ACCESS PATH          1 STATEMENTS WITH DIFFERENT ACCESS
PATH          1 FOR PROGRAM TEST10
PCK204I QUERIES WITH MATCHING EXPLAIN          2 QUERIES WITHOUT MATCHING
EXPLAIN          0 FOR PROGRAM TEST10
PCK217I TOTAL DBRMS COMPARED          1
PCK217I TOTAL STATEMENTS COMPARED          2
PCK217I TOTAL ACCESS PATH CHANGES          1
PCK217I TOTAL ACCESS PATH SAME          1
PCK217I TOTAL NEW SQL STATEMENTS          0
PCK217I TOTAL DELETED SQL STATEMENTS          0
PCK217I TOTAL DSN_STATEMNT COST INCR          0
COMPLETE RET CODE=          04
11          2005/04/11  SQL ID -          ACCESS PATH FOR TEST10          COLLID - TESTCOLLX
OLD PLAN_TABLE -

STATEMENT          327 THIS IS THE OLD ACCESS PATH.

STATEMENT#          327 DECLARE SELECT-1 CURSOR FOR SELECT A . NAME , A . TBNAME , A
              . COLNO , A . COLTYPE , A . LENGTH FROM SYSCOLUMNS A INNER
              JOIN SYSTABLES B ON A . TBNAME = B . NAME AND A . TBcreator
              = B . CREATOR WHERE A . TBNAME = : H AND A . TBcreator = : H

STEP          1 ACCESSES TABLE PUBLIC .SYSCOLUMNS          A
              USING INDEX PUBLIC .DSNDCX01          USING 2 COLUMN(S).
              THE INTENT LOCK FOR THE TABLE IS IS
              THE TIMESTAMP FOR THIS EXPLAIN IS 2005041113365129
              THE TABLE HAS          6,361 ROWS OF          969 BYTES.
              THE NON-UNIQUE INDEX HAS          6,361 ENTRIES IN 2 LEVELS WITH
CLUSTER RATIO 81
STEP          2 ACCESSES TABLE PUBLIC .SYSTABLES          B
              USING INDEX PUBLIC .DSNDTX01          USING 2 COLUMN(S).
              THE JOIN METHOD IS NESTED LOOP
              THE INTENT LOCK FOR THE TABLE IS IS
              THE TIMESTAMP FOR THIS EXPLAIN IS 2005041113365129
              THE TABLE HAS          404 ROWS OF          542 BYTES.
              THE NON-UNIQUE INDEX HAS          404 ENTRIES IN 2 LEVELS WITH
CLUSTER RATIO 72

```

```

TIME                DB2 ESTIMATES THIS QUERY WILL USE                1 MILLISECONDS OF CPU
STATEMENT           327 THIS IS THE NEW ACCESS PATH.
STATEMENT#          327 DECLARE SELECT-1 CURSOR FOR SELECT A . NAME , A . TBNAME , A
                   . COLNO , A . COLTYPE , A . LENGTH FROM SYSCOLUMNS A INNER
                   JOIN SYSTABLES B ON A . TBNAME = B . NAME AND A . TBCREATOR
                   = B . CREATOR WHERE A . TBNAME = : H AND A . TBCREATOR = : H

STEP                1  ACCESSES TABLE      PUBLIC10.SYSTABLES      B
                   USING INDEX PUBLIC10.DSNDTX01      USING      2 COLUMN(S).
                   THE INTENT LOCK FOR THE TABLE IS IS
                   THE TIMESTAMP FOR THIS EXPLAIN IS 2005041113370757
                   THE TABLE HAS                404 ROWS OF      542 BYTES.
                   THE NON-UNIQUE INDEX HAS      404 ENTRIES IN  2 LEVELS WITH
CLUSTER RATIO 73
STEP                2  ACCESSES TABLE      PUBLIC10.SYSCOLUMNS  A
                   USING INDEX PUBLIC10.DSNDX01      USING      2 COLUMN(S).
                   THE JOIN METHOD IS NESTED LOOP
                   THE ACCESS WILL USE LIST PREFETCH
                   THE INTENT LOCK FOR THE TABLE IS IS
                   THE TIMESTAMP FOR THIS EXPLAIN IS 2005041113370757
                   THE TABLE HAS                6,361 ROWS OF   969 BYTES.
                   THE NON-UNIQUE INDEX HAS      404 ENTRIES IN  2 LEVELS WITH
CLUSTER RATIO 69
TIME                DB2 ESTIMATES THIS QUERY WILL USE                2 MILLISECONDS OF CPU
STATEMENT           DB2 ESTIMATES THIS QUERY WILL USE                6 SERVICE UNITS
PCK206I COMPARE COMPLETE FOR PROGRAM = TEST10  VERSION =    2004-02-26-16.16.07.887167
                   PREVIOUS VERSION =    2004-02-25-23.09.57.127041
PCK217I TOTAL DBRMS COMPARED                    1
PCK217I TOTAL STATEMENTS COMPARED                2
PCK217I TOTAL ACCESS PATH CHANGES              1
PCK217I TOTAL ACCESS PATH SAME                  1
PCK217I TOTAL NEW SQL STATEMENTS                0
11      2005/04/11  SQL ID -                ACCESS PATH FOR TEST10      COLLID - TESTCOLLX
OLD PLAN_TABLE -
PCK217I TOTAL DELETED SQL STATEMENTS            0
    
```

Version 7 Comparison

```

PCK031I EXECUTING LICENSED PATH CHECKER V2R2
11      OPTIONS CATALOGSQL NOMATCHCREATOR REPORTCOSTGT
11      CONNECT TO DB7G
11      COMPARE PACKAGE TESTCOLLX.TEST10 IN PUBLIC.PLAN_TABLE
                   TO PREVIOUS
11      2005/04/11  SQL ID -                ACCESS PATH FOR TEST10      COLLID - TESTCOLLX
OLD PLAN_TABLE -
IN QRYNO M CREATOR TNAME                TBNO AC MC CREATOR ACCESSNAME IO
SORTUJGO LK PF QBNO PLNO MXSQ
PCK212I TIMESTAMP USED FOR PREVIOUS COMMAND = 2005041112321752  VERSION = 2004-02-25-
23.09.57.127041

1  327 0 PUBLIC SYSCOLUMNS                1 I  2 PUBLIC DSNDX01      N
NNNNNNNN IS 1 1
1  327 1 PUBLIC SYSTABLES                  2 I  2 PUBLIC DSNDTX01      N
NNNNNNNN IS 1 2
2  327 0 PUBLIC10 SYSTABLES                2 I  2 PUBLIC10 DSNDTX01      N
NNNNNNNN IS 1 1
2  327 1 PUBLIC10 SYSCOLUMNS              1 I  2 PUBLIC10 DSNDX01      N
NNNNNNNN IS L 1 2
PCK206I COMPARE COMPLETE FOR PROGRAM = TEST10  VERSION =    2004-02-26-16.16.07.887167
                   PREVIOUS VERSION =    2004-02-25-23.09.57.127041
PCK203I STATEMENTS WITH SAME ACCESS PATH      1 STATEMENTS WITH DIFFERENT ACCESS
PATH 1 FOR PROGRAM TEST10
PCK204I QUERIES WITH MATCHING EXPLAIN        2 QUERIES WITHOUT MATCHING
EXPLAIN 0 FOR PROGRAM TEST10
    
```

```

PCK217I TOTAL DBRMS COMPARED                1
PCK217I TOTAL STATEMENTS COMPARED           2
PCK217I TOTAL ACCESS PATH CHANGES           1
PCK217I TOTAL ACCESS PATH SAME              1
PCK217I TOTAL NEW SQL STATEMENTS            0
PCK217I TOTAL DELETED SQL STATEMENTS        0
PCK217I TOTAL DSN_STATEMNT COST INCR        0
COMPLETE RET CODE=                          04
11      2005/04/11  SQL ID -                  ACCESS PATH FOR TEST10      COLLID - TESTCOLLX
OLD PLAN_TABLE -

STATEMENT          327 THIS IS THE OLD ACCESS PATH.

STATEMENT#         327 DECLARE SELECT-1 CURSOR FOR SELECT A . NAME , A . TBNAME , A
                   . COLNO , A . COLTYPE , A . LENGTH FROM SYSCOLUMNS A INNER
                   JOIN SYSTABLES B ON A . TBNAME = B . NAME AND A . TBCREATOR
                   = B . CREATOR WHERE A . TBNAME = : H AND A . TBCREATOR = : H

STEP              1  ACCESSES TABLE PUBLIC .SYSCOLUMNS A
                   USING INDEX PUBLIC .DSNDCX01 USING 2 COLUMN(S).
                   THE INTENT LOCK FOR THE TABLE IS IS
                   THE TIMESTAMP FOR THIS EXPLAIN IS 2005041112321745
                   THIS OPERATION REFERENCES A TABLE
                   THE TABLE HAS 6,361 ROWS OF 969 BYTES.
                   THE NON-UNIQUE INDEX HAS 6,361 ENTRIES IN 2 LEVELS WITH
CLUSTER RATIO 81
STEP              2  ACCESSES TABLE PUBLIC .SYSTABLES B
                   USING INDEX PUBLIC .DSNDTX01 USING 2 COLUMN(S).
                   THE JOIN METHOD IS NESTED LOOP
                   THE INTENT LOCK FOR THE TABLE IS IS
                   THE TIMESTAMP FOR THIS EXPLAIN IS 2005041112321745
                   THIS OPERATION REFERENCES A TABLE
                   THE TABLE HAS 404 ROWS OF 542 BYTES.
                   THE NON-UNIQUE INDEX HAS 404 ENTRIES IN 2 LEVELS WITH
CLUSTER RATIO 72
TIME
DB2 ESTIMATES THIS QUERY WILL USE 1 MILLISECONDS OF CPU
DB2 ESTIMATES THIS QUERY WILL USE 1 SERVICE UNITS

STATEMENT          327 THIS IS THE NEW ACCESS PATH.

STATEMENT#         327 DECLARE SELECT-1 CURSOR FOR SELECT A . NAME , A . TBNAME , A
                   . COLNO , A . COLTYPE , A . LENGTH FROM SYSCOLUMNS A INNER
                   JOIN SYSTABLES B ON A . TBNAME = B . NAME AND A . TBCREATOR
                   = B . CREATOR WHERE A . TBNAME = : H AND A . TBCREATOR = : H

STEP              1  ACCESSES TABLE PUBLIC10.SYSTABLES B
                   USING INDEX PUBLIC10.DSNDTX01 USING 2 COLUMN(S).
                   THE INTENT LOCK FOR THE TABLE IS IS
                   THE TIMESTAMP FOR THIS EXPLAIN IS 2005041112393763
                   THIS OPERATION REFERENCES A TABLE
                   THE TABLE HAS 404 ROWS OF 542 BYTES.
                   THE NON-UNIQUE INDEX HAS 404 ENTRIES IN 2 LEVELS WITH
CLUSTER RATIO 73
STEP              2  ACCESSES TABLE PUBLIC10.SYSCOLUMNS A
                   USING INDEX PUBLIC10.DSNDCX01 USING 2 COLUMN(S).
                   THE JOIN METHOD IS NESTED LOOP
                   THE ACCESS WILL USE LIST PREFETCH
                   THE INTENT LOCK FOR THE TABLE IS IS
                   THE TIMESTAMP FOR THIS EXPLAIN IS 2005041112393763
                   THIS OPERATION REFERENCES A TABLE
                   THE TABLE HAS 6,361 ROWS OF 969 BYTES.
                   THE NON-UNIQUE INDEX HAS 6,361 ENTRIES IN 3 LEVELS WITH
CLUSTER RATIO 81
TIME
DB2 ESTIMATES THIS QUERY WILL USE 2 MILLISECONDS OF CPU
DB2 ESTIMATES THIS QUERY WILL USE 6 SERVICE UNITS
PCK206I COMPARE COMPLETE FOR PROGRAM = TEST10 VERSION = 2004-02-26-16.16.07.887167

```

```

PREVIOUS VERSION = 2004-02-25-23.09.57.127041
PCK217I TOTAL DBRMS COMPARED 1
11 2005/04/11 SQL ID - ACCESS PATH FOR TEST10 COLLID - TESTCOLLX
OLD PLAN_TABLE -

PCK217I TOTAL STATEMENTS COMPARED 2
PCK217I TOTAL ACCESS PATH CHANGES 1
PCK217I TOTAL ACCESS PATH SAME 1
PCK217I TOTAL NEW SQL STATEMENTS 0
PCK217I TOTAL DELETED SQL STATEMENTS 0
    
```

```

*****
*****
PCK218I PROGRAM TEST10 HAS A CHANGED ACCESS PATH
QUERYNO 327
COLLECTION TESTCOLLX
NEW VERSION 2004-02-26-16.16.07.887167
OLD VERSION 2004-02-25-23.09.57.127041
    
```

```

*****
*****
PCK217I TOTAL DBRMS COMPARED 1
PCK217I TOTAL STATEMENTS COMPARED 2
PCK217I TOTAL ACCESS PATH CHANGES 1
PCK217I TOTAL ACCESS PATH SAME 1
PCK217I TOTAL NEW SQL STATEMENTS 0
PCK217I TOTAL DELETED SQL STATEMENTS 0
    
```

Version 8 Comparison

```

PCK031I EXECUTING LICENSED PATH CHECKER V2R2
11 OPTIONS CATALOGSQL NOMATCHCREATOR REPORTCOSTGT
11 CONNECT TO DB8G
11 COMPARE PACKAGE TESTCOLLX.TEST10 IN PUBLIC.PLAN_TABLE
TO PREVIOUS
11 2005/04/11 SQL ID - ACCESS PATH FOR TEST10 COLLID - TESTCOLLX
OLD PLAN_TABLE -
IN QRYNO M CREATOR TNAME TBNO AC MC CREATOR ACCESSNAME IO
SORTUJGO LK PF QBNO PLNO MXSQ
PCK212I TIMESTAMP USED FOR PREVIOUS COMMAND = 2005041114360013 VERSION = 2004-02-25-
23.09.57.127041

1 327 0 PUBLIC SYSCOLUMNS 1 I 2 PUBLIC DSNDX01 N
NNNNNNNN IS 1 1
1 327 1 PUBLIC SYSTABLES 2 I 2 PUBLIC DSNDTX01 Y
NNNNNNNN IS 1 2
2 327 0 PUBLIC10 SYSTABLES 2 I 2 PUBLIC10 DSNDTX01 Y
NNNNNNNN IS 1 1
2 327 1 PUBLIC10 SYSCOLUMNS 1 I 2 PUBLIC10 DSNDX01 N
NNNNNNNN IS 1 2

1 338 0 PUBLIC SYSTABLES 1 I 1 PUBLIC DSNDTX01 N
NNNNNNNN IS L 1 1
PCK220I DATA CHANGE FOR COLUMN PREFETCH = WAS L
2 338 0 PUBLIC10 SYSTABLES 1 I 1 PUBLIC10 DSNDTX01 N
NNNNNNNN IS 1 1
PCK221I DATA CHANGE FOR COLUMN PREFETCH = IS NOW
PCK206I COMPARE COMPLETE FOR PROGRAM = TEST10 VERSION = 2004-02-26-16.16.07.887167
PREVIOUS VERSION = 2004-02-25-23.09.57.127041

PCK203I STATEMENTS WITH SAME ACCESS PATH 0 STATEMENTS WITH DIFFERENT ACCESS
PATH 2 FOR PROGRAM TEST10
PCK204I QUERIES WITH MATCHING EXPLAIN 2 QUERIES WITHOUT MATCHING
EXPLAIN 0 FOR PROGRAM TEST10
PCK217I TOTAL DBRMS COMPARED 1
PCK217I TOTAL STATEMENTS COMPARED 2
PCK217I TOTAL ACCESS PATH CHANGES 2
PCK217I TOTAL ACCESS PATH SAME 0
PCK217I TOTAL NEW SQL STATEMENTS 0
PCK217I TOTAL DELETED SQL STATEMENTS 0
PCK217I TOTAL DSN_STATEMNT COST INCR 0
COMPLETE RET CODE= 04
    
```

11 2005/04/11 SQL ID - ACCESS PATH FOR TEST10 COLLID - TESTCOLLX
 OLD PLAN_TABLE -

STATEMENT 327 THIS IS THE OLD ACCESS PATH.

STATEMENT# 327 DECLARE SELECT-1 CURSOR FOR SELECT A . NAME , A . TBNAME , A
 . COLNO , A . COLTYPE , A . LENGTH FROM SYSCOLUMNS A INNER
 JOIN SYSTABLES B ON A . TBNAME = B . NAME AND A . TBCREATOR
 = B . CREATOR WHERE A . TBNAME = : H AND A . TBCREATOR = : H

STEP 1 ACCESSES TABLE PUBLIC .SYSCOLUMNS A
 USING INDEX PUBLIC .DSNDCX01 USING 2 COLUMN(S).
 THE INTENT LOCK FOR THE TABLE IS IS
 THE TIMESTAMP FOR THIS EXPLAIN IS 2005041114355995
 THIS OPERATION REFERENCES A TABLE
 THE TABLE HAS 6,361 ROWS OF 969 BYTES.
 THE NON-UNIQUE INDEX HAS 6,361 ENTRIES IN 2 LEVELS WITH

CLUSTER RATIO 81
 STEP 2 ACCESSES TABLE PUBLIC .SYSTABLES B
 USING INDEX PUBLIC .DSNDTX01 USING 2 COLUMN(S).
 THE JOIN METHOD IS NESTED LOOP
 THE ACCESS ONLY READS THE INDEX NOT THE TABLE
 THE INTENT LOCK FOR THE TABLE IS IS
 THE TIMESTAMP FOR THIS EXPLAIN IS 2005041114355995
 THIS OPERATION REFERENCES A TABLE
 THE TABLE HAS 404 ROWS OF 542 BYTES.
 THE NON-UNIQUE INDEX HAS 404 ENTRIES IN 2 LEVELS WITH

CLUSTER RATIO 72
 TIME DB2 ESTIMATES THIS QUERY WILL USE 1 MILLISECONDS OF CPU
 DB2 ESTIMATES THIS QUERY WILL USE 2 SERVICE UNITS

STATEMENT 327 THIS IS THE NEW ACCESS PATH.

STATEMENT# 327 DECLARE SELECT-1 CURSOR FOR SELECT A . NAME , A . TBNAME , A
 . COLNO , A . COLTYPE , A . LENGTH FROM SYSCOLUMNS A INNER
 JOIN SYSTABLES B ON A . TBNAME = B . NAME AND A . TBCREATOR
 = B . CREATOR WHERE A . TBNAME = : H AND A . TBCREATOR = : H

STEP 1 ACCESSES TABLE PUBLIC10.SYSTABLES B
 USING INDEX PUBLIC10.DSNDTX01 USING 2 COLUMN(S).
 THE ACCESS ONLY READS THE INDEX NOT THE TABLE
 THE INTENT LOCK FOR THE TABLE IS IS
 THE TIMESTAMP FOR THIS EXPLAIN IS 2005041114361612
 THIS OPERATION REFERENCES A TABLE
 THE TABLE HAS 404 ROWS OF 542 BYTES.
 THE NON-UNIQUE INDEX HAS 404 ENTRIES IN 2 LEVELS WITH

CLUSTER RATIO 94
 STEP 2 ACCESSES TABLE PUBLIC10.SYSCOLUMNS A
 USING INDEX PUBLIC10.DSNDXC01 USING 2 COLUMN(S).
 THE JOIN METHOD IS NESTED LOOP
 THE INTENT LOCK FOR THE TABLE IS IS
 THE TIMESTAMP FOR THIS EXPLAIN IS 2005041114361612
 THIS OPERATION REFERENCES A TABLE
 THE TABLE HAS 6,361 ROWS OF 969 BYTES.
 THE NON-UNIQUE INDEX HAS 6,361 ENTRIES IN 2 LEVELS WITH

CLUSTER RATIO 94
 TIME DB2 ESTIMATES THIS QUERY WILL USE 1 MILLISECONDS OF CPU
 DB2 ESTIMATES THIS QUERY WILL USE 2 SERVICE UNITS

STATEMENT 338 THIS IS THE OLD ACCESS PATH.
 11 2005/04/11 SQL ID - ACCESS PATH FOR TEST10 COLLID - TESTCOLLX
 OLD PLAN_TABLE -

STATEMENT# 338 DECLARE SELECT-2 CURSOR FOR SELECT NAME , CREATOR , TYPE , D
 BNAME , TSNAME FROM SYSTABLES WHERE CREATOR = : H

```

STEP          1  ACCESSES TABLE      PUBLIC  .SYSTABLES
                USING INDEX PUBLIC  .DSNDTX01          USING  1 COLUMN(S).
                THE ACCESS WILL USE LIST PREFETCH
                THE INTENT LOCK FOR THE TABLE IS IS
                THE TIMESTAMP FOR THIS EXPLAIN IS 2005041114360013
                THIS OPERATION REFERENCES A TABLE
                THE TABLE HAS              404 ROWS OF    542 BYTES.
                THE NON-UNIQUE INDEX HAS    404 ENTRIES IN  2 LEVELS WITH
CLUSTER RATIO 72
                DB2 ESTIMATES THIS QUERY WILL USE          2 MILLISECONDS OF CPU
TIME
                DB2 ESTIMATES THIS QUERY WILL USE          4 SERVICE UNITS

STATEMENT      338 THIS IS THE NEW ACCESS PATH.

STATEMENT#     338 DECLARE SELECT-2 CURSOR FOR SELECT NAME , CREATOR , TYPE , D
                BNAME , TSNAME FROM SYSTABLES WHERE CREATOR = : H

STEP          1  ACCESSES TABLE      PUBLIC10.SYSTABLES
                USING INDEX PUBLIC10.DSNDTX01          USING  1 COLUMN(S).
                THE INTENT LOCK FOR THE TABLE IS IS
                THE TIMESTAMP FOR THIS EXPLAIN IS 2005041114361629
                THIS OPERATION REFERENCES A TABLE
                THE TABLE HAS              404 ROWS OF    542 BYTES.
                THE NON-UNIQUE INDEX HAS    404 ENTRIES IN  2 LEVELS WITH
CLUSTER RATIO 94
                DB2 ESTIMATES THIS QUERY WILL USE          2 MILLISECONDS OF CPU
TIME
                DB2 ESTIMATES THIS QUERY WILL USE          4 SERVICE UNITS
PCK206I COMPARE COMPLETE FOR PROGRAM = TEST10  VERSION =    2004-02-26-16.16.07.887167
                PREVIOUS VERSION =            2004-02-25-23.09.57.127041
PCK217I TOTAL DBRMS COMPARED                    1
PCK217I TOTAL STATEMENTS COMPARED                2
PCK217I TOTAL ACCESS PATH CHANGES                2
PCK217I TOTAL ACCESS PATH SAME                   0
PCK217I TOTAL NEW SQL STATEMENTS                 0
PCK217I TOTAL DELETED SQL STATEMENTS              0

*****
*****
PCK218I PROGRAM TEST10      HAS A CHANGED ACCESS PATH
QUERYNO                      327
COLLECTION                    TESTCOLLX
NEW VERSION                   2004-02-26-16.16.07.887167
OLD VERSION                   2004-02-25-23.09.57.127041

*****
*****
PCK218I PROGRAM TEST10      HAS A CHANGED ACCESS PATH
QUERYNO                      338
COLLECTION                    TESTCOLLX
NEW VERSION                   2004-02-26-16.16.07.887167
OLD VERSION                   2004-02-25-23.09.57.127041

*****
*****
PCK217I TOTAL DBRMS COMPARED                    1
PCK217I TOTAL STATEMENTS COMPARED                2
PCK217I TOTAL ACCESS PATH CHANGES                2
PCK217I TOTAL ACCESS PATH SAME                   0
PCK217I TOTAL NEW SQL STATEMENTS                 0
PCK217I TOTAL DELETED SQL STATEMENTS              0

```

Analysis of the Comparisons between Versions of DB2

	V6	V7	V8
Before MSUs	2	1	2
After MSUs	23	5	1
Access Type Change			

Analysis of the Comparisons between Versions of DB2 cursor-2

	V6	V7	V8
Before MSUs			4
After MSUs			4
Access Type Change			List Prefetch

The Change

. We changed from IX1 to IX2.

```

OLD
CREATE INDEX    DSNDX01
      ON SYSCOLUMNS
(TBCREATOR
, TBNAME
, NAME )
USING STOGROUP SYSDEFLT PRIQTY 7200 SECQTY 7200
CLOSE NO;
NEW
CREATE INDEX DSNDX01
      ON SYSCOLUMNS
(TBCREATOR
, TBNAME )
USING STOGROUP SYSDEFLT PRIQTY 7200 SECQTY 7200
CLOSE NO;

```

This required structure changes.

Query Summary

Database Alias: HLSP390 **Explain Time :** 2005-05-30 09:00:27.693612

DB2 Platform : Z/OS **DB2 Version:** v8

SQL Statement :
 DECLARE SELECT-1 CURSOR FOR SELECT A . NAME , A .
 TBNAME , A . COLNO , A . COLTYPE , A . LENGTH FROM
 SYSCOLUMNS A INNER JOIN SYSTABLES B ON A . TBNAME =
 B . NAME AND A . TBCREATOR = B . CREATOR WHERE A .
 TBNAME = : H AND A . TBCREATOR = : H

Attribute	Value	Explanation
Timestamp	2005-05-30 09:00:27.693612	Timestamp when the query is explained
Type	SELECT	Query type (SELECT, INSERT, UPDATE, DELETE, SELUPD, DELCUR, UPDCUR)
CPU Cost (ms)	3	Estimated CPU cost (in milliseconds)
CPU Cost (su)	6	Estimated CPU cost (in service units)
Cost Category	A	Cost estimation category (A=statistics; B=default)
Reason		Reason when the cost estimation category is B (HOST VARIABLES, TABLE CARDINALITY, UDF, TRIGGERS, REFERENTIAL CONSTRAINTS)
Group Member		

Query Summary

Database Alias: HLSP390 **Explain Time :** 2005-05-30 09:00:27.693612

DB2 Platform : Z/OS **DB2 Version:** v8

SQL Statement : DECLARE SELECT-2 CURSOR FOR SELECT NAME , CREATOR
, TYPE , DBNAME , TSNAME FROM SYSTABLES WHERE
CREATOR = : H

Attribute	Value	Explanation
Timestamp	2005-05-30 09:00:27.693612	Timestamp when the query is explained
Type	SELECT	Query type (SELECT, INSERT, UPDATE, DELETE, SELUPD, DELCUR, UPDCUR)
CPU Cost (ms)	2	Estimated CPU cost (in milliseconds)
CPU Cost (su)	5	Estimated CPU cost (in service units)
Cost Category	A	Cost estimation category (A=statistics; B=default)
Reason		Reason when the cost estimation category is B (HOST VARIABLES, TABLE CARDINALITY, UDF, TRIGGERS, REFERENTIAL CONSTRAINTS)
Group Member		

Case 11: Drop a Column from the Index

Version 6 Comparison

```

PCK031I EXECUTING LICENSED PATH CHECKER V2R2
11          OPTIONS CATALOGSQL NOMATCHCREATOR REPORTCOSTGT
11          CONNECT TO DB6G
11          COMPARE PACKAGE TESTCOLLX.TEST11 IN PUBLIC.PLAN_TABLE
              TO PREVIOUS
11          2005/04/11  SQL ID -          ACCESS PATH FOR TEST11          COLLID - TESTCOLLX
OLD PLAN_TABLE -
  IN QRYNO M  CREATOR  TNAME          TBNO AC MC CREATOR  ACCESSNAME          IO
SORTUJGO LK PF QBNO PLNO MXSQ
PCK212I TIMESTAMP USED FOR PREVIOUS COMMAND = 2005041113365169  VERSION = 2004-02-25-
23.10.51.046774

  1   327 0 PUBLIC  SYSCOLUMNS          1 I   2 PUBLIC  DSNDXC01          N
NNNNNNNN IS          1   1
PCK220I DATA CHANGE FOR COLUMN MATCHCOLS          WAS          2
PCK220I DATA CHANGE FOR COLUMN PREFETCH =          WAS
  1   327 1 PUBLIC  SYSTABLES          2 I   2 PUBLIC  DSNDTX01          N
NNNNNNNN IS          1   2
  2   327 0 PUBLIC11 SYSCOLUMNS          1 I   1 PUBLIC11 DSNDXC01          N
NNNNNNNN IS L        1   1
PCK221I DATA CHANGE FOR COLUMN MATCHCOLS          IS NOW          1
PCK221I DATA CHANGE FOR COLUMN PREFETCH =          IS NOW L
  2   327 1 PUBLIC11 SYSTABLES          2 I   2 PUBLIC11 DSNDTX01          N
NNNNNNNN IS          1   2
PCK206I COMPARE COMPLETE FOR PROGRAM = TEST11  VERSION = 2004-02-26-16.17.59.404674
              PREVIOUS VERSION = 2004-02-25-23.10.51.046774

PCK203I STATEMENTS WITH SAME ACCESS PATH 1 STATEMENTS WITH DIFFERENT ACCESS
PATH 1 FOR PROGRAM TEST11
PCK204I QUERIES WITH MATCHING EXPLAIN 2 QUERIES WITHOUT MATCHING
EXPLAIN 0 FOR PROGRAM TEST11
PCK217I TOTAL DBRMS COMPARED 1
PCK217I TOTAL STATEMENTS COMPARED 2
PCK217I TOTAL ACCESS PATH CHANGES 1
PCK217I TOTAL ACCESS PATH SAME 1
PCK217I TOTAL NEW SQL STATEMENTS 0
PCK217I TOTAL DELETED SQL STATEMENTS 0
PCK217I TOTAL DSN_STATEMNT COST INCR 0
COMPLETE RET CODE= 04
11          2005/04/11  SQL ID -          ACCESS PATH FOR TEST11          COLLID - TESTCOLLX
OLD PLAN_TABLE -

STATEMENT          327 THIS IS THE OLD ACCESS PATH.

STATEMENT#          327 DECLARE SELECT-1 CURSOR FOR SELECT A . NAME , A . TBNAME , A
. COLNO , A . COLTYPE , A . LENGTH FROM SYSCOLUMNS A INNER
JOIN SYSTABLES B ON A . TBNAME = B . NAME AND A . TBcreator
= B . CREATOR WHERE A . TBNAME = : H AND A . TBcreator = : H

STEP          1  ACCESSES TABLE PUBLIC .SYSCOLUMNS A
USING INDEX PUBLIC .DSNDXC01 USING 2 COLUMN(S).
THE INTENT LOCK FOR THE TABLE IS IS
THE TIMESTAMP FOR THIS EXPLAIN IS 2005041113365161
THE TABLE HAS 6,361 ROWS OF 969 BYTES.
THE NON-UNIQUE INDEX HAS 6,361 ENTRIES IN 2 LEVELS WITH

CLUSTER RATIO 81
STEP          2  ACCESSES TABLE PUBLIC .SYSTABLES B
USING INDEX PUBLIC .DSNDTX01 USING 2 COLUMN(S).
THE JOIN METHOD IS NESTED LOOP
THE INTENT LOCK FOR THE TABLE IS IS
THE TIMESTAMP FOR THIS EXPLAIN IS 2005041113365161
THE TABLE HAS 404 ROWS OF 542 BYTES.
THE NON-UNIQUE INDEX HAS 404 ENTRIES IN 2 LEVELS WITH

CLUSTER RATIO 72

```

```

TIME          DB2 ESTIMATES THIS QUERY WILL USE          1 MILLISECOND(S) OF CPU
STATEMENT     327 THIS IS THE NEW ACCESS PATH.
STATEMENT#    327 DECLARE SELECT-1 CURSOR FOR SELECT A . NAME , A . TBNAME , A
              . COLNO , A . COLTYPE , A . LENGTH FROM SYSCOLUMNS A INNER
              JOIN SYSTABLES B ON A . TBNAME = B . NAME AND A . TBCREATOR
              = B . CREATOR WHERE A . TBNAME = : H AND A . TBCREATOR = : H

STEP          1  ACCESSES TABLE PUBLIC11.SYSCOLUMNS          A
              USING INDEX PUBLIC11.DSNDX01          USING 1 COLUMN(S).
              THE ACCESS WILL USE LIST PREFETCH
              THE INTENT LOCK FOR THE TABLE IS IS
              THE TIMESTAMP FOR THIS EXPLAIN IS 2005041113370789
              THE TABLE HAS 6,361 ROWS OF 969 BYTES.
              THE NON-UNIQUE INDEX HAS 33 ENTRIES IN 2 LEVELS WITH
CLUSTER RATIO 53
STEP          2  ACCESSES TABLE PUBLIC11.SYSTABLES          B
              USING INDEX PUBLIC11.DSNDTX01          USING 2 COLUMN(S).
              THE JOIN METHOD IS NESTED LOOP
              THE INTENT LOCK FOR THE TABLE IS IS
              THE TIMESTAMP FOR THIS EXPLAIN IS 2005041113370789
              THE TABLE HAS 404 ROWS OF 542 BYTES.
              THE NON-UNIQUE INDEX HAS 404 ENTRIES IN 2 LEVELS WITH
CLUSTER RATIO 73
TIME          DB2 ESTIMATES THIS QUERY WILL USE          8 MILLISECOND(S) OF CPU
STATEMENT     DB2 ESTIMATES THIS QUERY WILL USE          21 SERVICE UNITS
PCK206I COMPARE COMPLETE FOR PROGRAM = TEST11 VERSION = 2004-02-26-16.17.59.404674
              PREVIOUS VERSION = 2004-02-25-23.10.51.046774
PCK217I TOTAL DBRMS COMPARED 1
PCK217I TOTAL STATEMENTS COMPARED 2
PCK217I TOTAL ACCESS PATH CHANGES 1
PCK217I TOTAL ACCESS PATH SAME 1
PCK217I TOTAL NEW SQL STATEMENTS 0
11 2005/04/11 SQL ID - ACCESS PATH FOR TEST11 COLLID - TESTCOLLX
OLD PLAN_TABLE -
    
```

Version 7 Comparison

```

PCK031I EXECUTING LICENSED PATH CHECKER V2R2
11          OPTIONS CATALOGSQL NOMATCHCREATOR REPORTCOSTGT
11          CONNECT TO DB7G
11          COMPARE PACKAGE TESTCOLLX.TEST11 IN PUBLIC.PLAN_TABLE
              TO PREVIOUS
11 2005/04/11 SQL ID - ACCESS PATH FOR TEST11 COLLID - TESTCOLLX
OLD PLAN_TABLE -
IN QRYNO M CREATOR TNAME TBNO AC MC CREATOR ACCESSNAME IO
SORTUJGO LK PF QBNO PLNO MXSQ
PCK212I TIMESTAMP USED FOR PREVIOUS COMMAND = 2005041112321785 VERSION = 2004-02-25-
23.10.51.046774

1 327 0 PUBLIC SYSCOLUMNS 1 I 2 PUBLIC DSNDX01 N
NNNNNNNN IS 1 1
PCK220I DATA CHANGE FOR COLUMN MATCHCOLS WAS 2
PCK220I DATA CHANGE FOR COLUMN PREFETCH = WAS
1 327 1 PUBLIC SYSTABLES 2 I 2 PUBLIC DSNDTX01 N
NNNNNNNN IS 1 2
2 327 0 PUBLIC11 SYSCOLUMNS 1 I 1 PUBLIC11 DSNDX01 N
NNNNNNNN IS L 1 1
PCK221I DATA CHANGE FOR COLUMN MATCHCOLS IS NOW 1
PCK221I DATA CHANGE FOR COLUMN PREFETCH = IS NOW L
2 327 1 PUBLIC11 SYSTABLES 2 I 2 PUBLIC11 DSNDTX01 N
NNNNNNNN IS 1 2
PCK206I COMPARE COMPLETE FOR PROGRAM = TEST11 VERSION = 2004-02-26-16.17.59.404674
              PREVIOUS VERSION = 2004-02-25-23.10.51.046774
    
```

```

PCK203I STATEMENTS WITH SAME ACCESS PATH          1      STATEMENTS WITH DIFFERENT ACCESS
PATH          1      FOR PROGRAM TEST11
PCK204I   QUERIES WITH MATCHING EXPLAIN          2      QUERIES WITHOUT MATCHING
EXPLAIN      0      FOR PROGRAM TEST11
PCK217I TOTAL DBRMS COMPARED                      1
PCK217I TOTAL STATEMENTS COMPARED                 2
PCK217I TOTAL ACCESS PATH CHANGES                1
PCK217I TOTAL ACCESS PATH SAME                    1
PCK217I TOTAL NEW SQL STATEMENTS                  0
PCK217I TOTAL DELETED SQL STATEMENTS              0
PCK217I TOTAL DSN_STATEMNT COST INCR              0
COMPLETE RET CODE=                                04
11      2005/04/11  SQL ID -                      ACCESS PATH FOR TEST11      COLLID - TESTCOLLX
OLD PLAN_TABLE -

```

```

STATEMENT      327 THIS IS THE OLD ACCESS PATH.

STATEMENT#     327 DECLARE SELECT-1 CURSOR FOR SELECT A . NAME , A . TBNAME , A
                . COLNO , A . COLTYPE , A . LENGTH FROM SYSCOLUMNS A INNER
                JOIN SYSTABLES B ON A . TBNAME = B . NAME AND A . TBCREATOR
                = B . CREATOR WHERE A . TBNAME = : H AND A . TBCREATOR = : H

STEP           1  ACCESSES TABLE      PUBLIC .SYSCOLUMNS          A
                USING INDEX PUBLIC .DSNDCX01          USING 2 COLUMN(S).
                THE INTENT LOCK FOR THE TABLE IS IS
                THE TIMESTAMP FOR THIS EXPLAIN IS 2005041112321778
                THIS OPERATION REFERENCES A TABLE
                THE TABLE HAS          6,361 ROWS OF    969 BYTES.
                THE NON-UNIQUE INDEX HAS          6,361 ENTRIES IN 2 LEVELS WITH
CLUSTER RATIO 81
STEP           2  ACCESSES TABLE      PUBLIC .SYSTABLES          B
                USING INDEX PUBLIC .DSNDTX01          USING 2 COLUMN(S).
                THE JOIN METHOD IS NESTED LOOP
                THE INTENT LOCK FOR THE TABLE IS IS
                THE TIMESTAMP FOR THIS EXPLAIN IS 2005041112321778
                THIS OPERATION REFERENCES A TABLE
                THE TABLE HAS          404 ROWS OF    542 BYTES.
                THE NON-UNIQUE INDEX HAS          404 ENTRIES IN 2 LEVELS WITH
CLUSTER RATIO 72
                DB2 ESTIMATES THIS QUERY WILL USE          1 MILLISECONDS OF CPU
TIME
                DB2 ESTIMATES THIS QUERY WILL USE          1 SERVICE UNITS

STATEMENT      327 THIS IS THE NEW ACCESS PATH.

STATEMENT#     327 DECLARE SELECT-1 CURSOR FOR SELECT A . NAME , A . TBNAME , A
                . COLNO , A . COLTYPE , A . LENGTH FROM SYSCOLUMNS A INNER
                JOIN SYSTABLES B ON A . TBNAME = B . NAME AND A . TBCREATOR
                = B . CREATOR WHERE A . TBNAME = : H AND A . TBCREATOR = : H

STEP           1  ACCESSES TABLE      PUBLIC11.SYSCOLUMNS        A
                USING INDEX PUBLIC11.DSNDCX01          USING 1 COLUMN(S).
                THE ACCESS WILL USE LIST PREFETCH
                THE INTENT LOCK FOR THE TABLE IS IS
                THE TIMESTAMP FOR THIS EXPLAIN IS 2005041112393799
                THIS OPERATION REFERENCES A TABLE
                THE TABLE HAS          6,361 ROWS OF    969 BYTES.
                THE NON-UNIQUE INDEX HAS          33 ENTRIES IN 2 LEVELS WITH
CLUSTER RATIO 53
STEP           2  ACCESSES TABLE      PUBLIC11.SYSTABLES        B
                USING INDEX PUBLIC11.DSNDTX01          USING 2 COLUMN(S).
                THE JOIN METHOD IS NESTED LOOP
                THE INTENT LOCK FOR THE TABLE IS IS
                THE TIMESTAMP FOR THIS EXPLAIN IS 2005041112393799
                THIS OPERATION REFERENCES A TABLE
                THE TABLE HAS          404 ROWS OF    542 BYTES.
                THE NON-UNIQUE INDEX HAS          404 ENTRIES IN 2 LEVELS WITH
CLUSTER RATIO 73

```

```

DB2 ESTIMATES THIS QUERY WILL USE                8 MILLISECONDS OF CPU
TIME
DB2 ESTIMATES THIS QUERY WILL USE                21 SERVICE UNITS
PCK206I COMPARE COMPLETE FOR PROGRAM = TEST11  VERSION = 2004-02-26-16.17.59.404674
PREVIOUS VERSION = 2004-02-25-23.10.51.046774
PCK217I TOTAL DBRMS COMPARED                    1
11 2005/04/11 SQL ID - ACCESS PATH FOR TEST11 COLLID - TESTCOLLX
OLD PLAN_TABLE -
PCK217I TOTAL STATEMENTS COMPARED              2
PCK217I TOTAL ACCESS PATH CHANGES              1
PCK217I TOTAL ACCESS PATH SAME                 1
PCK217I TOTAL NEW SQL STATEMENTS               0
PCK217I TOTAL DELETED SQL STATEMENTS           0
*****
*****
PCK218I PROGRAM TEST11 HAS A CHANGED ACCESS PATH
QUERYNO 327
COLLECTION TESTCOLLX
NEW VERSION 2004-02-26-16.17.59.404674
OLD VERSION 2004-02-25-23.10.51.046774
*****
*****
PCK217I TOTAL DBRMS COMPARED                    1
PCK217I TOTAL STATEMENTS COMPARED              2
PCK217I TOTAL ACCESS PATH CHANGES              1
PCK217I TOTAL ACCESS PATH SAME                 1
PCK217I TOTAL NEW SQL STATEMENTS               0
PCK217I TOTAL DELETED SQL STATEMENTS           0

```

Version 8 Comparison

```

PCK031I EXECUTING LICENSED PATH CHECKER V2R2
11 OPTIONS CATALOGSQL NOMATCHCREATOR REPORTCOSTGT
11 CONNECT TO DB8G
11 COMPARE PACKAGE TESTCOLLX.TEST11 IN PUBLIC.PLAN_TABLE
TO PREVIOUS
11 2005/04/11 SQL ID - ACCESS PATH FOR TEST11 COLLID - TESTCOLLX
OLD PLAN_TABLE -
IN QRYNO M CREATOR TNAME TBNO AC MC CREATOR ACCESSNAME IO
SORTUJGO LK PF QBNO PLNO MXSQ
PCK212I TIMESTAMP USED FOR PREVIOUS COMMAND = 2005041114360064 VERSION = 2004-02-25-
23.10.51.046774
1 327 0 PUBLIC SYSCOLUMNS 1 I 2 PUBLIC DSNDX01 N
NNNNNNNN IS 1 1
PCK220I DATA CHANGE FOR COLUMN MATCHCOLS WAS 2
PCK220I DATA CHANGE FOR COLUMN PREFETCH = WAS
1 327 1 PUBLIC SYSTABLES 2 I 2 PUBLIC DSNDTX01 Y
NNNNNNNN IS 1 2
2 327 0 PUBLIC11 SYSCOLUMNS 1 I 1 PUBLIC11 DSNDX01 N
NNNNNNNN IS L 1 1
PCK221I DATA CHANGE FOR COLUMN MATCHCOLS IS NOW 1
PCK221I DATA CHANGE FOR COLUMN PREFETCH = IS NOW L
2 327 1 PUBLIC11 SYSTABLES 2 I 2 PUBLIC11 DSNDTX01 Y
NNNNNNNN IS 1 2
1 338 0 PUBLIC SYSTABLES 1 I 1 PUBLIC DSNDTX01 N
NNNNNNNN IS L 1 1
PCK220I DATA CHANGE FOR COLUMN PREFETCH = WAS L
2 338 0 PUBLIC11 SYSTABLES 1 I 1 PUBLIC11 DSNDTX01 N
NNNNNNNN IS 1 1
PCK221I DATA CHANGE FOR COLUMN PREFETCH = IS NOW
PCK206I COMPARE COMPLETE FOR PROGRAM = TEST11 VERSION = 2004-02-26-16.17.59.404674
PREVIOUS VERSION = 2004-02-25-23.10.51.046774
PCK203I STATEMENTS WITH SAME ACCESS PATH 0 STATEMENTS WITH DIFFERENT ACCESS
PATH 2 FOR PROGRAM TEST11
PCK204I QUERIES WITH MATCHING EXPLAIN 2 QUERIES WITHOUT MATCHING
EXPLAIN 0 FOR PROGRAM TEST11

```

```

PCK217I TOTAL DBRMS COMPARED                1
PCK217I TOTAL STATEMENTS COMPARED           2
PCK217I TOTAL ACCESS PATH CHANGES           2
PCK217I TOTAL ACCESS PATH SAME              0
PCK217I TOTAL NEW SQL STATEMENTS            0
PCK217I TOTAL DELETED SQL STATEMENTS        0
PCK217I TOTAL DSN_STATEMNT COST INCR        0
COMPLETE RET CODE=                          04
11      2005/04/11  SQL ID -                  ACCESS PATH FOR TEST11      COLLID - TESTCOLLX
OLD PLAN_TABLE -

```

```

STATEMENT          327 THIS IS THE OLD ACCESS PATH.

STATEMENT#         327 DECLARE SELECT-1 CURSOR FOR SELECT A . NAME , A . TBNAME , A
                   . COLNO , A . COLTYPE , A . LENGTH FROM SYSCOLUMNS A INNER
                   JOIN SYSTABLES B ON A . TBNAME = B . NAME AND A . TBCREATOR
                   = B . CREATOR WHERE A . TBNAME = : H AND A . TBCREATOR = : H

STEP              1  ACCESSES TABLE      PUBLIC .SYSCOLUMNS      A
                   USING INDEX PUBLIC .DSNDCX01      USING 2 COLUMN(S).
                   THE INTENT LOCK FOR THE TABLE IS IS
                   THE TIMESTAMP FOR THIS EXPLAIN IS 2005041114360047
                   THIS OPERATION REFERENCES A TABLE
                   THE TABLE HAS          6,361 ROWS OF    969 BYTES.
                   THE NON-UNIQUE INDEX HAS          6,361 ENTRIES IN 2 LEVELS WITH
CLUSTER RATIO 81
STEP              2  ACCESSES TABLE      PUBLIC .SYSTABLES      B
                   USING INDEX PUBLIC .DSNDTX01      USING 2 COLUMN(S).
                   THE JOIN METHOD IS NESTED LOOP
                   THE ACCESS ONLY READS THE INDEX NOT THE TABLE
                   THE INTENT LOCK FOR THE TABLE IS IS
                   THE TIMESTAMP FOR THIS EXPLAIN IS 2005041114360047
                   THIS OPERATION REFERENCES A TABLE
                   THE TABLE HAS          404 ROWS OF    542 BYTES.
                   THE NON-UNIQUE INDEX HAS          404 ENTRIES IN 2 LEVELS WITH
CLUSTER RATIO 72
TIME              DB2 ESTIMATES THIS QUERY WILL USE          1 MILLISECONDS OF CPU
                   DB2 ESTIMATES THIS QUERY WILL USE          2 SERVICE UNITS

STATEMENT          327 THIS IS THE NEW ACCESS PATH.

STATEMENT#         327 DECLARE SELECT-1 CURSOR FOR SELECT A . NAME , A . TBNAME , A
                   . COLNO , A . COLTYPE , A . LENGTH FROM SYSCOLUMNS A INNER
                   JOIN SYSTABLES B ON A . TBNAME = B . NAME AND A . TBCREATOR
                   = B . CREATOR WHERE A . TBNAME = : H AND A . TBCREATOR = : H

STEP              1  ACCESSES TABLE      PUBLIC11.SYSCOLUMNS  A
                   USING INDEX PUBLIC11.DSNDCX01     USING 1 COLUMN(S).
                   THE ACCESS WILL USE LIST PREFETCH
                   THE INTENT LOCK FOR THE TABLE IS IS
                   THE TIMESTAMP FOR THIS EXPLAIN IS 2005041114361662
                   THIS OPERATION REFERENCES A TABLE
                   THE TABLE HAS          6,361 ROWS OF    969 BYTES.
                   THE NON-UNIQUE INDEX HAS          33 ENTRIES IN 2 LEVELS WITH
CLUSTER RATIO 56
STEP              2  ACCESSES TABLE      PUBLIC11.SYSTABLES  B
                   USING INDEX PUBLIC11.DSNDTX01     USING 2 COLUMN(S).
                   THE JOIN METHOD IS NESTED LOOP
                   THE ACCESS ONLY READS THE INDEX NOT THE TABLE
                   THE INTENT LOCK FOR THE TABLE IS IS
                   THE TIMESTAMP FOR THIS EXPLAIN IS 2005041114361662
                   THIS OPERATION REFERENCES A TABLE
                   THE TABLE HAS          404 ROWS OF    542 BYTES.
                   THE NON-UNIQUE INDEX HAS          404 ENTRIES IN 2 LEVELS WITH
CLUSTER RATIO 94
TIME              DB2 ESTIMATES THIS QUERY WILL USE          7 MILLISECONDS OF CPU

```

```

DB2 ESTIMATES THIS QUERY WILL USE          18 SERVICE UNITS

11      2005/04/11  SQL ID -          ACCESS PATH FOR TEST11      COLLID - TESTCOLLX
OLD PLAN_TABLE -

STATEMENT      338 THIS IS THE OLD ACCESS PATH.

STATEMENT#     338 DECLARE SELECT-2 CURSOR FOR SELECT NAME , CREATOR , TYPE , D
                BNAME , TSNAME FROM SYSTABLES WHERE CREATOR = : H

STEP           1  ACCESSES TABLE      PUBLIC .SYSTABLES
                USING INDEX PUBLIC .DSNDTX01          USING 1 COLUMN(S).
                THE ACCESS WILL USE LIST PREFETCH
                THE INTENT LOCK FOR THE TABLE IS IS
                THE TIMESTAMP FOR THIS EXPLAIN IS 2005041114360064
                THIS OPERATION REFERENCES A TABLE
                THE TABLE HAS          404 ROWS OF    542 BYTES.
                THE NON-UNIQUE INDEX HAS          404 ENTRIES IN 2 LEVELS WITH
CLUSTER RATIO 72
TIME
                DB2 ESTIMATES THIS QUERY WILL USE          2 MILLISECONDS OF CPU
                DB2 ESTIMATES THIS QUERY WILL USE          4 SERVICE UNITS

STATEMENT      338 THIS IS THE NEW ACCESS PATH.

STATEMENT#     338 DECLARE SELECT-2 CURSOR FOR SELECT NAME , CREATOR , TYPE , D
                BNAME , TSNAME FROM SYSTABLES WHERE CREATOR = : H

STEP           1  ACCESSES TABLE      PUBLIC11.SYSTABLES
                USING INDEX PUBLIC11.DSNDTX01        USING 1 COLUMN(S).
                THE INTENT LOCK FOR THE TABLE IS IS
                THE TIMESTAMP FOR THIS EXPLAIN IS 2005041114361680
                THIS OPERATION REFERENCES A TABLE
                THE TABLE HAS          404 ROWS OF    542 BYTES.
                THE NON-UNIQUE INDEX HAS          404 ENTRIES IN 2 LEVELS WITH
CLUSTER RATIO 94
TIME
                DB2 ESTIMATES THIS QUERY WILL USE          2 MILLISECONDS OF CPU
                DB2 ESTIMATES THIS QUERY WILL USE          4 SERVICE UNITS
PCK206I COMPARE COMPLETE FOR PROGRAM = TEST11  VERSION =    2004-02-26-16.17.59.404674
                PREVIOUS VERSION =    2004-02-25-23.10.51.046774
PCK217I TOTAL DBRMS COMPARED                    1
PCK217I TOTAL STATEMENTS COMPARED                2
PCK217I TOTAL ACCESS PATH CHANGES                2
PCK217I TOTAL ACCESS PATH SAME                    0
PCK217I TOTAL NEW SQL STATEMENTS                  0
PCK217I TOTAL DELETED SQL STATEMENTS              0

*****
*****
PCK218I PROGRAM TEST11      HAS A CHANGED ACCESS PATH
QUERYNO                      327
COLLECTION                    TESTCOLLX
NEW VERSION                    2004-02-26-16.17.59.404674
OLD VERSION                    2004-02-25-23.10.51.046774

*****
*****
PCK218I PROGRAM TEST11      HAS A CHANGED ACCESS PATH
QUERYNO                      338
COLLECTION                    TESTCOLLX
NEW VERSION                    2004-02-26-16.17.59.404674
OLD VERSION                    2004-02-25-23.10.51.046774

*****
*****
PCK217I TOTAL DBRMS COMPARED                    1
PCK217I TOTAL STATEMENTS COMPARED                2
PCK217I TOTAL ACCESS PATH CHANGES                2
PCK217I TOTAL ACCESS PATH SAME                    0
PCK217I TOTAL NEW SQL STATEMENTS                  0

```

PCK217I TOTAL DELETED SQL STATEMENTS

0

Analysis of the Comparisons between Versions of DB2

	V6	V7	V8
Before MSUs	2	1	2
After MSUs	21	21	18
Access Type Change			

The Change

We dropped a column from the index.

```

OLD
CREATE INDEX    DSNDX01
      ON SYSCOLUMNS
(TBCREATOR
, TBNAME
, NAME )
USING STOGROUP SYSDEFLT PRIQTY 7200 SECQTY 7200
CLOSE NO;
NEW
CREATE INDEX DSNDX01
      ON SYSCOLUMNS
(TBCREATOR)
USING STOGROUP SYSDEFLT PRIQTY 7200 SECQTY 7200
CLOSE NO;

```

Query Summary

Database Alias: HLSP390 **Explain Time :** 2005-05-30 09:00:28.212694

DB2 Platform : Z/OS **DB2 Version:** v8

SQL Statement : DECLARE SELECT-2 CURSOR FOR SELECT NAME , CREATOR
, TYPE , DBNAME , TSNAME FROM SYSTABLES WHERE
CREATOR = : H

Attribute	Value	Explanation
Timestamp	2005-05-30 09:00:28.212694	Timestamp when the query is explained
Type	SELECT	Query type (SELECT, INSERT, UPDATE, DELETE, SELUPD, DELCUR, UPDCUR)
CPU Cost (ms)	2	Estimated CPU cost (in milliseconds)
CPU Cost (su)	5	Estimated CPU cost (in service units)
Cost Category	A	Cost estimation category (A=statistics; B=default)
Reason		Reason when the cost estimation category is B (HOST VARIABLES, TABLE CARDINALITY, UDF, TRIGGERS, REFERENTIAL CONSTRAINTS)
Group Member		

Case 12: Drop the index on SYSCOLUMNS – expect tablespace scan

Version 6 Comparison

```

PCK031I EXECUTING LICENSED PATH CHECKER V2R2
11          OPTIONS CATALOGSQL NOMATCHCREATOR REPORTCOSTGT
11          CONNECT TO DB6G
11          COMPARE PACKAGE TESTCOLLX.TEST12 IN PUBLIC.PLAN_TABLE
              TO PREVIOUS
11          2005/04/11  SQL ID -          ACCESS PATH FOR TEST12          COLLID - TESTCOLLX
OLD PLAN_TABLE -
IN QRYNO M CREATOR TNAME          TBNO AC MC CREATOR ACCESSNAME          IO
SORTUJGO LK PF QBNO PLNO MXSQ
PCK212I TIMESTAMP USED FOR PREVIOUS COMMAND = 2005041113365201  VERSION = 2004-02-25-
23.11.06.608336

1  327 0 PUBLIC SYSCOLUMNS          1 I  2 PUBLIC DSNDX01          N
NNNNNNNN IS 1 1
PCK220I DATA CHANGE FOR COLUMN ACESSTYPE WAS I
PCK220I DATA CHANGE FOR COLUMN MATCHCOLS WAS 2
PCK220I DATA CHANGE FOR COLUMN ACCESSNAME WAS DSNDX01
PCK220I DATA CHANGE FOR COLUMN PREFETCH = WAS
1  327 1 PUBLIC SYSTABLES          2 I  2 PUBLIC DSNDTX01          N
NNNNNNNN IS 1 2
2  327 0 PUBLIC12 SYSCOLUMNS          1 R  0          N
NNNNNNNN IS S 1 1
PCK221I DATA CHANGE FOR COLUMN ACESSTYPE IS NOW R
PCK221I DATA CHANGE FOR COLUMN MATCHCOLS IS NOW 0
PCK221I DATA CHANGE FOR COLUMN ACCESSNAME IS NOW
PCK221I DATA CHANGE FOR COLUMN PREFETCH = IS NOW S
2  327 1 PUBLIC12 SYSTABLES          2 I  2 PUBLIC12 DSNDTX01          N
NNNNNNNN IS 1 2
PCK206I COMPARE COMPLETE FOR PROGRAM = TEST12 VERSION = 2004-02-26-16.18.37.416872
PREVIOUS VERSION = 2004-02-25-23.11.06.608336
PCK203I STATEMENTS WITH SAME ACCESS PATH 1 STATEMENTS WITH DIFFERENT ACCESS
PATH 1 FOR PROGRAM TEST12
PCK204I QUERIES WITH MATCHING EXPLAIN 2 QUERIES WITHOUT MATCHING
EXPLAIN 0 FOR PROGRAM TEST12
PCK217I TOTAL DBRMS COMPARED 1
PCK217I TOTAL STATEMENTS COMPARED 2
PCK217I TOTAL ACCESS PATH CHANGES 1
PCK217I TOTAL ACCESS PATH SAME 1
PCK217I TOTAL NEW SQL STATEMENTS 0
PCK217I TOTAL DELETED SQL STATEMENTS 0
PCK217I TOTAL DSN_STATEMNT COST INCR 0
COMPLETE RET CODE= 04
11          2005/04/11  SQL ID -          ACCESS PATH FOR TEST12          COLLID - TESTCOLLX
OLD PLAN_TABLE -

STATEMENT 327 THIS IS THE OLD ACCESS PATH.

STATEMENT# 327 DECLARE SELECT-1 CURSOR FOR SELECT A . NAME , A . TBNAME , A
. COLNO , A . COLTYPE , A . LENGTH FROM SYSCOLUMNS A INNER
JOIN SYSTABLES B ON A . TBNAME = B . NAME AND A . TBcreator
= B . CREATOR WHERE A . TBNAME = : H AND A . TBcreator = : H

STEP 1 ACCESSES TABLE PUBLIC .SYSCOLUMNS A
USING INDEX PUBLIC .DSNDX01 USING 2 COLUMN(S).
THE INTENT LOCK FOR THE TABLE IS IS
THE TIMESTAMP FOR THIS EXPLAIN IS 2005041113365193
THE TABLE HAS 6,361 ROWS OF 969 BYTES.
THE NON-UNIQUE INDEX HAS 6,361 ENTRIES IN 2 LEVELS WITH
CLUSTER RATIO 81
STEP 2 ACCESSES TABLE PUBLIC .SYSTABLES B
USING INDEX PUBLIC .DSNDTX01 USING 2 COLUMN(S).

```

```

THE JOIN METHOD IS NESTED LOOP
THE INTENT LOCK FOR THE TABLE IS IS
THE TIMESTAMP FOR THIS EXPLAIN IS 2005041113365193
THE TABLE HAS 404 ROWS OF 542 BYTES.
THE NON-UNIQUE INDEX HAS 404 ENTRIES IN 2 LEVELS WITH
CLUSTER RATIO 72
DB2 ESTIMATES THIS QUERY WILL USE 1 MILLISECONDS OF CPU
TIME
DB2 ESTIMATES THIS QUERY WILL USE 2 SERVICE UNITS

STATEMENT 327 THIS IS THE NEW ACCESS PATH.
STATEMENT# 327 DECLARE SELECT-1 CURSOR FOR SELECT A . NAME , A . TBNAME , A
. COLNO , A . COLTYPE , A . LENGTH FROM SYSCOLUMNS A INNER
JOIN SYSTABLES B ON A . TBNAME = B . NAME AND A . TBCREATOR
= B . CREATOR WHERE A . TBNAME = : H AND A . TBCREATOR = : H

STEP 1 ACCESSES TABLE PUBLIC12.SYSCOLUMNS A
USING A TABLESPACE SCAN.
THE ACCESS WILL USE SEQUENTIAL PREFETCH
THE INTENT LOCK FOR THE TABLE IS IS
THE TIMESTAMP FOR THIS EXPLAIN IS 2005041113370818
THE TABLE HAS 6,361 ROWS OF 969 BYTES.
STEP 2 ACCESSES TABLE PUBLIC12.SYSTABLES B
USING INDEX PUBLIC12.DSNDTX01 USING 2 COLUMN(S).
THE JOIN METHOD IS NESTED LOOP
THE INTENT LOCK FOR THE TABLE IS IS
THE TIMESTAMP FOR THIS EXPLAIN IS 2005041113370818
THE TABLE HAS 404 ROWS OF 542 BYTES.
THE NON-UNIQUE INDEX HAS 404 ENTRIES IN 2 LEVELS WITH
CLUSTER RATIO 73
DB2 ESTIMATES THIS QUERY WILL USE 29 MILLISECONDS OF CPU
TIME
DB2 ESTIMATES THIS QUERY WILL USE 78 SERVICE UNITS
PCK206I COMPARE COMPLETE FOR PROGRAM = TEST12 VERSION = 2004-02-26-16.18.37.416872
PREVIOUS VERSION = 2004-02-25-23.11.06.608336
PCK217I TOTAL DBRMS COMPARED 1
PCK217I TOTAL STATEMENTS COMPARED 2
PCK217I TOTAL ACCESS PATH CHANGES 1
PCK217I TOTAL ACCESS PATH SAME 1
PCK217I TOTAL NEW SQL STATEMENTS 0
PCK217I TOTAL DELETED SQL STATEMENTS 0
11 2005/04/11 SQL ID - ACCESS PATH FOR TEST12 COLLID - TESTCOLLX
OLD PLAN_TABLE -

```

Version 7 Comparison

```

PCK031I EXECUTING LICENSED PATH CHECKER V2R2
11 OPTIONS CATALOGSQL NOMATCHCREATOR REPORTCOSTGT
11 CONNECT TO DB7G
11 COMPARE PACKAGE TESTCOLLX.TEST12 IN PUBLIC.PLAN_TABLE
TO PREVIOUS
11 2005/04/11 SQL ID - ACCESS PATH FOR TEST12 COLLID - TESTCOLLX
OLD PLAN_TABLE -
IN QRYNO M CREATOR TNAME TBNO AC MC CREATOR ACCESSNAME IO
SORTUJGO LK PF QBNO PLNO MXSQ
PCK212I TIMESTAMP USED FOR PREVIOUS COMMAND = 2005041112321821 VERSION = 2004-02-25-
23.11.06.608336

1 327 0 PUBLIC SYSCOLUMNS 1 I 2 PUBLIC DSNDX01 N
NNNNNNNN IS 1 1
PCK220I DATA CHANGE FOR COLUMN ACESSTYPE WAS I
PCK220I DATA CHANGE FOR COLUMN MATCHCOLS WAS 2
PCK220I DATA CHANGE FOR COLUMN ACCESSNAME WAS DSNDX01
PCK220I DATA CHANGE FOR COLUMN PREFETCH = WAS
1 327 1 PUBLIC SYSTABLES 2 I 2 PUBLIC DSNDTX01 N
NNNNNNNN IS 1 2
2 327 0 PUBLIC12 SYSCOLUMNS 1 R 0 N
NNNNNNNN IS S 1 1
PCK221I DATA CHANGE FOR COLUMN ACESSTYPE IS NOW R

```

```

PCK221I DATA CHANGE FOR COLUMN MATCHCOLS          IS NOW          0
PCK221I DATA CHANGE FOR COLUMN ACCESSNAME         IS NOW
PCK221I DATA CHANGE FOR COLUMN PREFETCH =        IS NOW S
2 327 1 PUBLIC12 SYSTABLES          2 I    2 PUBLIC12 DSNCTX01          N
NNNNNNNN IS          1 2
PCK206I COMPARE COMPLETE FOR PROGRAM = TEST12     VERSION =    2004-02-26-16.18.37.416872
PREVIOUS VERSION =    2004-02-25-23.11.06.608336

PCK203I STATEMENTS WITH SAME ACCESS PATH         1 STATEMENTS WITH DIFFERENT ACCESS
PATH 1 FOR PROGRAM TEST12
PCK204I QUERIES WITH MATCHING EXPLAIN           2 QUERIES WITHOUT MATCHING
EXPLAIN 0 FOR PROGRAM TEST12
PCK217I TOTAL DBRMS COMPARED                    1
PCK217I TOTAL STATEMENTS COMPARED              2
PCK217I TOTAL ACCESS PATH CHANGES            1
PCK217I TOTAL ACCESS PATH SAME                1
PCK217I TOTAL NEW SQL STATEMENTS              0
PCK217I TOTAL DELETED SQL STATEMENTS          0
PCK217I TOTAL DSN_STATEMNT COST INCR          0
COMPLETE RET CODE= 04
11 2005/04/11 SQL ID - ACCESS PATH FOR TEST12 COLLID - TESTCOLLX
OLD PLAN_TABLE -

```

STATEMENT 327 THIS IS THE OLD ACCESS PATH.

STATEMENT# 327 DECLARE SELECT-1 CURSOR FOR SELECT A . NAME , A . TBNAME , A
. COLNO , A . COLTYPE , A . LENGTH FROM SYSCOLUMNS A INNER
JOIN SYSTABLES B ON A . TBNAME = B . NAME AND A . TBCREATOR
= B . CREATOR WHERE A . TBNAME = : H AND A . TBCREATOR = : H

```

STEP 1 ACCESSES TABLE PUBLIC .SYSCOLUMNS A
USING INDEX PUBLIC .DSNCTX01 USING 2 COLUMN(S).
THE INTENT LOCK FOR THE TABLE IS IS
THE TIMESTAMP FOR THIS EXPLAIN IS 2005041112321813
THIS OPERATION REFERENCES A TABLE
THE TABLE HAS 6,361 ROWS OF 969 BYTES.
THE NON-UNIQUE INDEX HAS 6,361 ENTRIES IN 2 LEVELS WITH
CLUSTER RATIO 81
STEP 2 ACCESSES TABLE PUBLIC .SYSTABLES B
USING INDEX PUBLIC .DSNCTX01 USING 2 COLUMN(S).
THE JOIN METHOD IS NESTED LOOP
THE INTENT LOCK FOR THE TABLE IS IS
THE TIMESTAMP FOR THIS EXPLAIN IS 2005041112321813
THIS OPERATION REFERENCES A TABLE
THE TABLE HAS 404 ROWS OF 542 BYTES.
THE NON-UNIQUE INDEX HAS 404 ENTRIES IN 2 LEVELS WITH
CLUSTER RATIO 72
DB2 ESTIMATES THIS QUERY WILL USE 1 MILLISECONDS OF CPU
TIME
DB2 ESTIMATES THIS QUERY WILL USE 1 SERVICE UNITS

```

STATEMENT 327 THIS IS THE NEW ACCESS PATH.

STATEMENT# 327 DECLARE SELECT-1 CURSOR FOR SELECT A . NAME , A . TBNAME , A
. COLNO , A . COLTYPE , A . LENGTH FROM SYSCOLUMNS A INNER
JOIN SYSTABLES B ON A . TBNAME = B . NAME AND A . TBCREATOR
= B . CREATOR WHERE A . TBNAME = : H AND A . TBCREATOR = : H

```

STEP 1 ACCESSES TABLE PUBLIC12.SYSCOLUMNS A
USING A TABLESPACE SCAN.
THE ACCESS WILL USE SEQUENTIAL PREFETCH
THE INTENT LOCK FOR THE TABLE IS IS
THE TIMESTAMP FOR THIS EXPLAIN IS 2005041112393831
THIS OPERATION REFERENCES A TABLE
THE TABLE HAS 6,361 ROWS OF 969 BYTES.
STEP 2 ACCESSES TABLE PUBLIC12.SYSTABLES B
USING INDEX PUBLIC12.DSNCTX01 USING 2 COLUMN(S).
THE JOIN METHOD IS NESTED LOOP
THE INTENT LOCK FOR THE TABLE IS IS

```

```

THE TIMESTAMP FOR THIS EXPLAIN IS 2005041112393831
THIS OPERATION REFERENCES A TABLE
THE TABLE HAS          404 ROWS OF      542 BYTES.
THE NON-UNIQUE INDEX HAS          404 ENTRIES IN  2 LEVELS WITH
CLUSTER RATIO 73
DB2 ESTIMATES THIS QUERY WILL USE          29 MILLISECONDS OF CPU
TIME
DB2 ESTIMATES THIS QUERY WILL USE          78 SERVICE UNITS
PCK206I COMPARE COMPLETE FOR PROGRAM = TEST12  VERSION = 2004-02-26-16.18.37.416872
PREVIOUS VERSION = 2004-02-25-23.11.06.608336
PCK217I TOTAL DBRMS COMPARED 1
PCK217I TOTAL STATEMENTS COMPARED 2
11 2005/04/11 SQL ID - ACCESS PATH FOR TEST12 COLLID - TESTCOLLX
OLD PLAN_TABLE -
PCK217I TOTAL ACCESS PATH CHANGES 1
PCK217I TOTAL ACCESS PATH SAME 1
PCK217I TOTAL NEW SQL STATEMENTS 0
PCK217I TOTAL DELETED SQL STATEMENTS 0

```

```

*****
*****
PCK218I PROGRAM TEST12 HAS A CHANGED ACCESS PATH
QUERYNO 327
COLLECTION TESTCOLLX
NEW VERSION 2004-02-26-16.18.37.416872
OLD VERSION 2004-02-25-23.11.06.608336

```

```

*****
*****
PCK217I TOTAL DBRMS COMPARED 1
PCK217I TOTAL STATEMENTS COMPARED 2
PCK217I TOTAL ACCESS PATH CHANGES 1
PCK217I TOTAL ACCESS PATH SAME 1
PCK217I TOTAL NEW SQL STATEMENTS 0
PCK217I TOTAL DELETED SQL STATEMENTS 0

```

Version 8 Comparison

```

PCK031I EXECUTING LICENSED PATH CHECKER V2R2
11 OPTIONS CATALOGSQL NOMATCHCREATOR REPORTCOSTGT
11 CONNECT TO DB8G
11 COMPARE PACKAGE TESTCOLLX.TEST12 IN PUBLIC.PLAN_TABLE
TO PREVIOUS
11 2005/04/11 SQL ID - ACCESS PATH FOR TEST12 COLLID - TESTCOLLX
OLD PLAN_TABLE -
IN QRYNO M CREATOR TNAME TBNO AC MC CREATOR ACCESSNAME IO
SORTUJGO LK PF QBNO PLNO MXSQ
PCK212I TIMESTAMP USED FOR PREVIOUS COMMAND = 2005041114360117 VERSION = 2004-02-25-
23.11.06.608336

1 327 0 PUBLIC SYSCOLUMNS 1 I 2 PUBLIC DSNDXC01 N
NNNNNNNN IS 1 1
PCK220I DATA CHANGE FOR COLUMN ACESSTYPE WAS I
PCK220I DATA CHANGE FOR COLUMN MATCHCOLS WAS 2
PCK220I DATA CHANGE FOR COLUMN ACCESSNAME WAS DSNDXC01
PCK220I DATA CHANGE FOR COLUMN PREFETCH = WAS
1 327 1 PUBLIC SYSTABLES 2 I 2 PUBLIC DSNDTX01 Y
NNNNNNNN IS 1 2
2 327 0 PUBLIC12 SYSCOLUMNS 1 R 0 N
NNNNNNNN IS S 1 1
PCK221I DATA CHANGE FOR COLUMN ACESSTYPE IS NOW R
PCK221I DATA CHANGE FOR COLUMN MATCHCOLS IS NOW 0
PCK221I DATA CHANGE FOR COLUMN ACCESSNAME IS NOW
PCK221I DATA CHANGE FOR COLUMN PREFETCH = IS NOW S
2 327 1 PUBLIC12 SYSTABLES 2 I 2 PUBLIC12 DSNDTX01 Y
NNNNNNNN IS 1 2

1 338 0 PUBLIC SYSTABLES 1 I 1 PUBLIC DSNDTX01 N
NNNNNNNN IS L 1 1
PCK220I DATA CHANGE FOR COLUMN PREFETCH = WAS L

```

```

2      338 0 PUBLIC12 SYSTABLES          1 I    1 PUBLIC12 DSNDTX01          N
NNNNNNNN IS          1      1
PCK221I DATA CHANGE FOR COLUMN PREFETCH =          IS NOW
PCK206I COMPARE COMPLETE FOR PROGRAM = TEST12 VERSION =      2004-02-26-16.18.37.416872
PREVIOUS VERSION =      2004-02-25-23.11.06.608336
PCK203I STATEMENTS WITH SAME ACCESS PATH 0 STATEMENTS WITH DIFFERENT ACCESS
PATH      2      FOR PROGRAM TEST12
PCK204I QUERIES WITH MATCHING EXPLAIN      2 QUERIES WITHOUT MATCHING
EXPLAIN      0      FOR PROGRAM TEST12
PCK217I TOTAL DBRMS COMPARED          1
PCK217I TOTAL STATEMENTS COMPARED      2
PCK217I TOTAL ACCESS PATH CHANGES      2
PCK217I TOTAL ACCESS PATH SAME          0
PCK217I TOTAL NEW SQL STATEMENTS        0
PCK217I TOTAL DELETED SQL STATEMENTS    0
PCK217I TOTAL DSN_STATEMNT COST INCR    0
COMPLETE RET CODE=          04
11      2005/04/11 SQL ID - ACCESS PATH FOR TEST12 COLLID - TESTCOLLX
OLD PLAN_TABLE -

```

```

STATEMENT      327 THIS IS THE OLD ACCESS PATH.

STATEMENT#     327 DECLARE SELECT-1 CURSOR FOR SELECT A . NAME , A . TBNAME , A
                . COLNO , A . COLTYPE , A . LENGTH FROM SYSCOLUMNS A INNER
                JOIN SYSTABLES B ON A . TBNAME = B . NAME AND A . TBCREATOR
                = B . CREATOR WHERE A . TBNAME = : H AND A . TBCREATOR = : H

STEP           1      ACCESSES TABLE PUBLIC .SYSCOLUMNS A
                USING INDEX PUBLIC .DSNDCX01 USING 2 COLUMN(S).
                THE INTENT LOCK FOR THE TABLE IS IS
                THE TIMESTAMP FOR THIS EXPLAIN IS 2005041114360098
                THIS OPERATION REFERENCES A TABLE
                THE TABLE HAS 6,361 ROWS OF 969 BYTES.
                THE NON-UNIQUE INDEX HAS 6,361 ENTRIES IN 2 LEVELS WITH
CLUSTER RATIO 81
STEP           2      ACCESSES TABLE PUBLIC .SYSTABLES B
                USING INDEX PUBLIC .DSNDTX01 USING 2 COLUMN(S).
                THE JOIN METHOD IS NESTED LOOP
                THE ACCESS ONLY READS THE INDEX NOT THE TABLE
                THE INTENT LOCK FOR THE TABLE IS IS
                THE TIMESTAMP FOR THIS EXPLAIN IS 2005041114360098
                THIS OPERATION REFERENCES A TABLE
                THE TABLE HAS 404 ROWS OF 542 BYTES.
                THE NON-UNIQUE INDEX HAS 404 ENTRIES IN 2 LEVELS WITH
CLUSTER RATIO 72
DB2 ESTIMATES THIS QUERY WILL USE 1 MILLISECONDS OF CPU
TIME
DB2 ESTIMATES THIS QUERY WILL USE 2 SERVICE UNITS

STATEMENT      327 THIS IS THE NEW ACCESS PATH.

STATEMENT#     327 DECLARE SELECT-1 CURSOR FOR SELECT A . NAME , A . TBNAME , A
                . COLNO , A . COLTYPE , A . LENGTH FROM SYSCOLUMNS A INNER
                JOIN SYSTABLES B ON A . TBNAME = B . NAME AND A . TBCREATOR
                = B . CREATOR WHERE A . TBNAME = : H AND A . TBCREATOR = : H

STEP           1      ACCESSES TABLE PUBLIC12.SYSCOLUMNS A
                USING A TABLESPACE SCAN.
                THE ACCESS WILL USE SEQUENTIAL PREFETCH
                THE INTENT LOCK FOR THE TABLE IS IS
                THE TIMESTAMP FOR THIS EXPLAIN IS 2005041114361711
                THIS OPERATION REFERENCES A TABLE
                THE TABLE HAS 6,361 ROWS OF 969 BYTES.
STEP           2      ACCESSES TABLE PUBLIC12.SYSTABLES B
                USING INDEX PUBLIC12.DSNDTX01 USING 2 COLUMN(S).
                THE JOIN METHOD IS NESTED LOOP
                THE ACCESS ONLY READS THE INDEX NOT THE TABLE
                THE INTENT LOCK FOR THE TABLE IS IS

```

```

THE TIMESTAMP FOR THIS EXPLAIN IS 2005041114361711
THIS OPERATION REFERENCES A TABLE
THE TABLE HAS          404 ROWS OF    542 BYTES.
THE NON-UNIQUE INDEX HAS          404 ENTRIES IN  2 LEVELS WITH
CLUSTER RATIO 94
DB2 ESTIMATES THIS QUERY WILL USE          19 MILLISECONDS OF CPU
TIME
DB2 ESTIMATES THIS QUERY WILL USE          53 SERVICE UNITS

STATEMENT          338 THIS IS THE OLD ACCESS PATH.
11 2005/04/11 SQL ID -          ACCESS PATH FOR TEST12          COLLID - TESTCOLLX
OLD PLAN_TABLE -
    
```

```

STATEMENT#        338 DECLARE SELECT-2 CURSOR FOR SELECT NAME , CREATOR , TYPE , D
                    BNAME , TSNAME FROM SYSTABLES WHERE CREATOR = : H

STEP              1  ACCESSES TABLE      PUBLIC .SYSTABLES
                    USING INDEX PUBLIC .DSNDTX01          USING  1 COLUMN(S).
                    THE ACCESS WILL USE LIST PREFETCH
                    THE INTENT LOCK FOR THE TABLE IS IS
                    THE TIMESTAMP FOR THIS EXPLAIN IS 2005041114360117
                    THIS OPERATION REFERENCES A TABLE
                    THE TABLE HAS          404 ROWS OF    542 BYTES.
                    THE NON-UNIQUE INDEX HAS          404 ENTRIES IN  2 LEVELS WITH
CLUSTER RATIO 72
DB2 ESTIMATES THIS QUERY WILL USE          2 MILLISECONDS OF CPU
TIME
DB2 ESTIMATES THIS QUERY WILL USE          4 SERVICE UNITS

STATEMENT          338 THIS IS THE NEW ACCESS PATH.

STATEMENT#        338 DECLARE SELECT-2 CURSOR FOR SELECT NAME , CREATOR , TYPE , D
                    BNAME , TSNAME FROM SYSTABLES WHERE CREATOR = : H

STEP              1  ACCESSES TABLE      PUBLIC12.SYSTABLES
                    USING INDEX PUBLIC12.DSNDTX01        USING  1 COLUMN(S).
                    THE INTENT LOCK FOR THE TABLE IS IS
                    THE TIMESTAMP FOR THIS EXPLAIN IS 2005041114361730
                    THIS OPERATION REFERENCES A TABLE
                    THE TABLE HAS          404 ROWS OF    542 BYTES.
                    THE NON-UNIQUE INDEX HAS          404 ENTRIES IN  2 LEVELS WITH
CLUSTER RATIO 94
DB2 ESTIMATES THIS QUERY WILL USE          2 MILLISECONDS OF CPU
TIME
DB2 ESTIMATES THIS QUERY WILL USE          4 SERVICE UNITS
    
```

```

PCK206I COMPARE COMPLETE FOR PROGRAM = TEST12  VERSION =    2004-02-26-16.18.37.416872
                                           PREVIOUS VERSION =    2004-02-25-23.11.06.608336

PCK217I TOTAL DBRMS COMPARED                1
PCK217I TOTAL STATEMENTS COMPARED           2
PCK217I TOTAL ACCESS PATH CHANGES          2
PCK217I TOTAL ACCESS PATH SAME              0
PCK217I TOTAL NEW SQL STATEMENTS            0
PCK217I TOTAL DELETED SQL STATEMENTS        0
    
```

```

*****
*****
PCK218I PROGRAM TEST12      HAS A CHANGED ACCESS PATH
QUERYNO                      327
COLLECTION                    TESTCOLLX
NEW VERSION                   2004-02-26-16.18.37.416872
OLD VERSION                   2004-02-25-23.11.06.608336
    
```

```

*****
*****
PCK218I PROGRAM TEST12      HAS A CHANGED ACCESS PATH
QUERYNO                      338
COLLECTION                    TESTCOLLX
NEW VERSION                   2004-02-26-16.18.37.416872
OLD VERSION                   2004-02-25-23.11.06.608336
    
```

```

*****
*****
PCK217I TOTAL DBRMS COMPARED                1
PCK217I TOTAL STATEMENTS COMPARED           2
PCK217I TOTAL ACCESS PATH CHANGES          2
PCK217I TOTAL ACCESS PATH SAME              0
PCK217I TOTAL NEW SQL STATEMENTS            0
PCK217I TOTAL DELETED SQL STATEMENTS        0
    
```

Analysis of the Comparisons between Versions of DB2

	V6	V7	V8
Before MSUs	2	1	2
After MSUs	3	3	2
Access Type Change	Match Columns 1	Match Columns 1	Match Columns 1

The Change

We dropped an index from SYSCOLUMNS

```

OLD
CREATE INDEX    DSNDX01
ON SYSCOLUMNS
(TBCREATOR
, TBNAME
, NAME )
USING STOGROUP SYSDEFLT PRIQTY 7200 SECQTY 7200
CLOSE NO;
NEW CASE - DROP THE INDEX
    
```

Query Summary

Database Alias: HLSP390 **Explain Time :** 2005-05-30 09:00:29.171864

DB2 Platform : Z/OS **DB2 Version:** v8

SQL Statement : DECLARE SELECT-2 CURSOR FOR SELECT NAME , CREATOR
, TYPE , DBNAME , TSNAME FROM SYSTABLES WHERE
CREATOR = : H

Attribute	Value	Explanation
Timestamp	2005-05-30 09:00:29.171864	Timestamp when the query is explained
Type	SELECT	Query type (SELECT, INSERT, UPDATE, DELETE, SELUPD, DELCUR, UPDCUR)
CPU Cost (ms)	2	Estimated CPU cost (in milliseconds)
CPU Cost (su)	5	Estimated CPU cost (in service units)
Cost Category	A	Cost estimation category (A=statistics; B=default)
Reason		Reason when the cost estimation category is B (HOST VARIABLES, TABLE CARDINALITY, UDF, TRIGGERS, REFERENTIAL CONSTRAINTS)
Group Member		

Case 13: Change Column Sequence in the Index

Version 6 Comparison

```

PCK031I EXECUTING LICENSED PATH CHECKER V2R2
11          OPTIONS CATALOGSQL NOMATCHCREATOR REPORTCOSTGT
11          CONNECT TO DB6G
11          COMPARE PACKAGE TESTCOLLX.TEST13 IN PUBLIC.PLAN_TABLE
              TO PREVIOUS
11          2005/04/11  SQL ID -          ACCESS PATH FOR TEST13          COLLID - TESTCOLLX
OLD PLAN_TABLE -
  IN QRYNO M  CREATOR  TNAME          TBNO AC MC CREATOR  ACCESSNAME          IO
SORTUJGO LK PF QBNO PLNO MXSQ
PCK212I TIMESTAMP USED FOR PREVIOUS COMMAND = 2005041113365231  VERSION = 2004-02-25-
23.11.27.728615

  1   327 0 PUBLIC  SYSCOLUMNS          1 I   2 PUBLIC  DSNDX01          N
NNNNNNNN IS      1   1
PCK220I DATA CHANGE FOR COLUMN MATCHCOLS          WAS          2
  1   327 1 PUBLIC  SYSTABLES          2 I   2 PUBLIC  DSNDTX01          N
NNNNNNNN IS      1   2
  2   327 0 PUBLIC13 SYSCOLUMNS          1 I   1 PUBLIC13 DSNDX01          N
NNNNNNNN IS      1   1
PCK221I DATA CHANGE FOR COLUMN MATCHCOLS          IS NOW          1
  2   327 1 PUBLIC13 SYSTABLES          2 I   2 PUBLIC13 DSNDTX01          N
NNNNNNNN IS      1   2
PCK206I COMPARE COMPLETE FOR PROGRAM = TEST13  VERSION = 2004-02-26-16.21.48.536309
              PREVIOUS  VERSION = 2004-02-25-23.11.27.728615

PCK203I STATEMENTS WITH SAME ACCESS PATH          1 STATEMENTS WITH DIFFERENT ACCESS
PATH          1 FOR PROGRAM TEST13
PCK204I QUERIES WITH MATCHING EXPLAIN          2 QUERIES WITHOUT MATCHING
EXPLAIN          0 FOR PROGRAM TEST13
PCK217I TOTAL DBRMS COMPARED          1
PCK217I TOTAL STATEMENTS COMPARED          2
PCK217I TOTAL ACCESS PATH CHANGES          1
PCK217I TOTAL ACCESS PATH SAME          1
PCK217I TOTAL NEW SQL STATEMENTS          0
PCK217I TOTAL DELETED SQL STATEMENTS          0
PCK217I TOTAL DSN_STATEMNT COST INCR          0
COMPLETE RET CODE=          04
11          2005/04/11  SQL ID -          ACCESS PATH FOR TEST13          COLLID - TESTCOLLX
OLD PLAN_TABLE -

STATEMENT          327 THIS IS THE OLD ACCESS PATH.

STATEMENT#          327 DECLARE SELECT-1 CURSOR FOR SELECT A . NAME , A . TBNAME , A
. COLNO , A . COLTYPE , A . LENGTH FROM SYSCOLUMNS A INNER
JOIN SYSTABLES B ON A . TBNAME = B . NAME AND A . TBcreator
= B . creator WHERE A . TBNAME = : H AND A . TBcreator = : H

STEP          1  ACCESSES TABLE PUBLIC .SYSCOLUMNS          A
USING INDEX PUBLIC .DSNDX01          USING 2 COLUMN(S).
THE INTENT LOCK FOR THE TABLE IS IS
THE TIMESTAMP FOR THIS EXPLAIN IS 2005041113365224
THE TABLE HAS          6,361 ROWS OF 969 BYTES.
THE NON-UNIQUE INDEX HAS          6,361 ENTRIES IN 2 LEVELS WITH
CLUSTER RATIO 81
STEP          2  ACCESSES TABLE PUBLIC .SYSTABLES          B
USING INDEX PUBLIC .DSNDTX01          USING 2 COLUMN(S).
THE JOIN METHOD IS NESTED LOOP
THE INTENT LOCK FOR THE TABLE IS IS
THE TIMESTAMP FOR THIS EXPLAIN IS 2005041113365224
THE TABLE HAS          404 ROWS OF 542 BYTES.
THE NON-UNIQUE INDEX HAS          404 ENTRIES IN 2 LEVELS WITH
CLUSTER RATIO 72
DB2 ESTIMATES THIS QUERY WILL USE          1 MILLISECONDS OF CPU
TIME

```

```

DB2 ESTIMATES THIS QUERY WILL USE                2 SERVICE UNITS

STATEMENT      327 THIS IS THE NEW ACCESS PATH.

STATEMENT#     327 DECLARE SELECT-1 CURSOR FOR SELECT A . NAME , A . TBNAME , A
                . COLNO , A . COLTYPE , A . LENGTH FROM SYSCOLUMNS A INNER
                JOIN SYSTABLES B ON A . TBNAME = B . NAME AND A . TBcreator
                = B . creator WHERE A . TBNAME = : H AND A . TBcreator = : H

STEP           1  ACCESSES TABLE      PUBLIC13.SYSCOLUMNS      A
                USING INDEX PUBLIC13.DSNDX01      USING 1 COLUMN(S).
                THE INTENT LOCK FOR THE TABLE IS IS
                THE TIMESTAMP FOR THIS EXPLAIN IS 2005041113370851
                THE TABLE HAS          6,361 ROWS OF 969 BYTES.
                THE NON-UNIQUE INDEX HAS 6,361 ENTRIES IN 2 LEVELS WITH

CLUSTER RATIO 65
STEP           2  ACCESSES TABLE      PUBLIC13.SYSTABLES      B
                USING INDEX PUBLIC13.DSNDTX01     USING 2 COLUMN(S).
                THE JOIN METHOD IS NESTED LOOP
                THE INTENT LOCK FOR THE TABLE IS IS
                THE TIMESTAMP FOR THIS EXPLAIN IS 2005041113370851
                THE TABLE HAS          404 ROWS OF 542 BYTES.
                THE NON-UNIQUE INDEX HAS 404 ENTRIES IN 2 LEVELS WITH

CLUSTER RATIO 73
DB2 ESTIMATES THIS QUERY WILL USE                1 MILLISECOND OF CPU
TIME
DB2 ESTIMATES THIS QUERY WILL USE                3 SERVICE UNITS
PCK206I COMPARE COMPLETE FOR PROGRAM = TEST13  VERSION = 2004-02-26-16.21.48.536309
                PREVIOUS VERSION = 2004-02-25-23.11.27.728615
PCK217I TOTAL DBRMS COMPARED                    1
PCK217I TOTAL STATEMENTS COMPARED              2
PCK217I TOTAL ACCESS PATH CHANGES             1
PCK217I TOTAL ACCESS PATH SAME                 1
PCK217I TOTAL NEW SQL STATEMENTS              0
PCK217I TOTAL DELETED SQL STATEMENTS          0
11 2005/04/11 SQL ID - ACCESS PATH FOR TEST13 COLLID - TESTCOLLX
OLD PLAN_TABLE -

```

Version 7 Comparison

```

11 OPTIONS CATALOGSQL NOMATCHCREATOR REPORTCOSTGT
11 CONNECT TO DB7G
11 COMPARE PACKAGE TESTCOLLX.TEST13 IN PUBLIC.PLAN_TABLE
    TO PREVIOUS
11 2005/04/11 SQL ID - ACCESS PATH FOR TEST13 COLLID - TESTCOLLX
OLD PLAN_TABLE -
IN QRYNO M CREATOR TNAME TBNO AC MC CREATOR ACCESSNAME IO
SORTUJGO LK PF QBNO PLNO MXSQ
PCK212I TIMESTAMP USED FOR PREVIOUS COMMAND = 2005041112321854 VERSION = 2004-02-25-
23.11.27.728615

327 0 PUBLIC SYSCOLUMNS 1 I 2 PUBLIC DSNDX01N NNNNNNNN IS 1 1
PCK220I DATA CHANGE FOR COLUMN MATCHCOLS WAS 2
1 327 1 PUBLIC SYSTABLES 2 I 2 PUBLIC DSNDTX01 N
NNNNNNNN IS 1 2
2 327 0 PUBLIC13 SYSCOLUMNS 1 I 1 PUBLIC13 DSNDX01 N
NNNNNNNN IS 1 1
PCK221I DATA CHANGE FOR COLUMN MATCHCOLS IS NOW 1
2 327 1 PUBLIC13 SYSTABLES 2 I 2 PUBLIC13 DSNDTX01 N
NNNNNNNN IS 1 2
PCK206I COMPARE COMPLETE FOR PROGRAM = TEST13 VERSION = 2004-02-26-16.21.48.536309
                PREVIOUS VERSION = 2004-02-25-23.11.27.728615
PCK203I STATEMENTS WITH SAME ACCESS PATH 1 STATEMENTS WITH DIFFERENT ACCESS
PATH 1 FOR PROGRAM TEST13
PCK204I QUERIES WITH MATCHING EXPLAIN 2 QUERIES WITHOUT MATCHING
EXPLAIN 0 FOR PROGRAM TEST13
PCK217I TOTAL DBRMS COMPARED 1
PCK217I TOTAL STATEMENTS COMPARED 2

```

```

PCK217I TOTAL ACCESS PATH CHANGES          1
PCK217I TOTAL ACCESS PATH SAME              1
PCK217I TOTAL NEW SQL STATEMENTS            0
PCK217I TOTAL DELETED SQL STATEMENTS        0
PCK217I TOTAL DSN_STATEMNT COST INCR        0
COMPLETE RET CODE=                           04
11      2005/04/11  SQL ID -                ACCESS PATH FOR TEST13      COLLID - TESTCOLLX
OLD PLAN_TABLE -

```

```
STATEMENT          327 THIS IS THE OLD ACCESS PATH.
```

```
STATEMENT#         327 DECLARE SELECT-1 CURSOR FOR SELECT A . NAME , A . TBNAME , A
                  . COLNO , A . COLTYPE , A . LENGTH FROM SYSCOLUMNS A INNER
                  JOIN SYSTABLES B ON A . TBNAME = B . NAME AND A . TBCREATOR
                  = B . CREATOR WHERE A . TBNAME = : H AND A . TBCREATOR = : H
```

Version 8 Comparison

```

PCK031I EXECUTING LICENSED PATH CHECKER V2R2
11      OPTIONS CATALOGSQL NOMATCHCREATOR REPORTCOSTGT
11      CONNECT TO DB8G
11      COMPARE PACKAGE TESTCOLLX.TEST13 IN PUBLIC.PLAN_TABLE
                  TO PREVIOUS
11      2005/04/11  SQL ID -                ACCESS PATH FOR TEST13      COLLID - TESTCOLLX
OLD PLAN_TABLE -
IN QRYNO M CREATOR TNAME          TBNO AC MC CREATOR ACCESSNAME      IO
SORTUJGO LK PF QBNO PLNO MXSQ
PCK212I TIMESTAMP USED FOR PREVIOUS COMMAND = 2005041114360175  VERSION = 2004-02-25-
23.11.27.728615

1  327 0 PUBLIC SYSCOLUMNS          1 I  2 PUBLIC DSNDX01          N
NNNNNNNN IS 1 1
PCK220I DATA CHANGE FOR COLUMN MATCHCOLS WAS 2
1  327 1 PUBLIC SYSTABLES            2 I  2 PUBLIC DSNDTX01          Y
NNNNNNNN IS 1 2
2  327 0 PUBLIC13 SYSCOLUMNS         1 I  1 PUBLIC13 DSNDX01          N
NNNNNNNN IS 1 1
PCK221I DATA CHANGE FOR COLUMN MATCHCOLS IS NOW 1
2  327 1 PUBLIC13 SYSTABLES           2 I  2 PUBLIC13 DSNDTX01          Y
NNNNNNNN IS 1 2

1  338 0 PUBLIC SYSTABLES             1 I  1 PUBLIC DSNDTX01          N
NNNNNNNN IS L 1 1
PCK220I DATA CHANGE FOR COLUMN PREFETCH = WAS L
2  338 0 PUBLIC13 SYSTABLES           1 I  1 PUBLIC13 DSNDTX01          N
NNNNNNNN IS 1 1
PCK221I DATA CHANGE FOR COLUMN PREFETCH = IS NOW
PCK206I COMPARE COMPLETE FOR PROGRAM = TEST13 VERSION = 2004-02-26-16.21.48.536309
PREVIOUS VERSION = 2004-02-25-23.11.27.728615

PCK203I STATEMENTS WITH SAME ACCESS PATH 0 STATEMENTS WITH DIFFERENT ACCESS
PATH 2 FOR PROGRAM TEST13
PCK204I QUERIES WITH MATCHING EXPLAIN 2 QUERIES WITHOUT MATCHING
EXPLAIN 0 FOR PROGRAM TEST13
PCK217I TOTAL DBRMS COMPARED 1
PCK217I TOTAL STATEMENTS COMPARED 2
PCK217I TOTAL ACCESS PATH CHANGES 2
PCK217I TOTAL ACCESS PATH SAME 0
PCK217I TOTAL NEW SQL STATEMENTS 0
PCK217I TOTAL DELETED SQL STATEMENTS 0
PCK217I TOTAL DSN_STATEMNT COST INCR 0
COMPLETE RET CODE= 04
11      2005/04/11  SQL ID -                ACCESS PATH FOR TEST13      COLLID - TESTCOLLX
OLD PLAN_TABLE -

```

```
STATEMENT          327 THIS IS THE OLD ACCESS PATH.
```

```
STATEMENT#         327 DECLARE SELECT-1 CURSOR FOR SELECT A . NAME , A . TBNAME , A
```

```

      . COLNO , A . COLTYPE , A . LENGTH FROM SYSCOLUMNS A INNER
JOIN SYSTABLES B ON A . TBNAME = B . NAME AND A . TBCREATOR
= B . CREATOR WHERE A . TBNAME = : H AND A . TBCREATOR = : H

STEP          1  ACCESSES TABLE      PUBLIC .SYSCOLUMNS      A
                USING INDEX PUBLIC .DSNDCX01      USING  2 COLUMN(S).
                THE INTENT LOCK FOR THE TABLE IS IS
                THE TIMESTAMP FOR THIS EXPLAIN IS 2005041114360158
                THIS OPERATION REFERENCES A TABLE
                THE TABLE HAS          6,361 ROWS OF    969 BYTES.
                THE NON-UNIQUE INDEX HAS          6,361 ENTRIES IN  2 LEVELS WITH
CLUSTER RATIO 81
STEP          2  ACCESSES TABLE      PUBLIC .SYSTABLES      B
                USING INDEX PUBLIC .DSNDTX01      USING  2 COLUMN(S).
                THE JOIN METHOD IS NESTED LOOP
                THE ACCESS ONLY READS THE INDEX NOT THE TABLE
                THE INTENT LOCK FOR THE TABLE IS IS
                THE TIMESTAMP FOR THIS EXPLAIN IS 2005041114360158
                THIS OPERATION REFERENCES A TABLE
                THE TABLE HAS          404 ROWS OF    542 BYTES.
                THE NON-UNIQUE INDEX HAS          404 ENTRIES IN  2 LEVELS WITH
CLUSTER RATIO 72
                DB2 ESTIMATES THIS QUERY WILL USE          1 MILLISECONDS OF CPU
TIME
                DB2 ESTIMATES THIS QUERY WILL USE          2 SERVICE UNITS

STATEMENT      327 THIS IS THE NEW ACCESS PATH.

STATEMENT#     327 DECLARE SELECT-1 CURSOR FOR SELECT A . NAME , A . TBNAME , A
      . COLNO , A . COLTYPE , A . LENGTH FROM SYSCOLUMNS A INNER
JOIN SYSTABLES B ON A . TBNAME = B . NAME AND A . TBCREATOR
= B . CREATOR WHERE A . TBNAME = : H AND A . TBCREATOR = : H

STEP          1  ACCESSES TABLE      PUBLIC13.SYSCOLUMNS  A
                USING INDEX PUBLIC13.DSNDCX01      USING  1 COLUMN(S).
                THE INTENT LOCK FOR THE TABLE IS IS
                THE TIMESTAMP FOR THIS EXPLAIN IS 2005041114361764
                THIS OPERATION REFERENCES A TABLE
                THE TABLE HAS          6,361 ROWS OF    969 BYTES.
                THE NON-UNIQUE INDEX HAS          6,361 ENTRIES IN  2 LEVELS WITH
CLUSTER RATIO 80
STEP          2  ACCESSES TABLE      PUBLIC13.SYSTABLES  B
                USING INDEX PUBLIC13.DSNDTX01      USING  2 COLUMN(S).
                THE JOIN METHOD IS NESTED LOOP
                THE ACCESS ONLY READS THE INDEX NOT THE TABLE
                THE INTENT LOCK FOR THE TABLE IS IS
                THE TIMESTAMP FOR THIS EXPLAIN IS 2005041114361764
                THIS OPERATION REFERENCES A TABLE
                THE TABLE HAS          404 ROWS OF    542 BYTES.
                THE NON-UNIQUE INDEX HAS          404 ENTRIES IN  2 LEVELS WITH
CLUSTER RATIO 94
                DB2 ESTIMATES THIS QUERY WILL USE          1 MILLISECONDS OF CPU
TIME
                DB2 ESTIMATES THIS QUERY WILL USE          2 SERVICE UNITS

STATEMENT      338 THIS IS THE OLD ACCESS PATH.
11      2005/04/11 SQL ID -          ACCESS PATH FOR TEST13      COLLID - TESTCOLLX
OLD PLAN_TABLE -

STATEMENT#     338 DECLARE SELECT-2 CURSOR FOR SELECT NAME , CREATOR , TYPE , D
      BNAME , TSNAME FROM SYSTABLES WHERE CREATOR = : H

STEP          1  ACCESSES TABLE      PUBLIC .SYSTABLES
                USING INDEX PUBLIC .DSNDTX01      USING  1 COLUMN(S).
                THE ACCESS WILL USE LIST PREFETCH
                THE INTENT LOCK FOR THE TABLE IS IS
                THE TIMESTAMP FOR THIS EXPLAIN IS 2005041114360175
                THIS OPERATION REFERENCES A TABLE

```

```

THE TABLE HAS          404 ROWS OF    542 BYTES.
THE NON-UNIQUE INDEX HAS          404 ENTRIES IN  2 LEVELS WITH
CLUSTER RATIO 72
DB2 ESTIMATES THIS QUERY WILL USE          2 MILLISECONDS OF CPU
TIME
DB2 ESTIMATES THIS QUERY WILL USE          4 SERVICE UNITS

STATEMENT      338 THIS IS THE NEW ACCESS PATH.

STATEMENT#     338 DECLARE SELECT-2 CURSOR FOR SELECT NAME , CREATOR , TYPE , D
                BNAME , TSNAME FROM SYSTABLES WHERE CREATOR = : H

STEP           1  ACCESSES TABLE      PUBLIC13.SYSTABLES
                USING INDEX PUBLIC13.DSNDTX01          USING  1 COLUMN(S).
                THE INTENT LOCK FOR THE TABLE IS IS
                THE TIMESTAMP FOR THIS EXPLAIN IS 2005041114361781
                THIS OPERATION REFERENCES A TABLE
                THE TABLE HAS          404 ROWS OF    542 BYTES.
                THE NON-UNIQUE INDEX HAS          404 ENTRIES IN  2 LEVELS WITH
CLUSTER RATIO 94
DB2 ESTIMATES THIS QUERY WILL USE          2 MILLISECONDS OF CPU
TIME
DB2 ESTIMATES THIS QUERY WILL USE          4 SERVICE UNITS
PCK206I COMPARE COMPLETE FOR PROGRAM = TEST13  VERSION =    2004-02-26-16.21.48.536309
                PREVIOUS VERSION =    2004-02-25-23.11.27.728615

PCK217I TOTAL DBRMS COMPARED                1
PCK217I TOTAL STATEMENTS COMPARED           2
PCK217I TOTAL ACCESS PATH CHANGES          2
PCK217I TOTAL ACCESS PATH SAME              0
PCK217I TOTAL NEW SQL STATEMENTS           0
PCK217I TOTAL DELETED SQL STATEMENTS        0
    
```


```

PCK218I PROGRAM TEST13      HAS A CHANGED ACCESS PATH
QUERYNO                     327
COLLECTION                   TESTCOLLX
NEW VERSION                  2004-02-26-16.21.48.536309
OLD VERSION                  2004-02-25-23.11.27.728615
    
```


```

PCK218I PROGRAM TEST13      HAS A CHANGED ACCESS PATH
QUERYNO                     338
COLLECTION                   TESTCOLLX
NEW VERSION                  2004-02-26-16.21.48.536309
OLD VERSION                  2004-02-25-23.11.27.728615
    
```


```

PCK217I TOTAL DBRMS COMPARED                1
PCK217I TOTAL STATEMENTS COMPARED           2
PCK217I TOTAL ACCESS PATH CHANGES          2
PCK217I TOTAL ACCESS PATH SAME              0
PCK217I TOTAL NEW SQL STATEMENTS           0
PCK217I TOTAL DELETED SQL STATEMENTS        0
    
```

Analysis of the Comparisons between Versions of DB2

	V6	V7	V8
Before MSUs			
After MSUs			
Access Type Change			

The Change

We changed the column sequence in the index.

```
OLD
CREATE INDEX    DSNDX01
    ON SYSCOLUMNS
(TBCREATOR
, TBNAME
, NAME )
USING STOGROUP SYSDEFLT PRIQTY 7200 SECQTY 7200
CLOSE NO;
NEW
CREATE INDEX DSNDX01
    ON SYSCOLUMNS
(TBCREATOR
, NAME
, TBNAME )
USING STOGROUP SYSDEFLT PRIQTY 7200 SECQTY 7200
CLOSE NO;
```

Query Summary

Database Alias: HLSP390 **Explain Time :** 2005-05-30 09:00:29.662125

DB2 Platform : Z/OS **DB2 Version:** v8

SQL Statement : DECLARE SELECT-2 CURSOR FOR SELECT NAME , CREATOR
, TYPE , DBNAME , TSNAME FROM SYSTABLES WHERE
CREATOR = : H

Attribute	Value	Explanation
Timestamp	2005-05-30 09:00:29.662125	Timestamp when the query is explained
Type	SELECT	Query type (SELECT, INSERT, UPDATE, DELETE, SELUPD, DELCUR, UPDCUR)
CPU Cost (ms)	2	Estimated CPU cost (in milliseconds)
CPU Cost (su)	5	Estimated CPU cost (in service units)
Cost Category	A	Cost estimation category (A=statistics; B=default)
Reason		Reason when the cost estimation category is B (HOST VARIABLES, TABLE CARDINALITY, UDF, TRIGGERS, REFERENTIAL CONSTRAINTS)
Group Member		

Case 14: Select MIN and MAX on an Index

Version 6 Example

```

PCK031I EXECUTING LICENSED PATH CHECKER V2R2
11          OPTIONS CATALOGSQL NOMATCHCREATOR REPORTCOSTGT
11          CONNECT TO DB6G
11          REPORT ON PACKAGE TESTCOLLX.TEST14 IN PUBLIC.PLAN_TABLE
11          2005/04/14  SQL ID -          ACCESS PATH FOR TEST14          COLLID - TESTCOLLX
OLD PLAN_TABLE -
      IN QRYNO M  CREATOR  TNAME          TBNO AC MC CREATOR  ACCESSNAME          IO
SORTUJGO LK PF QBNO PLNO MXSQ
      327 0 PUBLIC  SYSCOLUMNS          1 I1  0 PUBLIC  DSNDXC01          Y
NNNNNNNN IS          1  1
      332 0 PUBLIC  SYSCOLUMNS          1 I1  1 PUBLIC  DSNDXC01          N
NNNNNNNN IS          1  1
      338 0 PUBLIC  SYSCOLUMNS          1 I  0 PUBLIC  DSNDXC01          Y
NNNNNNNN IS S R      1  1
      343 0 PUBLIC  SYSCOLUMNS          1 I  1 PUBLIC  DSNDXC01          N
NNNNNNNN IS L R      1  1

PCK206I REPORT COMPLETE FOR PROGRAM = TEST14  VERSION = 2005-04-11-18.30.07.463125
COMPLETE RET CODE= 00
11          2005/04/14  SQL ID -          ACCESS PATH FOR TEST14          COLLID - TESTCOLLX
OLD PLAN_TABLE -

STATEMENT# 327 DECLARE SELECT-1 CURSOR FOR SELECT MIN ( A . TBcreator ) FRO
M SYSCOLUMNS A

STATEMENT 327 FROM REPORT.
STEP      1  ACCESSES TABLE PUBLIC .SYSCOLUMNS A
          USING INDEX PUBLIC .DSNDXC01 USING 0 COLUMN(S).
          THE ACCESS IS A ONE FETCH INDEX SCAN
          THE ACCESS ONLY READS THE INDEX NOT THE TABLE
          THE INTENT LOCK FOR THE TABLE IS IS
          THE TIMESTAMP FOR THIS EXPLAIN IS 2005041314094722
          THE TABLE HAS 6,361 ROWS OF 969 BYTES.
          THE NON-UNIQUE INDEX HAS 6,361 ENTRIES IN 2 LEVELS WITH
CLUSTER RATIO 81
          DB2 ESTIMATES THIS QUERY WILL USE 17 MILLISECONDS OF CPU
TIME
          DB2 ESTIMATES THIS QUERY WILL USE 45 SERVICE UNITS

STATEMENT# 332 DECLARE SELECT-2 CURSOR FOR SELECT MIN ( A . TBNAME ) FROM S
YSCOLUMNS A WHERE A . TBcreator = : H

STATEMENT 332 FROM REPORT.
STEP      1  ACCESSES TABLE PUBLIC .SYSCOLUMNS A
          USING INDEX PUBLIC .DSNDXC01 USING 1 COLUMN(S).
          THE ACCESS IS A ONE FETCH INDEX SCAN
          THE INTENT LOCK FOR THE TABLE IS IS
          THE TIMESTAMP FOR THIS EXPLAIN IS 2005041314094726
          THE TABLE HAS 6,361 ROWS OF 969 BYTES.
          THE NON-UNIQUE INDEX HAS 6,361 ENTRIES IN 2 LEVELS WITH
CLUSTER RATIO 81
          DB2 ESTIMATES THIS QUERY WILL USE 7 MILLISECONDS OF CPU
TIME
          DB2 ESTIMATES THIS QUERY WILL USE 17 SERVICE UNITS

STATEMENT# 338 DECLARE SELECT-3 CURSOR FOR SELECT MAX ( A . TBcreator ) FRO
M SYSCOLUMNS A

```

```

STATEMENT      338 FROM REPORT.
STEP           1  ACCESSES TABLE      PUBLIC .SYSCOLUMNS      A
                USING INDEX PUBLIC .DSNDCX01      USING 0 COLUMN(S).
                THE ACCESS ONLY READS THE INDEX NOT THE TABLE
                THE ACCESS WILL USE SEQUENTIAL PREFETCH
                THE INTENT LOCK FOR THE TABLE IS IS
                THE TIMESTAMP FOR THIS EXPLAIN IS 2005041314094729
                COLUMN FUNCTIONS WILL BE EVALUATED DURING READ
                THE TABLE HAS          6,361 ROWS OF    969 BYTES.
                THE NON-UNIQUE INDEX HAS          6,361 ENTRIES IN 2 LEVELS WITH
CLUSTER RATIO 81
TIME           DB2 ESTIMATES THIS QUERY WILL USE          17 MILLISECONDS OF CPU
                DB2 ESTIMATES THIS QUERY WILL USE          45 SERVICE UNITS

STATEMENT#     343 DECLARE SELECT-4 CURSOR FOR SELECT MAX ( A . TBNAME ) FROM S
                YSCOLUMNS A WHERE A . TBCREATOR = : H

STATEMENT      343 FROM REPORT.
STEP           1  ACCESSES TABLE      PUBLIC .SYSCOLUMNS      A
                USING INDEX PUBLIC .DSNDCX01      USING 1 COLUMN(S).
11            2005/04/14 SQL ID -          ACCESS PATH FOR TEST14      COLLID - TESTCOLLX
OLD PLAN_TABLE -

                THE ACCESS WILL USE LIST PREFETCH
                THE INTENT LOCK FOR THE TABLE IS IS
                THE TIMESTAMP FOR THIS EXPLAIN IS 2005041314094732
                COLUMN FUNCTIONS WILL BE EVALUATED DURING READ
                THE TABLE HAS          6,361 ROWS OF    969 BYTES.
                THE NON-UNIQUE INDEX HAS          6,361 ENTRIES IN 2 LEVELS WITH
CLUSTER RATIO 81
TIME           DB2 ESTIMATES THIS QUERY WILL USE          5 MILLISECONDS OF CPU
                DB2 ESTIMATES THIS QUERY WILL USE          14 SERVICE UNITS
PCK206I REPORT COMPLETE FOR PROGRAM = TEST14 VERSION = 2005-04-11-18.30.07.463125

```

Version 7 Example

```

PCK031I EXECUTING LICENSED PATH CHECKER V2R2
11            OPTIONS CATALOGSQL NOMATCHCREATOR REPORTCOSTGT
11            CONNECT TO DB7G
11            REPORT ON PACKAGE TESTCOLLX.TEST14 IN PUBLIC.PLAN_TABLE
11            2005/04/14 SQL ID -          ACCESS PATH FOR TEST14      COLLID - TESTCOLLX
OLD PLAN_TABLE -
IN QRYNO M CREATOR TNAME      TBNO AC MC CREATOR ACCESSNAME      IO
SORTUJGO LK PF QBNO PLNO MXSQ
327 0 PUBLIC SYSCOLUMNS      1 I1 0 PUBLIC DSNDCX01      Y
NNNNNNNN IS 1 1
332 0 PUBLIC SYSCOLUMNS      1 I1 1 PUBLIC DSNDCX01      N
NNNNNNNN IS 1 1
338 0 PUBLIC SYSCOLUMNS      1 I1 0 PUBLIC DSNDCX01      Y
NNNNNNNN IS 1 1
343 0 PUBLIC SYSCOLUMNS      1 I1 1 PUBLIC DSNDCX01      N
NNNNNNNN IS 1 1

PCK206I REPORT COMPLETE FOR PROGRAM = TEST14 VERSION = 2005-04-11-18.30.07.463125
COMPLETE RET CODE= 00
11            2005/04/14 SQL ID -          ACCESS PATH FOR TEST14      COLLID - TESTCOLLX
OLD PLAN_TABLE -

STATEMENT#     327 DECLARE SELECT-1 CURSOR FOR SELECT MIN ( A . TBCREATOR ) FRO
                M SYSCOLUMNS A

```

```

STATEMENT      327 FROM REPORT.
STEP           1  ACCESSES TABLE      PUBLIC .SYSCOLUMNS      A
                USING INDEX PUBLIC .DSNDCX01      USING 0 COLUMN(S).
                THE ACCESS IS A ONE FETCH INDEX SCAN
                THE ACCESS ONLY READS THE INDEX NOT THE TABLE
                THE INTENT LOCK FOR THE TABLE IS IS
                THE TIMESTAMP FOR THIS EXPLAIN IS 2005041314100505
                THIS OPERATION REFERENCES A TABLE
                THE TABLE HAS          6,361 ROWS OF      969 BYTES.
                THE NON-UNIQUE INDEX HAS          6,361 ENTRIES IN 2 LEVELS WITH
CLUSTER RATIO 81
TIME
                DB2 ESTIMATES THIS QUERY WILL USE          1 MILLISECONDS OF CPU
                DB2 ESTIMATES THIS QUERY WILL USE          1 SERVICE UNITS

STATEMENT#     332 DECLARE SELECT-2 CURSOR FOR SELECT MIN ( A . TBNAME ) FROM S
                YSCOLUMNS A WHERE A . TBCREATOR = : H

STATEMENT      332 FROM REPORT.
STEP           1  ACCESSES TABLE      PUBLIC .SYSCOLUMNS      A
                USING INDEX PUBLIC .DSNDCX01      USING 1 COLUMN(S).
                THE ACCESS IS A ONE FETCH INDEX SCAN
                THE INTENT LOCK FOR THE TABLE IS IS
                THE TIMESTAMP FOR THIS EXPLAIN IS 2005041314100509
                THIS OPERATION REFERENCES A TABLE
                THE TABLE HAS          6,361 ROWS OF      969 BYTES.
                THE NON-UNIQUE INDEX HAS          6,361 ENTRIES IN 2 LEVELS WITH
CLUSTER RATIO 81
TIME
                DB2 ESTIMATES THIS QUERY WILL USE          1 MILLISECONDS OF CPU
                DB2 ESTIMATES THIS QUERY WILL USE          1 SERVICE UNITS

STATEMENT#     338 DECLARE SELECT-3 CURSOR FOR SELECT MAX ( A . TBCREATOR ) FRO
                M SYSCOLUMNS A

STATEMENT      338 FROM REPORT.
STEP           1  ACCESSES TABLE      PUBLIC .SYSCOLUMNS      A
                USING INDEX PUBLIC .DSNDCX01      USING 0 COLUMN(S).
                THE ACCESS IS A ONE FETCH INDEX SCAN
                THE ACCESS ONLY READS THE INDEX NOT THE TABLE
                THE INTENT LOCK FOR THE TABLE IS IS
                THE TIMESTAMP FOR THIS EXPLAIN IS 2005041314100512
                THIS OPERATION REFERENCES A TABLE
                THE TABLE HAS          6,361 ROWS OF      969 BYTES.
                THE NON-UNIQUE INDEX HAS          6,361 ENTRIES IN 2 LEVELS WITH
CLUSTER RATIO 81
TIME
                DB2 ESTIMATES THIS QUERY WILL USE          1 MILLISECONDS OF CPU
                DB2 ESTIMATES THIS QUERY WILL USE          1 SERVICE UNITS

STATEMENT#     343 DECLARE SELECT-4 CURSOR FOR SELECT MAX ( A . TBNAME ) FROM S
                YSCOLUMNS A WHERE A . TBCREATOR = : H

STATEMENT      343 FROM REPORT.
11 2005/04/14 SQL ID -          ACCESS PATH FOR TEST14          COLLID - TESTCOLLX
OLD PLAN_TABLE -

STEP           1  ACCESSES TABLE      PUBLIC .SYSCOLUMNS      A
                USING INDEX PUBLIC .DSNDCX01      USING 1 COLUMN(S).
                THE ACCESS IS A ONE FETCH INDEX SCAN
                THE INTENT LOCK FOR THE TABLE IS IS
                THE TIMESTAMP FOR THIS EXPLAIN IS 2005041314100515
                THIS OPERATION REFERENCES A TABLE
                THE TABLE HAS          6,361 ROWS OF      969 BYTES.
                THE NON-UNIQUE INDEX HAS          6,361 ENTRIES IN 2 LEVELS WITH
CLUSTER RATIO 81

```

```

                DB2 ESTIMATES THIS QUERY WILL USE          1 MILLISECONDS OF CPU
TIME
                DB2 ESTIMATES THIS QUERY WILL USE          1 SERVICE UNITS
PCK206I REPORT COMPLETE FOR PROGRAM = TEST14  VERSION =    2005-04-11-18.30.07.463125

```

Version 8 Example

```

11          OPTIONS CATALOGSQL NOMATCHCREATOR REPORTCOSTGT
11          CONNECT TO DB8G
11          REPORT ON PACKAGE TESTCOLLX.TEST14 IN PUBLIC.PLAN_TABLE
11          2005/04/14  SQL ID -          ACCESS PATH FOR TEST14          COLLID - TESTCOLLX
OLD PLAN_TABLE -
  IN QRYNO M  CREATOR  TNAME          TBNO AC MC CREATOR  ACCESSNAME          IO
SORTUJGO LK PF QBNO PLNO MXSQ
  327 0 PUBLIC  SYSCOLUMNS          1 I1  0 PUBLIC  DSNDXC01          Y
NNNNNNNNN IS          1  1
          332 0 PUBLIC  SYSCOLUMNS          1 I1  1 PUBLIC  DSNDXC01          Y
NNNNNNNNN IS          1  1
          338 0 PUBLIC  SYSCOLUMNS          1 I1  0 PUBLIC  DSNDXC01          Y
NNNNNNNNN IS          1  1
          343 0 PUBLIC  SYSCOLUMNS          1 I1  1 PUBLIC  DSNDXC01          Y
NNNNNNNNN IS          1  1

PCK206I REPORT COMPLETE FOR PROGRAM = TEST14  VERSION =    2005-04-11-18.30.07.463125
COMPLETE RET CODE=          00
11          2005/04/14  SQL ID -          ACCESS PATH FOR TEST14          COLLID - TESTCOLLX
OLD PLAN_TABLE -

```

```

STATEMENT#      327 DECLARE SELECT-1 CURSOR FOR SELECT MIN ( A . TBcreator ) FRO
                M SYSCOLUMNS A

STATEMENT      327 FROM REPORT.
STEP           1  ACCESSES TABLE      PUBLIC .SYSCOLUMNS      A
                USING INDEX PUBLIC .DSNDXC01      USING  0 COLUMN(S).
                THE ACCESS IS A ONE FETCH INDEX SCAN
                THE ACCESS ONLY READS THE INDEX NOT THE TABLE
                THE INTENT LOCK FOR THE TABLE IS IS
                THE TIMESTAMP FOR THIS EXPLAIN IS 2005041314103438
                THIS OPERATION REFERENCES A TABLE
                THE TABLE HAS          6,361 ROWS OF      969 BYTES.
                THE NON-UNIQUE INDEX HAS          6,361 ENTRIES IN  2 LEVELS WITH
CLUSTER RATIO  81
TIME
                DB2 ESTIMATES THIS QUERY WILL USE          1 MILLISECONDS OF CPU
                DB2 ESTIMATES THIS QUERY WILL USE          1 SERVICE UNITS

STATEMENT#      332 DECLARE SELECT-2 CURSOR FOR SELECT MIN ( A . TBNAME ) FROM S
                YSCOLUMNS A WHERE A . TBcreator = : H

STATEMENT      332 FROM REPORT.
STEP           1  ACCESSES TABLE      PUBLIC .SYSCOLUMNS      A
                USING INDEX PUBLIC .DSNDXC01      USING  1 COLUMN(S).
                THE ACCESS IS A ONE FETCH INDEX SCAN
                THE ACCESS ONLY READS THE INDEX NOT THE TABLE
                THE INTENT LOCK FOR THE TABLE IS IS
                THE TIMESTAMP FOR THIS EXPLAIN IS 2005041314103448
                THIS OPERATION REFERENCES A TABLE
                THE TABLE HAS          6,361 ROWS OF      969 BYTES.
                THE NON-UNIQUE INDEX HAS          6,361 ENTRIES IN  2 LEVELS WITH
CLUSTER RATIO  81
TIME
                DB2 ESTIMATES THIS QUERY WILL USE          1 MILLISECONDS OF CPU
                DB2 ESTIMATES THIS QUERY WILL USE          1 SERVICE UNITS

```

```

STATEMENT#      338 DECLARE SELECT-3 CURSOR FOR SELECT MAX ( A . TBCREATOR ) FRO
                  M SYSCOLUMNS A

STATEMENT      338 FROM REPORT.
STEP           1  ACCESSES TABLE PUBLIC .SYSCOLUMNS A
                  USING INDEX PUBLIC .DSNDCX01 USING 0 COLUMN(S).
                  THE ACCESS IS A ONE FETCH INDEX SCAN
                  THE ACCESS ONLY READS THE INDEX NOT THE TABLE
                  THE INTENT LOCK FOR THE TABLE IS IS
                  THE TIMESTAMP FOR THIS EXPLAIN IS 2005041314103459
                  THIS OPERATION REFERENCES A TABLE
                  THE TABLE HAS 6,361 ROWS OF 969 BYTES.
                  THE NON-UNIQUE INDEX HAS 6,361 ENTRIES IN 2 LEVELS WITH

CLUSTER RATIO  81
TIME
                  DB2 ESTIMATES THIS QUERY WILL USE 1 MILLISECONDS OF CPU
                  DB2 ESTIMATES THIS QUERY WILL USE 1 SERVICE UNITS

STATEMENT#      343 DECLARE SELECT-4 CURSOR FOR SELECT MAX ( A . TBNAME ) FROM S
                  YSCOLUMNS A WHERE A . TBCREATOR = : H

11      2005/04/14  SQL ID - ACCESS PATH FOR TEST14 COLLID - TESTCOLLX
OLD PLAN_TABLE -

STATEMENT      343 FROM REPORT.
STEP           1  ACCESSES TABLE PUBLIC .SYSCOLUMNS A
                  USING INDEX PUBLIC .DSNDCX01 USING 1 COLUMN(S).
                  THE ACCESS IS A ONE FETCH INDEX SCAN
                  THE ACCESS ONLY READS THE INDEX NOT THE TABLE
                  THE INTENT LOCK FOR THE TABLE IS IS
                  THE TIMESTAMP FOR THIS EXPLAIN IS 2005041314103467
                  THIS OPERATION REFERENCES A TABLE
                  THE TABLE HAS 6,361 ROWS OF 969 BYTES.
                  THE NON-UNIQUE INDEX HAS 6,361 ENTRIES IN 2 LEVELS WITH

CLUSTER RATIO  81
TIME
                  DB2 ESTIMATES THIS QUERY WILL USE 1 MILLISECONDS OF CPU
                  DB2 ESTIMATES THIS QUERY WILL USE 1 SERVICE UNITS
PCK206I REPORT COMPLETE FOR PROGRAM = TEST14 VERSION = 2005-04-11-18.30.07.463125
    
```

Analysis of the Comparisons between Versions of DB2

	V6	V7	V8
MIN() MSUs	45	1	1
MAX() MSUs	45	1	1
Access Type Change	Index scan for max	I1 for both	I1 for both

The EXAMPLE – for each version of DB2

```

SELECT MIN INDEX SUPPORT AND SELECT MAX WITH SAME INDEX
USE PUBLIC TABLES
EXEC SQL
DECLARE SELECT-2 CURSOR FOR
SELECT MIN(A.TBNAME )
FROM SYSCOLUMNS A
WHERE A.TBCREATOR = :SYSCOL-SYSCOLUMNS.SYSCOL-TBCREATOR
END-EXEC.
EXEC SQL
DECLARE SELECT-3 CURSOR FOR
    
```

```
SELECT MAX(A.TBCREATOR)
FROM   SYSCOLUMNS A
END-EXEC.
```

Query Summary

Database Alias: HLSP390 **Explain Time :** 2005-05-30 09:00:30.178958

DB2 Platform : Z/OS **DB2 Version:** v8

SQL Statement : DECLARE SELECT-4 CURSOR FOR SELECT MAX (A .
TBNAME) FROM SYSCOLUMNS A WHERE A . TBCREATOR =
: H

Attribute	Value	Explanation
Timestamp	2005-05-30 09:00:30.178958	Timestamp when the query is explained
Type	SELECT	Query type (SELECT, INSERT, UPDATE, DELETE, SELUPD, DELCUR, UPDCUR)
CPU Cost (ms)	1	Estimated CPU cost (in milliseconds)
CPU Cost (su)	1	Estimated CPU cost (in service units)
Cost Category	A	Cost estimation category (A=statistics; B=default)
Reason		Reason when the cost estimation category is B (HOST VARIABLES, TABLE CARDINALITY, UDF, TRIGGERS, REFERENTIAL CONSTRAINTS)
Group Member		

Case 15: Scrolling Cursor

Version 6 Example

```

PCK031I EXECUTING LICENSED PATH CHECKER V2R2
11          OPTIONS CATALOGSQL NOMATCHCREATOR REPORTCOSTGT
11          CONNECT TO DB6G
11          REPORT ON PACKAGE TESTCOLLX.TEST15 IN PUBLIC.PLAN_TABLE
11          2005/04/14  SQL ID -          ACCESS PATH FOR TEST15          COLLID - TESTCOLLX
OLD PLAN_TABLE -
  IN QRYNO M  CREATOR  TNAME          TBNO AC MC CREATOR  ACCESSNAME          IO
SORTUJGO LK PF QBNO PLNO MXSQ
  327 0 PUBLIC  SYSTABLES          2 I  2 PUBLIC  DSNDTX01          N
NNNNNNNN IS  1  1
  327 1 PUBLIC  SYSCOLUMNS          1 I  2 PUBLIC  DSNDXC01          N
NNNNNNNN IS  1  2
          338 0 PUBLIC  SYSTABLES          1 R  0          N
NNNNNNNN IS S  1  1

PCK206I REPORT COMPLETE FOR PROGRAM = TEST15  VERSION = 2005-04-11-18.30.39.699793
COMPLETE RET CODE= 00
11          2005/04/14  SQL ID -          ACCESS PATH FOR TEST15          COLLID - TESTCOLLX
OLD PLAN_TABLE -

STATEMENT# 327 DECLARE SELECT-1 CURSOR FOR SELECT A . NAME , A . TBNAME , A
          . COLNO , A . COLTYPE , A . LENGTH FROM SYSCOLUMNS A INNER
          JOIN SYSTABLES B ON A . TBNAME = B . NAME AND A . TBcreator
          = B . CREATOR WHERE A . TBNAME >= : H AND A . TBcreator = :
          H

STATEMENT 327 FROM REPORT.
STEP 1 ACCESSES TABLE PUBLIC .SYSTABLES B
          USING INDEX PUBLIC .DSNDTX01 USING 2 COLUMN(S).
          THE INTENT LOCK FOR THE TABLE IS IS
          THE TIMESTAMP FOR THIS EXPLAIN IS 2005041314094757
          THE TABLE HAS 404 ROWS OF 542 BYTES.
          THE NON-UNIQUE INDEX HAS 404 ENTRIES IN 2 LEVELS WITH
CLUSTER RATIO 72
STEP 2 ACCESSES TABLE PUBLIC .SYSCOLUMNS A
          USING INDEX PUBLIC .DSNDXC01 USING 2 COLUMN(S).
          THE JOIN METHOD IS NESTED LOOP
          THE INTENT LOCK FOR THE TABLE IS IS
          THE TIMESTAMP FOR THIS EXPLAIN IS 2005041314094757
          THE TABLE HAS 6,361 ROWS OF 969 BYTES.
          THE NON-UNIQUE INDEX HAS 6,361 ENTRIES IN 2 LEVELS WITH
CLUSTER RATIO 81
TIME DB2 ESTIMATES THIS QUERY WILL USE 1 MILLISECONDS OF CPU
          DB2 ESTIMATES THIS QUERY WILL USE 2 SERVICE UNITS
          DB2 WAS FORCED TO USE ESTIMATES BECAUSE OF
          HOST VARIABLES

STATEMENT# 338 DECLARE SELECT-2 CURSOR FOR SELECT NAME , CREATOR , TYPE , D
          BNAME , TSNAME FROM SYSTABLES WHERE CREATOR > : H OR ( CREAT
          OR = : H AND NAME >= : H )

STATEMENT 338 FROM REPORT.
STEP 1 ACCESSES TABLE PUBLIC .SYSTABLES
          USING A TABLESPACE SCAN.
          THE ACCESS WILL USE SEQUENTIAL PREFETCH
          THE INTENT LOCK FOR THE TABLE IS IS
          THE TIMESTAMP FOR THIS EXPLAIN IS 2005041314094764
          THE TABLE HAS 404 ROWS OF 542 BYTES.

```

```

TIME          DB2 ESTIMATES THIS QUERY WILL USE          12 MILLISECONDS OF CPU
              DB2 ESTIMATES THIS QUERY WILL USE          34 SERVICE UNITS
              DB2 WAS FORCED TO USE ESTIMATES BECAUSE OF
              HOST VARIABLES

```

PCK206I REPORT COMPLETE FOR PROGRAM = TEST15 VERSION = 2005-04-11-18.30.39.699793

Version 7 Example

```

PCK031I EXECUTING LICENSED PATH CHECKER V2R2
11          OPTIONS CATALOGSQL NOMATCHCREATOR REPORTCOSTGT
11          CONNECT TO DB7G
11          REPORT ON PACKAGE TESTCOLLX.TEST15 IN PUBLIC.PLAN_TABLE
11          2005/04/14  SQL ID -          ACCESS PATH FOR TEST15          COLLID - TESTCOLLX
OLD PLAN_TABLE -
IN QRYNO M  CREATOR  TNAME          TBNO AC MC CREATOR  ACCESSNAME          IO
SORTUJGO LK PF QBNO PLNO MXSQ
          327 0 PUBLIC  SYSTABLES          2 I   2 PUBLIC  DSNDTX01          N
NNNNNNNN IS          1   1
          327 1 PUBLIC  SYSCOLUMNS          1 I   2 PUBLIC  DSNDX01          N
NNNNNNNN IS          1   2
          338 0 PUBLIC  SYSTABLES          1 R   0
NNNNNNNN IS S          1   1

PCK206I REPORT COMPLETE FOR PROGRAM = TEST15 VERSION = 2005-04-11-18.30.39.699793
COMPLETE RET CODE=          00
11          2005/04/14  SQL ID -          ACCESS PATH FOR TEST15          COLLID - TESTCOLLX
OLD PLAN_TABLE -

```

```

STATEMENT#    327 DECLARE SELECT-1 CURSOR FOR SELECT A . NAME , A . TBNAME , A
              . COLNO , A . COLTYPE , A . LENGTH FROM SYSCOLUMNS A INNER
              JOIN SYSTABLES B ON A . TBNAME = B . NAME AND A . TBcreator
              = B . CREATOR WHERE A . TBNAME >= : H AND A . TBcreator = :
              H

STATEMENT     327 FROM REPORT.
STEP          1  ACCESSES TABLE PUBLIC .SYSTABLES          B
              USING INDEX PUBLIC .DSNDTX01          USING 2 COLUMN(S).
              THE INTENT LOCK FOR THE TABLE IS IS
              THE TIMESTAMP FOR THIS EXPLAIN IS 2005041314100541
              THIS OPERATION REFERENCES A TABLE
              THE TABLE HAS          404 ROWS OF          542 BYTES.
              THE NON-UNIQUE INDEX HAS          404 ENTRIES IN 2 LEVELS WITH

CLUSTER RATIO 72
STEP          2  ACCESSES TABLE PUBLIC .SYSCOLUMNS          A
              USING INDEX PUBLIC .DSNDX01          USING 2 COLUMN(S).
              THE JOIN METHOD IS NESTED LOOP
              THE INTENT LOCK FOR THE TABLE IS IS
              THE TIMESTAMP FOR THIS EXPLAIN IS 2005041314100541
              THIS OPERATION REFERENCES A TABLE
              THE TABLE HAS          6,361 ROWS OF          969 BYTES.
              THE NON-UNIQUE INDEX HAS          6,361 ENTRIES IN 2 LEVELS WITH

CLUSTER RATIO 81
              DB2 ESTIMATES THIS QUERY WILL USE          1 MILLISECONDS OF CPU
TIME          DB2 ESTIMATES THIS QUERY WILL USE          2 SERVICE UNITS
              DB2 WAS FORCED TO USE ESTIMATES BECAUSE OF
              HOST VARIABLES

```

```

STATEMENT#    338 DECLARE SELECT-2 CURSOR FOR SELECT NAME , CREATOR , TYPE , D
              BNAME , TSNAME FROM SYSTABLES WHERE CREATOR > : H OR ( CREAT
              OR = : H AND NAME >= : H )

```

```

STATEMENT     338 FROM REPORT.
STEP          1  ACCESSES TABLE PUBLIC .SYSTABLES

```

```
        USING A TABLESPACE SCAN.
        THE ACCESS WILL USE SEQUENTIAL PREFETCH
        THE INTENT LOCK FOR THE TABLE IS IS
        THE TIMESTAMP FOR THIS EXPLAIN IS 2005041314100549
        THIS OPERATION REFERENCES A TABLE
        THE TABLE HAS          404 ROWS OF      542 BYTES.
        DB2 ESTIMATES THIS QUERY WILL USE          12 MILLISECONDS OF CPU
TIME
        DB2 ESTIMATES THIS QUERY WILL USE          34 SERVICE UNITS
        DB2 WAS FORCED TO USE ESTIMATES BECAUSE OF
        HOST VARIABLES

PCK206I REPORT COMPLETE FOR PROGRAM = TEST15  VERSION = 2005-04-11-18.30.39.699793
```

Version 8 Example

```

PCK031I EXECUTING LICENSED PATH CHECKER V2R2
11          OPTIONS CATALOGSQL NOMATCHCREATOR REPORTCOSTGT
11          CONNECT TO DB8G
11          REPORT ON PACKAGE TESTCOLLX.TEST15 IN PUBLIC.PLAN_TABLE
11          2005/04/14  SQL ID -          ACCESS PATH FOR TEST15          COLLID - TESTCOLLX
OLD PLAN_TABLE -
  IN QRYNO M  CREATOR  TNAME          TBNO AC MC CREATOR  ACCESSNAME          IO
SORTUJGO LK PF QBNO PLNO MXSQ
  327 0 PUBLIC  SYSTABLES          2 I  2 PUBLIC  DSNDTX01          Y
NNNNNNNN IS  1  1
  327 1 PUBLIC  SYSCOLUMNS          1 I  2 PUBLIC  DSNDX01          N
NNNNNNNN IS  1  2

  338 0 PUBLIC  SYSTABLES          1 R  0          N
NNNNNNNN IS S  1  1

PCK206I REPORT COMPLETE FOR PROGRAM = TEST15  VERSION = 2005-04-11-18.30.39.699793
COMPLETE RET CODE= 00
11          2005/04/14  SQL ID -          ACCESS PATH FOR TEST15          COLLID - TESTCOLLX
OLD PLAN_TABLE -

```

```

STATEMENT# 327 DECLARE SELECT-1 CURSOR FOR SELECT A . NAME , A . TBNAME , A
. COLNO , A . COLTYPE , A . LENGTH FROM SYSCOLUMNS A INNER
JOIN SYSTABLES B ON A . TBNAME = B . NAME AND A . TBcreator
= B . CREATOR WHERE A . TBNAME >= : H AND A . TBcreator = :
H

STATEMENT 327 FROM REPORT.
STEP 1 ACCESSES TABLE PUBLIC .SYSTABLES B
USING INDEX PUBLIC .DSNDTX01 USING 2 COLUMN(S).
THE ACCESS ONLY READS THE INDEX NOT THE TABLE
THE INTENT LOCK FOR THE TABLE IS IS
THE TIMESTAMP FOR THIS EXPLAIN IS 2005041314103500
THIS OPERATION REFERENCES A TABLE
THE TABLE HAS 404 ROWS OF 542 BYTES.
THE NON-UNIQUE INDEX HAS 404 ENTRIES IN 2 LEVELS WITH
CLUSTER RATIO 72
STEP 2 ACCESSES TABLE PUBLIC .SYSCOLUMNS A
USING INDEX PUBLIC .DSNDX01 USING 2 COLUMN(S).
THE JOIN METHOD IS NESTED LOOP
THE INTENT LOCK FOR THE TABLE IS IS
THE TIMESTAMP FOR THIS EXPLAIN IS 2005041314103500
THIS OPERATION REFERENCES A TABLE
THE TABLE HAS 6,361 ROWS OF 969 BYTES.
THE NON-UNIQUE INDEX HAS 6,361 ENTRIES IN 2 LEVELS WITH
CLUSTER RATIO 81
TIME DB2 ESTIMATES THIS QUERY WILL USE 1 MILLISECONDS OF CPU
DB2 ESTIMATES THIS QUERY WILL USE 2 SERVICE UNITS
DB2 WAS FORCED TO USE ESTIMATES BECAUSE OF
HOST VARIABLES

STATEMENT# 338 DECLARE SELECT-2 CURSOR FOR SELECT NAME , CREATOR , TYPE , D
BNAME , TSNAME FROM SYSTABLES WHERE CREATOR > : H OR ( CREAT
OR = : H AND NAME >= : H )

STATEMENT 338 FROM REPORT.
STEP 1 ACCESSES TABLE PUBLIC .SYSTABLES
USING A TABLESPACE SCAN.
THE ACCESS WILL USE SEQUENTIAL PREFETCH
THE INTENT LOCK FOR THE TABLE IS IS
THE TIMESTAMP FOR THIS EXPLAIN IS 2005041314103517
THIS OPERATION REFERENCES A TABLE
THE TABLE HAS 404 ROWS OF 542 BYTES.

```

TIME DB2 ESTIMATES THIS QUERY WILL USE 12 MILLISECONDS OF CPU
DB2 ESTIMATES THIS QUERY WILL USE 32 SERVICE UNITS
DB2 WAS FORCED TO USE ESTIMATES BECAUSE OF
HOST VARIABLES

PCK206I REPORT COMPLETE FOR PROGRAM = TEST15 VERSION = 2005-04-11-18.30.39.699793

Analysis of the Comparisons between Versions of DB2

	V6	V7	V8
Reposition 2 table	2	2	2
Reposition 1 table	34	34	32
Access Type Change	Or clause causes problem	Or clause causes problem	Or clause causes problem

The Example

```

SCROLLING CURSOR (AKA REPOSITIONING CURSOR)
USE PUBLIC. TABLES
EXEC SQL
DECLARE SELECT-1 CURSOR FOR
  SELECT A.NAME, A.TBNAME, A.COLNO, A.COLTYPE, A.LENGTH
  FROM   SYSCOLUMNS A
        INNER JOIN
        SYSTABLES B
        ON A.TBNAME = B.NAME
        AND A.TBCREATOR = B.CREATOR
  WHERE A.TBNAME >= :SYSCOL-SYSCOLUMNS.SYSCOL-TBNAME
        AND A.TBCREATOR = :SYSCOL-SYSCOLUMNS.SYSCOL-TBCREATOR
END-EXEC.
EXEC SQL
DECLARE SELECT-2 CURSOR FOR
  SELECT NAME, CREATOR, TYPE, DBNAME, TSNAME
  FROM   SYSTABLES
  WHERE CREATOR > :SYSTAB-SYSTABLES.SYSTAB-CREATOR
        OR (CREATOR = :SYSTAB-SYSTABLES.SYSTAB-CREATOR
            AND NAME >= :SYSTAB-SYSTABLES.SYSTAB-NAME )
END-EXEC.

```

Query Summary

Database Alias: HLSP390 **Explain Time :** 2005-05-30 09:00:30.760536

DB2 Platform : Z/OS **DB2 Version:** v8

SQL Statement : DECLARE SELECT-2 CURSOR FOR SELECT NAME , CREATOR , TYPE , DBNAME , TSNAME FROM SYSTABLES WHERE CREATOR > : H OR (CREATOR = : H AND NAME >= : H)

Attribute	Value	Explanation
Timestamp	2005-05-30 09:00:30.760536	Timestamp when the query is explained
Type	SELECT	Query type (SELECT, INSERT, UPDATE, DELETE, SELUPD, DELCUR, UPDCUR)
CPU Cost (ms)	12	Estimated CPU cost (in milliseconds)
CPU Cost (su)	34	Estimated CPU cost (in service units)
Cost Category	B	Cost estimation category (A=statistics; B=default)
Reason	HOST VARIABLES	Reason when the cost estimation category is B (HOST VARIABLES, TABLE CARDINALITY, UDF, TRIGGERS, REFERENTIAL CONSTRAINTS)
Group Member		

Case 16: REORG to Cluster ratio = 100**Version 6 Comparison**

```

PCK031I EXECUTING LICENSED PATH CHECKER V2R2
11          OPTIONS CATALOGSQL NOMATCHCREATOR REPORTCOSTGT
11          CONNECT TO DB6G
11          COMPARE PACKAGE TESTCOLLX.TEST16 IN PUBLIC.PLAN_TABLE
              TO PREVIOUS
11          2005/04/14  SQL ID -          ACCESS PATH FOR TEST16          COLLID - TESTCOLLX
OLD PLAN_TABLE -
          IN QRYNO M  CREATOR  TNAME          TBNO AC MC CREATOR  ACCESSNAME          IO
SORTUJGO LK PF QBNO PLNO MXSQ
PCK212I TIMESTAMP USED FOR PREVIOUS COMMAND = 2005041314092761  VERSION = 2005-04-13-
18.28.13.494678

1  338 0 PUBLIC  SYSTABLES          1 I  1 PUBLIC  DSNDTX01          N
NNNNNNNN IS L  1  1
PCK220I DATA CHANGE FOR COLUMN PREFETCH = WAS L
2  338 0 PUBLIC16 SYSTABLES          1 I  1 PUBLIC16 DSNDTX01          N
NNNNNNNN IS  1  1
PCK221I DATA CHANGE FOR COLUMN PREFETCH = IS NOW
PCK206I COMPARE COMPLETE FOR PROGRAM = TEST16  VERSION = 2005-04-13-18.28.13.494678
PCK203I STATEMENTS WITH SAME ACCESS PATH  1 STATEMENTS WITH DIFFERENT ACCESS
PATH  1 FOR PROGRAM TEST16
PCK204I QUERIES WITH MATCHING EXPLAIN  2 QUERIES WITHOUT MATCHING
EXPLAIN  0 FOR PROGRAM TEST16
PCK217I TOTAL DBRMS COMPARED 1
PCK217I TOTAL STATEMENTS COMPARED 2
PCK217I TOTAL ACCESS PATH CHANGES 1
PCK217I TOTAL ACCESS PATH SAME 1
PCK217I TOTAL NEW SQL STATEMENTS 0
PCK217I TOTAL DELETED SQL STATEMENTS 0
PCK217I TOTAL DSN_STATEMNT COST INCR 0
COMPLETE RET CODE= 04
11          2005/04/14  SQL ID -          ACCESS PATH FOR TEST16          COLLID - TESTCOLLX
OLD PLAN_TABLE -

STATEMENT 338 THIS IS THE OLD ACCESS PATH.
STEP 1 ACCESSES TABLE PUBLIC .SYSTABLES
      USING INDEX PUBLIC .DSNDTX01 USING 1 COLUMN(S).
      THE ACCESS WILL USE LIST PREFETCH
      THE INTENT LOCK FOR THE TABLE IS IS
      THE TIMESTAMP FOR THIS EXPLAIN IS 2005041314092761
      THE TABLE HAS 404 ROWS OF 542 BYTES.
      THE NON-UNIQUE INDEX HAS 404 ENTRIES IN 2 LEVELS WITH
CLUSTER RATIO 72
      DB2 ESTIMATES THIS QUERY WILL USE 2 MILLISECONDS OF CPU
TIME
      DB2 ESTIMATES THIS QUERY WILL USE 4 SERVICE UNITS

STATEMENT 338 THIS IS THE NEW ACCESS PATH.
STATEMENT# 338 DECLARE SELECT-2 CURSOR FOR SELECT NAME , CREATOR , TYPE , D
      BNAME , TNAME FROM SYSTABLES WHERE CREATOR = : H
STEP 1 ACCESSES TABLE PUBLIC16.SYSTABLES
      USING INDEX PUBLIC16.DSNDTX01 USING 1 COLUMN(S).
      THE INTENT LOCK FOR THE TABLE IS IS
      THE TIMESTAMP FOR THIS EXPLAIN IS 2005041314094795
      THE TABLE HAS 404 ROWS OF 542 BYTES.
      THE NON-UNIQUE INDEX HAS 404 ENTRIES IN 2 LEVELS WITH
CLUSTER RATIO 100
      DB2 ESTIMATES THIS QUERY WILL USE 2 MILLISECONDS OF CPU
TIME
      DB2 ESTIMATES THIS QUERY WILL USE 4 SERVICE UNITS

```

```

PCK206I COMPARE COMPLETE FOR PROGRAM = TEST16   VERSION =    2005-04-13-18.28.13.494678
PCK217I TOTAL DBRMS COMPARED                    1
PCK217I TOTAL STATEMENTS COMPARED              2
PCK217I TOTAL ACCESS PATH CHANGES            1
PCK217I TOTAL ACCESS PATH SAME                1
PCK217I TOTAL NEW SQL STATEMENTS              0
PCK217I TOTAL DELETED SQL STATEMENTS          0

```

Version 7 Comparison

```

PCK031I EXECUTING LICENSED PATH CHECKER V2R2
11          OPTIONS CATALOGSQL NOMATCHCREATOR REPORTCOSTGT
11          CONNECT TO DB7G
11          COMPARE PACKAGE TESTCOLLX.TEST16 IN PUBLIC.PLAN_TABLE
              TO PREVIOUS
11          2005/04/14  SQL ID -          ACCESS PATH FOR TEST16          COLLID - TESTCOLLX
OLD PLAN_TABLE -
IN QRYNO M  CREATOR  TNAME          TBNO AC MC CREATOR  ACCESSNAME          IO
SORTUJGO LK PF QBNO PLNO MXSQ
PCK212I TIMESTAMP USED FOR PREVIOUS COMMAND = 2005041314095962   VERSION = 2005-04-13-
18.28.13.494678

1   338 0 PUBLIC  SYSTABLES          1 I   1 PUBLIC  DSNDTX01          N
NNNNNNNN IS L   1   1
PCK220I DATA CHANGE FOR COLUMN PREFETCH = WAS L
2   338 0 PUBLIC16 SYSTABLES          1 I   1 PUBLIC16 DSNDTX01          N
NNNNNNNN IS L   1   1
PCK221I DATA CHANGE FOR COLUMN PREFETCH = IS NOW
PCK206I COMPARE COMPLETE FOR PROGRAM = TEST16   VERSION =    2005-04-13-18.28.13.494678
PCK203I STATEMENTS WITH SAME ACCESS PATH      1 STATEMENTS WITH DIFFERENT ACCESS
PATH      1 FOR PROGRAM TEST16
PCK204I QUERIES WITH MATCHING EXPLAIN        2 QUERIES WITHOUT MATCHING
EXPLAIN  0 FOR PROGRAM TEST16
PCK217I TOTAL DBRMS COMPARED                    1
PCK217I TOTAL STATEMENTS COMPARED              2
PCK217I TOTAL ACCESS PATH CHANGES            1
PCK217I TOTAL ACCESS PATH SAME                1
PCK217I TOTAL NEW SQL STATEMENTS              0
PCK217I TOTAL DELETED SQL STATEMENTS          0
PCK217I TOTAL DSN_STATEMNT COST INCR          0
COMPLETE RET CODE= 04
11          2005/04/14  SQL ID -          ACCESS PATH FOR TEST16          COLLID - TESTCOLLX
OLD PLAN_TABLE -

STATEMENT      338 THIS IS THE OLD ACCESS PATH.
STEP           1  ACCESSES TABLE PUBLIC .SYSTABLES
                  USING INDEX PUBLIC .DSNDTX01          USING 1 COLUMN(S).
                  THE ACCESS WILL USE LIST PREFETCH
                  THE INTENT LOCK FOR THE TABLE IS IS
                  THE TIMESTAMP FOR THIS EXPLAIN IS 2005041314095962
                  THIS OPERATION REFERENCES A TABLE
                  THE TABLE HAS 404 ROWS OF 542 BYTES.
                  THE NON-UNIQUE INDEX HAS 404 ENTRIES IN 2 LEVELS WITH
CLUSTER RATIO 72
TIME           DB2 ESTIMATES THIS QUERY WILL USE 2 MILLISECONDS OF CPU
              DB2 ESTIMATES THIS QUERY WILL USE 5 SERVICE UNITS

STATEMENT      338 THIS IS THE NEW ACCESS PATH.

STATEMENT#     338 DECLARE SELECT-2 CURSOR FOR SELECT NAME , CREATOR , TYPE , D
                  BNAME , TSNAME FROM SYSTABLES WHERE CREATOR = : H

STEP           1  ACCESSES TABLE PUBLIC16.SYSTABLES
                  USING INDEX PUBLIC16.DSNDTX01          USING 1 COLUMN(S).
                  THE INTENT LOCK FOR THE TABLE IS IS
                  THE TIMESTAMP FOR THIS EXPLAIN IS 2005041314100581
                  THIS OPERATION REFERENCES A TABLE
                  THE TABLE HAS 404 ROWS OF 542 BYTES.

```

```

THE NON-UNIQUE INDEX HAS          404 ENTRIES IN  2 LEVELS WITH
CLUSTER RATIO 100
DB2 ESTIMATES THIS QUERY WILL USE          2 MILLISECONDS OF CPU
TIME
DB2 ESTIMATES THIS QUERY WILL USE          4 SERVICE UNITS
PCK206I COMPARE COMPLETE FOR PROGRAM = TEST16  VERSION = 2005-04-13-18.28.13.494678
PCK217I TOTAL DBRMS COMPARED                1
PCK217I TOTAL STATEMENTS COMPARED           2
PCK217I TOTAL ACCESS PATH CHANGES           1
PCK217I TOTAL ACCESS PATH SAME              1
PCK217I TOTAL NEW SQL STATEMENTS            0
PCK217I TOTAL DELETED SQL STATEMENTS        0

*****
PCK218I PROGRAM TEST16      HAS A CHANGED ACCESS PATH
QUERYNO                      338
COLLECTION                    TESTCOLLX
NEW VERSION                   2005-04-13-18.28.13.494678

*****
PCK217I TOTAL DBRMS COMPARED                1
PCK217I TOTAL STATEMENTS COMPARED           2
PCK217I TOTAL ACCESS PATH CHANGES           1
PCK217I TOTAL ACCESS PATH SAME              1
PCK217I TOTAL NEW SQL STATEMENTS            0
PCK217I TOTAL DELETED SQL STATEMENTS        0
    
```

Version 8 Comparison

```

PCK031I EXECUTING LICENSED PATH CHECKER V2R2
11          OPTIONS CATALOGSQL NOMATCHCREATOR REPORTCOSTGT
11          CONNECT TO DB8G
11          COMPARE PACKAGE TESTCOLLX.TEST16 IN PUBLIC.PLAN_TABLE
          TO PREVIOUS
11          2005/04/14  SQL ID -          ACCESS PATH FOR TEST16          COLLID - TESTCOLLX
OLD PLAN_TABLE -
IN QRYNO M CREATOR TNAME          TBNO AC MC CREATOR ACCESSNAME          IO
SORTUJGO LK PF QBNO PLNO MXSQ
PCK212I TIMESTAMP USED FOR PREVIOUS COMMAND = 2005041314102600  VERSION = 2005-04-13-
18.28.13.494678

1  338 0 PUBLIC SYSTABLES          1 I  1 PUBLIC DSNDTX01          N
NNNNNNNN IS L  1  1
PCK220I DATA CHANGE FOR COLUMN PREFETCH =          WAS          L
2  338 0 PUBLIC16 SYSTABLES          1 I  1 PUBLIC16 DSNDTX01          N
NNNNNNNN IS          1  1
PCK221I DATA CHANGE FOR COLUMN PREFETCH =          IS NOW
PCK206I COMPARE COMPLETE FOR PROGRAM = TEST16  VERSION = 2005-04-13-18.28.13.494678
PCK203I STATEMENTS WITH SAME ACCESS PATH          1 STATEMENTS WITH DIFFERENT ACCESS
PATH          1 FOR PROGRAM TEST16
PCK204I QUERIES WITH MATCHING EXPLAIN          2 QUERIES WITHOUT MATCHING
EXPLAIN          0 FOR PROGRAM TEST16
PCK217I TOTAL DBRMS COMPARED                1
PCK217I TOTAL STATEMENTS COMPARED           2
PCK217I TOTAL ACCESS PATH CHANGES           1
PCK217I TOTAL ACCESS PATH SAME              1
PCK217I TOTAL NEW SQL STATEMENTS            0
PCK217I TOTAL DELETED SQL STATEMENTS        0
PCK217I TOTAL DSN_STATEMNT COST INCR          0
COMPLETE RET CODE=          04
11          2005/04/14  SQL ID -          ACCESS PATH FOR TEST16          COLLID - TESTCOLLX
OLD PLAN_TABLE -

STATEMENT          338 THIS IS THE OLD ACCESS PATH.
STEP          1 ACCESSES TABLE PUBLIC .SYSTABLES
          USING INDEX PUBLIC .DSNDTX01          USING 1 COLUMN(S).
          THE ACCESS WILL USE LIST PREFETCH
          THE INTENT LOCK FOR THE TABLE IS IS
    
```

```

THE TIMESTAMP FOR THIS EXPLAIN IS 2005041314102600
THIS OPERATION REFERENCES A TABLE
THE TABLE HAS          404 ROWS OF      542 BYTES.
THE NON-UNIQUE INDEX HAS          404 ENTRIES IN  2 LEVELS WITH
CLUSTER RATIO  72
DB2 ESTIMATES THIS QUERY WILL USE          2 MILLISECONDS OF CPU
TIME
DB2 ESTIMATES THIS QUERY WILL USE          4 SERVICE UNITS

STATEMENT          338 THIS IS THE NEW ACCESS PATH.

STATEMENT#        338 DECLARE SELECT-2 CURSOR FOR SELECT NAME , CREATOR , TYPE , D
                   BNAME , TSNAME FROM SYSTABLES WHERE CREATOR = : H

STEP              1  ACCESSES TABLE      PUBLIC16.SYSTABLES
                   USING INDEX PUBLIC16.DSNDTX01          USING  1 COLUMN(S).
                   THE INTENT LOCK FOR THE TABLE IS IS
                   THE TIMESTAMP FOR THIS EXPLAIN IS 2005041314103568
                   THIS OPERATION REFERENCES A TABLE
                   THE TABLE HAS          404 ROWS OF      542 BYTES.
                   THE NON-UNIQUE INDEX HAS          404 ENTRIES IN  2 LEVELS WITH
CLUSTER RATIO 100
DB2 ESTIMATES THIS QUERY WILL USE          2 MILLISECONDS OF CPU
TIME
DB2 ESTIMATES THIS QUERY WILL USE          4 SERVICE UNITS
PCK206I COMPARE COMPLETE FOR PROGRAM = TEST16  VERSION = 2005-04-13-18.28.13.494678
PCK217I TOTAL DBRMS COMPARED                    1
PCK217I TOTAL STATEMENTS COMPARED              2
PCK217I TOTAL ACCESS PATH CHANGES             1
PCK217I TOTAL ACCESS PATH SAME                 1
PCK217I TOTAL NEW SQL STATEMENTS               0
PCK217I TOTAL DELETED SQL STATEMENTS           0

```

```

*****
*****
PCK218I PROGRAM TEST16      HAS A CHANGED ACCESS PATH
QUERYNO                    338
COLLECTION                 TESTCOLLX
NEW VERSION                 2005-04-13-18.28.13.494678
*****
*****
PCK217I TOTAL DBRMS COMPARED                    1
PCK217I TOTAL STATEMENTS COMPARED              2
PCK217I TOTAL ACCESS PATH CHANGES             1
PCK217I TOTAL ACCESS PATH SAME                 1
PCK217I TOTAL NEW SQL STATEMENTS               0
PCK217I TOTAL DELETED SQL STATEMENTS           0

```

Analysis of the Comparisons between Versions of DB2

	V6	V7	V8
Before MSUs	4	5	4
After MSUs	4	4	4
Access Type Change	No List Prefetch	No List Prefetch	No List Prefetch

The Change

REORG tablespace so the cluster ratio for all the indexes = 100

Query Summary

Database Alias: HLSP390 **Explain Time :** 2005-05-30 09:00:31.276909

DB2 Platform : Z/OS **DB2 Version:** v8

SQL Statement : DECLARE SELECT-2 CURSOR FOR SELECT NAME , CREATOR
, TYPE , DBNAME , TSNAME FROM SYSTABLES WHERE
CREATOR = : H

Attribute	Value	Explanation
Timestamp	2005-05-30 09:00:31.276909	Timestamp when the query is explained
Type	SELECT	Query type (SELECT, INSERT, UPDATE, DELETE, SELUPD, DELCUR, UPDCUR)
CPU Cost (ms)	2	Estimated CPU cost (in milliseconds)
CPU Cost (su)	4	Estimated CPU cost (in service units)
Cost Category	A	Cost estimation category (A=statistics; B=default)
Reason		Reason when the cost estimation category is B (HOST VARIABLES, TABLE CARDINALITY, UDF, TRIGGERS, REFERENTIAL CONSTRAINTS)
Group Member		

Case 17: Use Distribution Statistics

Version 6 Comparison

```

PCK031I EXECUTING LICENSED PATH CHECK      V2R41
11          OPTIONS CATALOGSQL NOMATCHCREATOR REPORTCOSTGT
11          CONNECT TO DB6G
11          COMPARE PACKAGE TESTCOLLX.TEST17 IN PUBLIC.PLAN_TABLE
          TO PREVIOUS
11          2005/06/08  SQL ID -          ACCESS PATH FOR TEST17          COLLID - TESTCOLLX
OLD PLAN_TABLE -
  IN QRYNO M  CREATOR  TNAME          TBNO AC MC CREATOR  ACCESSNAME          IO
SORTUJGO LK PF QBNO PLNO MXSQ
PCK212I TIMESTAMP USED FOR PREVIOUS COMMAND = 2005060810584367  VERSION = 2005-05-16-
19.21.00.159957

  1   327 0 PUBLIC  SYSCOLUMNS          1 I   2 PUBLIC  DSNDXC01          N
NNNNNNNN IS      1   1
  1   327 1 PUBLIC  SYSTABLES            2 I   2 PUBLIC  DSNDTX01          N
NNNNNNNN IS      1   2
  2   327 0 PUBLIC17 SYSTABLES            2 I   2 PUBLIC17 DSNDTX01          N
NNNNNNNN IS      1   1
  2   327 1 PUBLIC17 SYSCOLUMNS          1 I   2 PUBLIC17 DSNDXC01          N
NNNNNNNN IS      1   2

  1   338 0 PUBLIC  SYSTABLES            1 I   1 PUBLIC  DSNDTX01          N
NNNNNNNN IS L    1   1
PCK220I DATA CHANGE FOR COLUMN PREFETCH =      WAS      L
  2   338 0 PUBLIC17 SYSTABLES            1 I   1 PUBLIC17 DSNDTX01          N
NNNNNNNN IS      1   1
PCK221I DATA CHANGE FOR COLUMN PREFETCH =      IS NOW
PCK206I COMPARE COMPLETE FOR PROGRAM = TEST17  VERSION =      2005-05-16-19.22.09.929101
          PREVIOUS  VERSION =      2005-05-16-19.21.00.159957

PCK203I STATEMENTS WITH SAME ACCESS PATH      0 STATEMENTS WITH DIFFERENT ACCESS
PATH      2 FOR PROGRAM TEST17
PCK204I QUERIES WITH MATCHING EXPLAIN        2 QUERIES WITHOUT MATCHING
EXPLAIN      0 FOR PROGRAM TEST17
PCK217I TOTAL DBRMS COMPARED                  1
PCK217I TOTAL STATEMENTS COMPARED            2
PCK217I TOTAL ACCESS PATH CHANGES           2
PCK217I TOTAL ACCESS PATH SAME              0
PCK217I TOTAL NEW SQL STATEMENTS            0
PCK217I TOTAL DELETED SQL STATEMENTS        0
PCK217I TOTAL DSN_STATEMNT COST INCR        0
COMPLETE RET CODE=      04
11          2005/06/08  SQL ID -          ACCESS PATH FOR TEST17          COLLID - TESTCOLLX
OLD PLAN_TABLE -

STATEMENT      327 THIS IS THE OLD ACCESS PATH.

STATEMENT#     327 DECLARE SELECT-1 CURSOR FOR SELECT A . NAME , A . TBNAME , A
          . COLNO , A . COLTYPE , A . LENGTH FROM SYSCOLUMNS A INNER
          JOIN SYSTABLES B ON A . TBNAME = B . NAME AND A . TBcreator
          = B . CREATOR WHERE A . TBNAME = : H AND A . TBcreator = : H

STEP           1  ACCESSES TABLE PUBLIC .SYSCOLUMNS          A
          USING INDEX PUBLIC .DSNDXC01          USING 2 COLUMN(S).
          THE INTENT LOCK FOR THE TABLE IS IS
          THE TIMESTAMP FOR THIS EXPLAIN IS 2005060810584355
          THE TABLE HAS          6,361 ROWS OF 969 BYTES.
          THE NON-UNIQUE INDEX HAS          6,361 ENTRIES IN 2 LEVELS WITH

CLUSTER RATIO 81
STEP           2  ACCESSES TABLE PUBLIC .SYSTABLES          B
          USING INDEX PUBLIC .DSNDTX01          USING 2 COLUMN(S).
          THE JOIN METHOD IS NESTED LOOP
          THE INTENT LOCK FOR THE TABLE IS IS
          THE TIMESTAMP FOR THIS EXPLAIN IS 2005060810584355

```

```

THE TABLE HAS          404 ROWS OF    542 BYTES.
THE NON-UNIQUE INDEX HAS          404 ENTRIES IN  2 LEVELS WITH
CLUSTER RATIO  72
DB2 ESTIMATES THIS QUERY WILL USE          1 MILLISECONDS OF CPU
TIME
DB2 ESTIMATES THIS QUERY WILL USE          2 SERVICE UNITS

STATEMENT          327 THIS IS THE NEW ACCESS PATH.

STATEMENT#        327 DECLARE SELECT-1 CURSOR FOR SELECT A . NAME , A . TBNAME , A
. COLNO , A . COLTYPE , A . LENGTH FROM SYSCOLUMNS A INNER
JOIN SYSTABLES B ON A . TBNAME = B . NAME AND A . TBCREATOR
= B . CREATOR WHERE A . TBNAME = : H AND A . TBCREATOR = : H

STEP              1  ACCESSES TABLE    PUBLIC17.SYSTABLES          B
USING INDEX PUBLIC17.DSNDTX01          USING  2 COLUMN(S).
THE INTENT LOCK FOR THE TABLE IS IS
THE TIMESTAMP FOR THIS EXPLAIN IS 2005060810591968
THE TABLE HAS          404 ROWS OF    542 BYTES.
THE NON-UNIQUE INDEX HAS          404 ENTRIES IN  2 LEVELS WITH
CLUSTER RATIO 100
STEP              2  ACCESSES TABLE    PUBLIC17.SYSCOLUMNS          A
USING INDEX PUBLIC17.DSNDX01          USING  2 COLUMN(S).
THE JOIN METHOD IS NESTED LOOP
THE INTENT LOCK FOR THE TABLE IS IS
THE TIMESTAMP FOR THIS EXPLAIN IS 2005060810591968
THE TABLE HAS          6,361 ROWS OF    969 BYTES.
THE NON-UNIQUE INDEX HAS          6,361 ENTRIES IN  2 LEVELS WITH
CLUSTER RATIO 100
DB2 ESTIMATES THIS QUERY WILL USE          2 MILLISECONDS OF CPU
TIME
DB2 ESTIMATES THIS QUERY WILL USE          5 SERVICE UNITS

STATEMENT          338 THIS IS THE OLD ACCESS PATH.

STATEMENT#        338 DECLARE SELECT-2 CURSOR FOR SELECT NAME , CREATOR , TYPE , D
BNAME , TSNAME FROM SYSTABLES WHERE CREATOR = : H

STEP              1  ACCESSES TABLE    PUBLIC .SYSTABLES
USING INDEX PUBLIC .DSNDTX01          USING  1 COLUMN(S).
11      2005/06/08  SQL ID -          ACCESS PATH FOR TEST17          COLLID - TESTCOLLX
OLD PLAN_TABLE -

THE ACCESS WILL USE LIST PREFETCH
THE INTENT LOCK FOR THE TABLE IS IS
THE TIMESTAMP FOR THIS EXPLAIN IS 2005060810584367
THE TABLE HAS          404 ROWS OF    542 BYTES.
THE NON-UNIQUE INDEX HAS          404 ENTRIES IN  2 LEVELS WITH
CLUSTER RATIO  72
DB2 ESTIMATES THIS QUERY WILL USE          2 MILLISECONDS OF CPU
TIME
DB2 ESTIMATES THIS QUERY WILL USE          4 SERVICE UNITS

STATEMENT          338 THIS IS THE NEW ACCESS PATH.

STATEMENT#        338 DECLARE SELECT-2 CURSOR FOR SELECT NAME , CREATOR , TYPE , D
BNAME , TSNAME FROM SYSTABLES WHERE CREATOR = : H

STEP              1  ACCESSES TABLE    PUBLIC17.SYSTABLES
USING INDEX PUBLIC17.DSNDTX01          USING  1 COLUMN(S).
THE INTENT LOCK FOR THE TABLE IS IS
THE TIMESTAMP FOR THIS EXPLAIN IS 2005060810591979
THE TABLE HAS          404 ROWS OF    542 BYTES.
THE NON-UNIQUE INDEX HAS          404 ENTRIES IN  2 LEVELS WITH
CLUSTER RATIO 100
DB2 ESTIMATES THIS QUERY WILL USE          2 MILLISECONDS OF CPU
TIME
DB2 ESTIMATES THIS QUERY WILL USE          4 SERVICE UNITS
PCK206I COMPARE COMPLETE FOR PROGRAM = TEST17  VERSION =    2005-05-16-19.22.09.929101
PREVIOUS VERSION =    2005-05-16-19.21.00.159957

```

```
PCK217I TOTAL DBRMS COMPARED 1
PCK217I TOTAL STATEMENTS COMPARED 2
PCK217I TOTAL ACCESS PATH CHANGES 2
PCK217I TOTAL ACCESS PATH SAME 0
PCK217I TOTAL NEW SQL STATEMENTS 0
PCK217I TOTAL DELETED SQL STATEMENTS 0
```

Version 7 Comparison

```
PCK031I EXECUTING LICENSED PATH CHECK V2R41
11 OPTIONS CATALOGSQL NOMATCHCREATOR REPORTCOSTGT
11 CONNECT TO DB7G
11 COMPARE PACKAGE TESTCOLLX.TEST17 IN PUBLIC.PLAN_TABLE
TO PREVIOUS
11 2005/06/08 SQL ID - ACCESS PATH FOR TEST17 COLLID - TESTCOLLX
OLD PLAN_TABLE -
IN QRYNO M CREATOR TNAME TBNO AC MC CREATOR ACCESSNAME IO
SORTUJGO LK PF QBNO PLNO MXSQ
PCK212I TIMESTAMP USED FOR PREVIOUS COMMAND = 2005060810314530 VERSION = 2005-05-16-
19.21.00.159957
```

```
1 327 0 PUBLIC SYSCOLUMNS 1 I 2 PUBLIC DSNDX01 N
NNNNNNNN IS 1 1
1 327 1 PUBLIC SYSTABLES 2 I 2 PUBLIC DSNDTX01 N
NNNNNNNN IS 1 2
2 327 0 PUBLIC17 SYSTABLES 2 I 2 PUBLIC17 DSNDTX01 N
NNNNNNNN IS 1 1
2 327 1 PUBLIC17 SYSCOLUMNS 1 I 2 PUBLIC17 DSNDX01 N
NNNNNNNN IS 1 2

1 338 0 PUBLIC SYSTABLES 1 I 1 PUBLIC DSNDTX01 N
NNNNNNNN IS L 1 1
PCK220I DATA CHANGE FOR COLUMN PREFETCH = WAS L
2 338 0 PUBLIC17 SYSTABLES 1 I 1 PUBLIC17 DSNDTX01 N
NNNNNNNN IS 1 1
PCK221I DATA CHANGE FOR COLUMN PREFETCH = IS NOW
PCK206I COMPARE COMPLETE FOR PROGRAM = TEST17 VERSION = 2005-05-16-19.22.09.929101
PREVIOUS VERSION = 2005-05-16-19.21.00.159957

PCK203I STATEMENTS WITH SAME ACCESS PATH 0 STATEMENTS WITH DIFFERENT ACCESS
PATH 2 FOR PROGRAM TEST17
PCK204I QUERIES WITH MATCHING EXPLAIN 2 QUERIES WITHOUT MATCHING
EXPLAIN 0 FOR PROGRAM TEST17
PCK217I TOTAL DBRMS COMPARED 1
PCK217I TOTAL STATEMENTS COMPARED 2
PCK217I TOTAL ACCESS PATH CHANGES 2
PCK217I TOTAL ACCESS PATH SAME 0
PCK217I TOTAL NEW SQL STATEMENTS 0
PCK217I TOTAL DELETED SQL STATEMENTS 0
PCK217I TOTAL DSN_STATEMNT COST INCR 0
COMPLETE RET CODE= 04
11 2005/06/08 SQL ID - ACCESS PATH FOR TEST17 COLLID - TESTCOLLX
OLD PLAN_TABLE -
```

```
STATEMENT 327 THIS IS THE OLD ACCESS PATH.

STATEMENT# 327 DECLARE SELECT-1 CURSOR FOR SELECT A . NAME , A . TBNAME , A
. COLNO , A . COLTYPE , A . LENGTH FROM SYSCOLUMNS A INNER
JOIN SYSTABLES B ON A . TBNAME = B . NAME AND A . TBcreator
= B . CREATOR WHERE A . TBNAME = : H AND A . TBcreator = : H

STEP 1 ACCESSES TABLE PUBLIC .SYSCOLUMNS A
USING INDEX PUBLIC .DSNDX01 USING 2 COLUMN(S).
THE INTENT LOCK FOR THE TABLE IS IS
THE TIMESTAMP FOR THIS EXPLAIN IS 2005060810314520
THIS OPERATION REFERENCES A TABLE
THE TABLE HAS 6,361 ROWS OF 969 BYTES.
THE NON-UNIQUE INDEX HAS 6,361 ENTRIES IN 2 LEVELS WITH
CLUSTER RATIO 81
STEP 2 ACCESSES TABLE PUBLIC .SYSTABLES B
```

```

        USING INDEX PUBLIC .DSNDTX01          USING  2 COLUMN(S).
        THE JOIN METHOD IS NESTED LOOP
        THE INTENT LOCK FOR THE TABLE IS IS
        THE TIMESTAMP FOR THIS EXPLAIN IS 2005060810314520
        THIS OPERATION REFERENCES A TABLE
        THE TABLE HAS          404 ROWS OF    542 BYTES.
        THE NON-UNIQUE INDEX HAS          404 ENTRIES IN  2 LEVELS WITH
CLUSTER RATIO  72
        DB2 ESTIMATES THIS QUERY WILL USE          1 MILLISECOND(S) OF CPU
TIME
        DB2 ESTIMATES THIS QUERY WILL USE          1 SERVICE UNITS

        STATEMENT      327 THIS IS THE NEW ACCESS PATH.

        STATEMENT#    327 DECLARE SELECT-1 CURSOR FOR SELECT A . NAME , A . TBNAME , A
        . COLNO , A . COLTYPE , A . LENGTH FROM SYSCOLUMNS A INNER
        JOIN SYSTABLES B ON A . TBNAME = B . NAME AND A . TBCREATOR
        = B . CREATOR WHERE A . TBNAME = : H AND A . TBCREATOR = : H

        STEP          1  ACCESSES TABLE PUBLIC17.SYSTABLES          B
        USING INDEX PUBLIC17.DSNDTX01          USING  2 COLUMN(S).
        THE INTENT LOCK FOR THE TABLE IS IS
        THE TIMESTAMP FOR THIS EXPLAIN IS 2005060810322009
        THIS OPERATION REFERENCES A TABLE
        THE TABLE HAS          404 ROWS OF    542 BYTES.
        THE NON-UNIQUE INDEX HAS          404 ENTRIES IN  2 LEVELS WITH
CLUSTER RATIO 100
        STEP          2  ACCESSES TABLE PUBLIC17.SYSCOLUMNS          A
        USING INDEX PUBLIC17.DSNDX01          USING  2 COLUMN(S).
        THE JOIN METHOD IS NESTED LOOP
        THE INTENT LOCK FOR THE TABLE IS IS
        THE TIMESTAMP FOR THIS EXPLAIN IS 2005060810322009
        THIS OPERATION REFERENCES A TABLE
        THE TABLE HAS          6,361 ROWS OF    969 BYTES.
        THE NON-UNIQUE INDEX HAS          6,361 ENTRIES IN  2 LEVELS WITH
CLUSTER RATIO 100
        DB2 ESTIMATES THIS QUERY WILL USE          2 MILLISECOND(S) OF CPU
TIME
        DB2 ESTIMATES THIS QUERY WILL USE          5 SERVICE UNITS

        STATEMENT      338 THIS IS THE OLD ACCESS PATH.

        STATEMENT#    338 DECLARE SELECT-2 CURSOR FOR SELECT NAME , CREATOR , TYPE , D
11      2005/06/08  SQL ID -          ACCESS PATH FOR TEST17          COLLID - TESTCOLLX
OLD PLAN_TABLE -

        BNAME , TSNAME FROM SYSTABLES WHERE CREATOR = : H

        STEP          1  ACCESSES TABLE PUBLIC .SYSTABLES
        USING INDEX PUBLIC .DSNDTX01          USING  1 COLUMN(S).
        THE ACCESS WILL USE LIST PREFETCH
        THE INTENT LOCK FOR THE TABLE IS IS
        THE TIMESTAMP FOR THIS EXPLAIN IS 2005060810314530
        THIS OPERATION REFERENCES A TABLE
        THE TABLE HAS          404 ROWS OF    542 BYTES.
        THE NON-UNIQUE INDEX HAS          404 ENTRIES IN  2 LEVELS WITH
CLUSTER RATIO  72
        DB2 ESTIMATES THIS QUERY WILL USE          2 MILLISECOND(S) OF CPU
TIME
        DB2 ESTIMATES THIS QUERY WILL USE          5 SERVICE UNITS

        STATEMENT      338 THIS IS THE NEW ACCESS PATH.

        STATEMENT#    338 DECLARE SELECT-2 CURSOR FOR SELECT NAME , CREATOR , TYPE , D
        BNAME , TSNAME FROM SYSTABLES WHERE CREATOR = : H

        STEP          1  ACCESSES TABLE PUBLIC17.SYSTABLES
        USING INDEX PUBLIC17.DSNDTX01          USING  1 COLUMN(S).
        THE INTENT LOCK FOR THE TABLE IS IS
        THE TIMESTAMP FOR THIS EXPLAIN IS 2005060810322016

```

```

THIS OPERATION REFERENCES A TABLE
THE TABLE HAS          404 ROWS OF    542 BYTES.
THE NON-UNIQUE INDEX HAS          404 ENTRIES IN  2 LEVELS WITH
CLUSTER RATIO 100
DB2 ESTIMATES THIS QUERY WILL USE          2 MILLISECONDS OF CPU
TIME
DB2 ESTIMATES THIS QUERY WILL USE          4 SERVICE UNITS
PCK206I COMPARE COMPLETE FOR PROGRAM = TEST17  VERSION =    2005-05-16-19.22.09.929101
PREVIOUS VERSION =    2005-05-16-19.21.00.159957
PCK217I TOTAL DBRMS COMPARED                1
PCK217I TOTAL STATEMENTS COMPARED          2
PCK217I TOTAL ACCESS PATH CHANGES         2
PCK217I TOTAL ACCESS PATH SAME            0
PCK217I TOTAL NEW SQL STATEMENTS          0
PCK217I TOTAL DELETED SQL STATEMENTS      0

```

Version 8 Comparison

```

1
PCK031I EXECUTING LICENSED PATH CHECK  V2R41
11          OPTIONS CATALOGSQL NOMATCHCREATOR REPORTCOSTGT
11          CONNECT TO DB8G
11          COMPARE  PACKAGE TESTCOLLX.TEST17 IN PUBLIC.PLAN_TABLE
          TO PREVIOUS
11          2005/06/08  SQL ID -          ACCESS PATH FOR TEST17          COLLID - TESTCOLLX
OLD PLAN_TABLE -
IN QRYNO M  CREATOR  TNAME          TBNO AC MC CREATOR  ACCESSNAME          IO
SORTUJGO LK PF QBNO PLNO MXSQ
PCK212I TIMESTAMP USED FOR PREVIOUS COMMAND = 2005060813370234  VERSION = 2005-05-16-
19.21.00.159957

1  327 0 PUBLIC  SYSCOLUMNS          1 I  2 PUBLIC  DSNDXC01          N
NNNNNNNNN IS  1  1
1  327 1 PUBLIC  SYSTABLES            2 I  2 PUBLIC  DSNDTX01          Y
NNNNNNNNN IS  1  2
2  327 0 PUBLIC17 SYSTABLES            2 I  2 PUBLIC17 DSNDTX01          Y
NNNNNNNNN IS  1  1
2  327 1 PUBLIC17 SYSCOLUMNS          1 I  2 PUBLIC17 DSNDXC01          N
NNNNNNNNN IS  1  2

1  338 0 PUBLIC  SYSTABLES            1 I  1 PUBLIC  DSNDTX01          N
NNNNNNNNN IS L  1  1
PCK220I DATA CHANGE FOR COLUMN PREFETCH = WAS L
2  338 0 PUBLIC17 SYSTABLES            1 I  1 PUBLIC17 DSNDTX01          N
NNNNNNNNN IS  1  1
PCK221I DATA CHANGE FOR COLUMN PREFETCH = IS NOW
PCK206I COMPARE COMPLETE FOR PROGRAM = TEST17  VERSION =    2005-05-16-19.22.09.929101
PREVIOUS VERSION =    2005-05-16-19.21.00.159957
PCK203I STATEMENTS WITH SAME ACCESS PATH    0 STATEMENTS WITH DIFFERENT ACCESS
PATH  2 FOR PROGRAM TEST17
PCK204I  QUERIES WITH MATCHING EXPLAIN      2 QUERIES WITHOUT MATCHING
EXPLAIN  0 FOR PROGRAM TEST17
PCK217I TOTAL DBRMS COMPARED                1
PCK217I TOTAL STATEMENTS COMPARED          2
PCK217I TOTAL ACCESS PATH CHANGES         2
PCK217I TOTAL ACCESS PATH SAME            0
PCK217I TOTAL NEW SQL STATEMENTS          0
PCK217I TOTAL DELETED SQL STATEMENTS      0
PCK217I TOTAL DSN_STATEMNT COST INCR      0
COMPLETE RET CODE= 04
11          2005/06/08  SQL ID -          ACCESS PATH FOR TEST17          COLLID - TESTCOLLX
OLD PLAN_TABLE -

STATEMENT  327 THIS IS THE OLD ACCESS PATH.

STATEMENT# 327 DECLARE SELECT-1 CURSOR FOR SELECT A . NAME , A . TBNAME , A
. COLNO , A . COLTYPE , A . LENGTH FROM SYSCOLUMNS A INNER
JOIN SYSTABLES B ON A . TBNAME = B . NAME AND A . TBcreator
= B . CREATOR WHERE A . TBNAME = : H AND A . TBcreator = : H

```

```

STEP          1  ACCESSES TABLE      PUBLIC .SYSCOLUMNS      A
                USING INDEX PUBLIC .DSNDCX01      USING  2 COLUMN(S).
                THE INTENT LOCK FOR THE TABLE IS IS
                THE TIMESTAMP FOR THIS EXPLAIN IS 2005060813370217
                THIS OPERATION REFERENCES A TABLE
                THE TABLE HAS          6,361 ROWS OF    969 BYTES.
                THE NON-UNIQUE INDEX HAS          6,361 ENTRIES IN  2 LEVELS WITH
CLUSTER RATIO 81
STEP          2  ACCESSES TABLE      PUBLIC .SYSTABLES      B
                USING INDEX PUBLIC .DSNDTX01      USING  2 COLUMN(S).
                THE JOIN METHOD IS NESTED LOOP
                THE ACCESS ONLY READS THE INDEX NOT THE TABLE
                THE INTENT LOCK FOR THE TABLE IS IS
                THE TIMESTAMP FOR THIS EXPLAIN IS 2005060813370217
                THIS OPERATION REFERENCES A TABLE
                THE TABLE HAS          404 ROWS OF    542 BYTES.
                THE NON-UNIQUE INDEX HAS          404 ENTRIES IN  2 LEVELS WITH
CLUSTER RATIO 72
TIME
                DB2 ESTIMATES THIS QUERY WILL USE          1 MILLISECONDS OF CPU
                DB2 ESTIMATES THIS QUERY WILL USE          2 SERVICE UNITS
STATEMENT      327 THIS IS THE NEW ACCESS PATH.
STATEMENT#     327 DECLARE SELECT-1 CURSOR FOR SELECT A . NAME , A . TBNAME , A
                . COLNO , A . COLTYPE , A . LENGTH FROM SYSCOLUMNS A INNER
                JOIN SYSTABLES B ON A . TBNAME = B . NAME AND A . TBCREATOR
                = B . CREATOR WHERE A . TBNAME = : H AND A . TBCREATOR = : H

STEP          1  ACCESSES TABLE      PUBLIC17.SYSTABLES      B
                USING INDEX PUBLIC17.DSNDTX01      USING  2 COLUMN(S).
                THE ACCESS ONLY READS THE INDEX NOT THE TABLE
                THE INTENT LOCK FOR THE TABLE IS IS
                THE TIMESTAMP FOR THIS EXPLAIN IS 2005060813373284
                THIS OPERATION REFERENCES A TABLE
                THE TABLE HAS          404 ROWS OF    542 BYTES.
                THE NON-UNIQUE INDEX HAS          404 ENTRIES IN  2 LEVELS WITH
CLUSTER RATIO 100
STEP          2  ACCESSES TABLE      PUBLIC17.SYSCOLUMNS      A
                USING INDEX PUBLIC17.DSNDCX01      USING  2 COLUMN(S).
                THE JOIN METHOD IS NESTED LOOP
                THE INTENT LOCK FOR THE TABLE IS IS
                THE TIMESTAMP FOR THIS EXPLAIN IS 2005060813373284
                THIS OPERATION REFERENCES A TABLE
                THE TABLE HAS          6,361 ROWS OF    969 BYTES.
                THE NON-UNIQUE INDEX HAS          6,361 ENTRIES IN  2 LEVELS WITH
CLUSTER RATIO 100
TIME
                DB2 ESTIMATES THIS QUERY WILL USE          2 MILLISECONDS OF CPU
                DB2 ESTIMATES THIS QUERY WILL USE          6 SERVICE UNITS
STATEMENT      338 THIS IS THE OLD ACCESS PATH.
11 2005/06/08 SQL ID -          ACCESS PATH FOR TEST17      COLLID - TESTCOLLX
OLD PLAN_TABLE -

STATEMENT#     338 DECLARE SELECT-2 CURSOR FOR SELECT NAME , CREATOR , TYPE , D
                BNAME , TSNAME FROM SYSTABLES WHERE CREATOR = : H

STEP          1  ACCESSES TABLE      PUBLIC .SYSTABLES
                USING INDEX PUBLIC .DSNDTX01      USING  1 COLUMN(S).
                THE ACCESS WILL USE LIST PREFETCH
                THE INTENT LOCK FOR THE TABLE IS IS
                THE TIMESTAMP FOR THIS EXPLAIN IS 2005060813370234
                THIS OPERATION REFERENCES A TABLE
                THE TABLE HAS          404 ROWS OF    542 BYTES.
                THE NON-UNIQUE INDEX HAS          404 ENTRIES IN  2 LEVELS WITH
CLUSTER RATIO 72

```

```

TIME          DB2 ESTIMATES THIS QUERY WILL USE          2 MILLISECONDS OF CPU
STATEMENT#    338 THIS IS THE NEW ACCESS PATH.
STATEMENT#    338 DECLARE SELECT-2 CURSOR FOR SELECT NAME , CREATOR , TYPE , D
              BNAME , TSNAME FROM SYSTABLES WHERE CREATOR = : H
STEP          1  ACCESSES TABLE PUBLIC17.SYSTABLES
              USING INDEX PUBLIC17.DSNDTX01          USING 1 COLUMN(S).
              THE INTENT LOCK FOR THE TABLE IS IS
              THE TIMESTAMP FOR THIS EXPLAIN IS 2005060813373302
              THIS OPERATION REFERENCES A TABLE
              THE TABLE HAS          404 ROWS OF      542 BYTES.
              THE NON-UNIQUE INDEX HAS          404 ENTRIES IN 2 LEVELS WITH
CLUSTER RATIO 100
TIME          DB2 ESTIMATES THIS QUERY WILL USE          2 MILLISECONDS OF CPU
              DB2 ESTIMATES THIS QUERY WILL USE          4 SERVICE UNITS
PCK206I COMPARE COMPLETE FOR PROGRAM = TEST17  VERSION = 2005-05-16-19.22.09.929101
              PREVIOUS VERSION = 2005-05-16-19.21.00.159957
PCK217I TOTAL DBRMS COMPARED                  1
PCK217I TOTAL STATEMENTS COMPARED            2
PCK217I TOTAL ACCESS PATH CHANGES           2
PCK217I TOTAL ACCESS PATH SAME              0
PCK217I TOTAL NEW SQL STATEMENTS            0
PCK217I TOTAL DELETED SQL STATEMENTS        0
    
```

Analysis of the Comparisons between Versions of DB2

	V6	V7	V8
Before MSUs	2	2	2
After MSUs	4	4	4
Access Type Change	Switch Inner / Outer	Switch Inner / Outer	Switch Inner / Outer

Switching Inner / Outer tables in a JOIN is a consistent issue both in terms of the effect and for the method to be used. V8 provides better distribution statistics. While the estimated cost may increase, so does the accuracy of the estimate to the actual runtime.

V8 will benefit most strongly from distribution statistics

Migration Strategies

Migration to V8 or to any new Version of DB2 poses some problems. Many systems have long lineages regarding previous Versions of DB2. We have seen subsystems in production that have migrated from V2 all the way through V8. The older the system the more likely it is to have Plans and Packages that have not been rebound recently.

To get greatest possible performance advantage from V8 a rebound in Compatibility Mode is suggested, then another after moving to New Function. At a minimum everything should be rebound when transition to New Function is complete. To avoid surprises it is suggested that an installation rebound in V7 before migrating to V8 Compatibility Mode.

The reasons for rebounding in V7 are: 1.) To insure that a rebound can occur. Because a plan or package will execute does not mean that it will rebound. If these exist then they should be isolated and fixed. 2.) If rebounding V7 causes an access path change then rebounding in V8 will most likely do the same. Again, isolating and resolving issues before they become problems is the best strategy. 3.) Rebinding older plans or packages insures that the best internal representation of these objects is taken forward into V8.

One of the SPUFIs below is designed to identify each Plan or Package for which there is no EXPLAIN. The SPUFI will identify each occurrence for which there is no EXPLAIN and it will generate the control cards for Path Checker to create the EXPLAIN information in the Plan Table. It is critical to bear in mind that the EXPLAIN generated is what would occur if the object was rebound *today* in your subsystem. It will not, necessarily, match the actual access path that the object is using, but there is no method to retrieve this information from the current DB2 Subsystem.

Another of the SPUFIs below will identify those objects which have not been rebound with explain past a specified date. This SPUFI will generate a TEST command that will use the catalog SQL to simulate the bind. This allows you to find SQL which had errors because of release compatibilities and to correct these issues before a migration.

The key steps in the process are to:

- 1.) Use the designed SPUFI to identify those objects that do not have an EXPLAIN and resolve this before the migration.
- 2.) Use the designed SPUFI to identify those objects that have not been recently bound and to do a TEST from the catalog SQL to determine that a rebound will not have release level issues.
- 3.) Use the designed SPUFI to do a complete TEST from the system catalog that will tell you which objects will have different access paths or different costs.
- 4.) Using the information from above, rebound the objects in V7 that have no change. Correct the ones with an issue and rebound them.

(Why rebound those with no change? DB2 stores access path information within the Skeleton Cursor tables, one for Plans and one for Packages. This information is only refreshed when a bind or rebound occurs. If the bind took place in an older version of

DB2 then the information is stored in the structure that version used. By rebinding you “level set” everything current to the V7 structures and may realize improvement from that alone.)

- 5.) We now have a V7 system that is as current as possible from the viewpoint of its access path information. We have choices to make in the V8 migration. We are either going to migrate the present system forward to V8 in Compatibility Mode or we are going to test in another system. Let’s examine the other system approach first.
- 6.) We need another system in V8 Compatibility Mode that matches the production system in its statistics, in its buffer pool configuration and in the size and number of CPUs. Given this, we migrate the DB2 Explain Table from V7 to the new V8 subsystem. (The table may be in V7 or V8 format. We suggest V8 to gain the additional information.) We insure that the V7 DBRM library is available to the V8 subsystem.
- 7.) We use the designated SPUFI to generate TEST from DBRM and to check against the migrated PLAN_TABLE. This will tell you which objects have different access paths and / or costs from the V7 system.
- 8.) We identify and exclude those that are improvements.
- 9.) We identify and resolve those that are not improvements.
- 10.) We are now ready to migrate to V8 Compatibility mode. We migrate and run the designated SPUFI to do a TEST from the CATALOG and match against the V7 Plan Table.
- 11.) We exclude the positive changes and resolve the non-positive changes, which should be much fewer because of what we did above.
- 12.) We then rebind.
- 12.) As we move each program into New Function we either do a TEST command to determine what will happen or a COMPARE to determine what has happened. When we have completed the migration to new function we run the designed SPUFI to determine if anything has not been rebound. If we find anything then we resolve this and we are finished.
- 13.) If we are migrating directly, we can proceed after the complete V7 rebinds are done.
- 14.) We run the designated SPUFI to generate TEST from catalog commands for each object. We run these tests.
- 15.) We identify those objects for which there are no changes or for which the change are positive. We rebind those so identified to bring them forward to V8 structures in the Skeleton Cursor Tables.
- 16.) We take those with issues and either do MAKE commands to reset them to the old Access Paths or we resolve the issues and repeat the tests until we are satisfied.
- 17.) We then rebind those objects for which we have resolved issues.
- 18.) We run the designated SPUFI to determine that nothing has been missed. If something has we resolve it.
- 19.) We use TEST or COMPARE as in the step above to insure migration to New Function.

20.) When New Function migration is complete we run the designated SPUI to ensure nothing that has been missed.

11.) Conclusions and Suggestions

We have seen data centers that have migrated from V5 to V6 just in time. They now have to leave V6 to go to V7. Eventually, there will be another migration to V8. Each of these migrations presents both opportunities and issues.

What this study has shown is that V8 will normally select an improved access path if one is available. It has also shown that you can not always guess what access path will be chosen. It is clear that you will need to rebind.

All plans and packages should be rebound in V7 with EXPLAIN. This will identify any SQL issues before the V8 migration. The access paths selected should be checked against the previous Access Path to validate the performance. With this accomplished you will have a performance reference point (a baseline.)

When in V8 Compatibility Mode you will need to bind once more to gain optimal performance from V8. At this point and during the migration to Full Function there is additional overhead which disappears once the migration is complete. You need to verify the access path choices against the baseline you created as the V7 reference point. As you move to New Function mode you will need to rebind once more. You can rebind program when it moves, or you can again do an en mass rebind. Check once more against the Compatibility Mode access path choices.

It is unfortunate that more people are not congratulated for the fine DB2 performance that they deliver. But the truth is that a performance problem is noted more than the generally excellent performance that is provided. The techniques we have explored here should assist in identifying problems before they occur.

We want to encourage both comments and suggestions. While the people listed on the title page have been invaluable, I want to make it clear that any errors are mine. If you go to our website you should be able to download everything you will need to recreate these scenarios.

Thank you, and we look forward to your comments.

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Appendixes

DSNZPARM Notes

The DSNZPARMS represent an interface between the system DBAs and the SYSPROG that is often not exploited. Both Visual Explain and HLS Describe offer a presentation of the DSNZPARM settings on a subsystem. They both use the DSNWZP stored procedure. HLS Describe is written in JAVA and the source code is downloadable from our website as part of the download of the program. HLS Describe has an additional feature in that you can save the output and use the program to compare the saved DSNZPARMS with the DSNZPARMS from a different system.

What follows are some but not all of the entries that may be of interest.

MAX_OPT_CPU & MAX_OPT_ELAP

These values are identified as serviceability controls. They represent the maximum amount of CPU time and the maximum amount of elapsed time the Optimizer can use. If either value is exceeded then the list of SQL access paths may not contain the access path you desire.

A symptom of this is where Dynamic SQL gets different access paths with the same SQL.

SPRMINLP

Again, this is serviceability. It is the IN list predicate pushdown degree.

SPRMMXC

Serviceability. This is the max cost entries for a query block.

SPRMTJTH

This is the join threshold for Optimization Limits.

SPRMOJEH

Outer Join performance enhancement.

SPRMXPL

This is to generate all the explain tables. The additional tables are not present in V8. If defined they will not be populated. This bit flag will generate the explain data to these additional tables in V6 and V7.

Be careful as this is unsupported and can cause an error during Bind with EXPLAIN(ALL). Do not turn this on in V8 without discussion with your IBM support as it may effect the data that is written to the existing plan tables.

Access Path Preferences

Direct Row access using ROWID

PRIMARY_ACCESSTYPE = D

To use this you must have coded a ROWID column in the table. This will affect SELECTs, DELETEs, and UPDATEs. Examples are in the Administration Guide.

One FETCH Index Scan using MIN, MAX

ACCESSTYPE=I1

This is a single access to an index and retrieves only one row. By definition this is as fast as DB2 can retrieve data. Setting up tests using this will give you a measurement for the best possible speed that you can achieve. No other access type can not be faster.

This access type is possible where:

- 1.) The query includes one table.
- 2.) The query includes only one aggregate function (either MAX or MIN)
- 3.) All predicates match the predicates for the index.
- 4.) The query includes no GROUPBY.

Examples are in the Administrative Guide.

Unique Matching Index Scan using a predicate value

MATCHCOLS>0

When MATCHCOLS>0 you have matched predicates on either the leading key columns in an index or for all of the columns in the index. These will be used to filter the index so that only specific index pages and the matching data pages are provided. This is very efficient where the filtering is high and the smallest number of index pages are returned. Examples are in the Administrative Guide.

Match Index Scan Only

INDEXONLY=Y

The Optimizer has identified that all of the requested columns are in the index. Examples are in the Administrative Guide

Non-Matching Index Scan Only

ACCESSTYPE=I, MATCHCOLS=0

When this is chosen there are no matching columns in the index and all index keys must be read. This access type provides little if any filtering, but it can be efficient in certain conditions.

Examples are in the Administrative Guide

Matching Index Cluster Scan

This is a matching index scan run against a clustered index.

Multiple Matching Index Scan using AND and OR

ACCESSTYPE= M, MX, MI OR MU

The Optimizer has determined it needs to use multiple indexes to retrieve data from a table. This is dependent on RID list functions. If you get poor performance with this access path consistently or just sometimes, the check for RID list Logical failures. Examples are in the Administrative Guide

Non-Matching Cluster Index Scan

This is a non-matching index scan against a clustered index.

Segmented Table Space Scan

ACCESSTYPE=R, PREFETCH=S

There are no indexes that will filter the data on this table. The table being read is a segmented table. A segmented scan first determines which segments in the table contain data that needs to be read. It then reads only those segments. See the Administrative Guide for tuning suggestions.

Non-Segmented Table Space Scan (in parallel or sequential)

ACCESSTYPE=R, PREFETCH=S

There are no indexes that will filter the data on this table. The table is not segmented, but may be partitioned. DB2 will read every page in the table space. This includes pages that may belong to other tables and pages that have been freed but not yet reclaimed.

Hidden Tables (sic)

For several releases DB2 has had what has been referred to as the ***Hidden Tables***. These are a series of tables that increase in number with each release of DB2. They contained diagnostic information that could be used to assist in defining Optimizer issues. They have never been documented formally nor has IBM stated that they support the information in the tables. These tables are no longer in the same place in V8.

V8 suggests you use the opaque tables that are available from Visual Explain. These tables are discussed in the section below.

To use the hidden tables you have to be on a version of DB2 that supports them. You have to define them to the subsystem. The DDL is not publicly available. You need to turn on the bit flag in the DSNZSPRM control block. You need to set up the Bind command with EXPLAIN(ALL). If you can do these things then you will have the hidden tables populated when you do an EXPLAIN.

An additional issue relates to what information is externalized. The data may be for the entry in the SQL list that is just before or just after the entry in the Plan Table. Or, it may match the entry in the PLAN_TABLE. You need to match timestamps for the entries to determine what corresponds to what. This, obviously this is not very dependable. And, users have made mistakes believing the data match the access path chosen when it does not.

The tables in their last appearance were:

COST_TABLE
REFERENCE_TABLE
PREDICATE_TABLE
STRUCTURE_TABLE
PGROUP_TABLE
ESTIMATES_TABLE
TABSTATS_TABLE
COLSTATS_TABLE

If you really insist on researching this and you can read control blocks then you can find the information that you need to build these tables. Given where DB2 is going your time would be much better spent working with the tables and the information in the Visual Explain Tables for V8.

Visual Explain Tables

Visual Explain V8 from IBM uses tables that we refer to as opaque. This means that the DDL is available, but the columns and their meaning is not available as it is for the standard DB2 PLAN_TABLE, etc. The Hidden Tables no longer exist with V8. Visual Explain for V8 from IBM provides the information formally contained in these tables along with other tools that give the diagnostic information needed.

We strongly suggest that Visual Explain V8 be installed and made available to at least the senior DBA staff. Do not define the additional tables to the standard production EXPLAIN process until you are familiar with the data impact on your EXPLAIN process.

DESCOST_TABLE
PREDICAT_TABLE
STRUCT_TABLE
FILTER_TABLE
SORT_TABLE
SORTKEY_TABLE
PGROUP_TABLE
PTASK_TABLE
PRANGE_TABLE

Version to Version Comparison Tables

Case 1: Where Clause change

	V6	V7	V8
Before MSUs	61	61	16
After MSUs	1	1	1
Access Type Change	Multiple Columns 2	Multiple Columns 2	Multiple Columns 2

Case 2: Change SELECT to JOIN

	V6	V7	V8
Before MSUs	61	61	16
After MSUs	5	5	2
Access Type Change	From Nested Loop Join to Sequential Prefetch	From Nested Loop Join to Sequential Prefetch	From Nested Loop Join Sequential Prefetch

Case 3: Change JOIN Criteria

	V6	V7	V8
Before MSUs	2	1	2
After MSUs	5	5	2
Access Type Change	MC=0	MC=0	MC=0

Case 4: Change Data List

	V6	V7	V8
Before MSUs			2
After MSUs			2
Access Type Change	No Change as the function is not supported	No change	Change from Index only to data

Case 5: Change JOIN to SUBSLELECT

	V6	V7	V8
Before MSUs	2		
After MSUs	1		
Access Type Change	Change to Index Only	No Change	No Change

Case 6: Statistics Change (no runstats)

	V6	V7	V8
Before MSUs	4	5	4
After MSUs	137	138	245
Access Type Change	Nested loop Join to merge scan + List Prefetch	Merge Scan + List Prefetch	Merge Scan + List Prefetch

Case 7: Tables are emptied**Analysis of the Comparisons between Versions of DB2 – Cursor 1**

	V6	V7	V8
Before MSUs	2	1	2
After MSUs	1	1	1
Access Type Change	Change Join Sequence	Change Join Sequence	Change Join Sequence

Analysis of the Comparisons between Versions of DB2 – Cursor 2

	V6	V7	V8
Before MSUs	4	5	4
After MSUs	1	1	1
Access Type Change	List Prefetch	List Prefetch	List Prefetch

Case 8: Case 8: Cluster Ratio Change

	V6	V7	V8
Before MSUs	2	No Change	2
After MSUs	2	No Change	2
Access Type Change	Change Join Sequence		Change Join Sequence

Case 9: Change Host Variable to not match the table**Analysis of the Comparisons between Versions of DB2 – Cursor 1**

	V6	V7	V8
Before MSUs	2	1	2
After MSUs	23	5	1
Access Type Change	Change in Join Sequence	Change in Join Sequence	Change in Join Sequence

Case 10: Create new Index and expect switch in Index used**Analysis of the Comparisons between Versions of DB2**

	V6	V7	V8
Before MSUs	2	1	2
After MSUs	23	5	1
Access Type Change			

Analysis of the Comparisons between Versions of DB2 cursor-2

	V6	V7	V8
Before MSUs			4
After MSUs			4
Access Type Change			List Prefetch

Case 11: Drop a Column from the Index

	V6	V7	V8
Before MSUs	2	1	2
After MSUs	21	21	18
Access Type Change			

Case 12: Drop the index on SYSCOLUMNS – expect tablespace scan

	V6	V7	V8
Before MSUs	2	1	2
After MSUs	3	3	2
Access Type Change	Match Columns 1	Match Columns 1	Match Columns 1

Case 13: Change Column Sequence in the Index

	V6	V7	V8
Before MSUs			
After MSUs			
Access Type Change			

Case 14: Select MIN / MAX on an Index

	V6	V7	V8

MIN() MSUs	45	1	1
MAX() MSUs	45	1	1
Access Type Change	Index scan for max	I1 for both	I1 for both

Case 15: Scrolling Cursor

	V6	V7	V8
Reposition 2 table	2	2	2
Reposition 1 table	34	34	32
Access Type Change	Or clause causes problem	Or clause causes problem	Or clause causes problem

Case 16: Reorg and Cluster Ratio to 100

	V6	V7	V8
Before MSUs	4	5	4
After MSUs	4	4	4
Access Type Change	No List Prefetch	No List Prefetch	No List Prefetch

Case 17: Distribution Statistics

	V6	V7	V8
Before MSUs	2	2	2
After MSUs	4	4	4
Access Type Change	Switch Inner / Outer	Switch Inner / Outer	Switch Inner / Outer

How to Read the Detail Reports

Various reports are placed together in the presented output as breakout would only add to the size of this document. However, some explanation is required. If you use SDSF then you should be able to separate these out by using '?' to display the outputs by their DDNAME.

SYSPRINT presents the command data and information from the PLAN_TABLE without formatting. Some people feel more secure if they can check the uninterrupted data, so we present it.

```
PCK031I EXECUTING LICENSED PATH CHECKER V2R2
      OPTIONS CATALOGSQL NOMATCHCREATOR REPORTCOSTGT
      CONNECT TO DB8G
      REPORT ON PACKAGE TESTCOLLX.TEST15 IN PUBLIC.PLAN_TABLE
```

The above information states the options used. The DB2 that the program connects to and the actual command

```
QRYNO M  CREATOR  TNAME                TBNO AC MC CREATOR  ACCESSNAME
   327 0 PUBLIC   SYSTABLES                2 I  2 PUBLIC  DSNDTX01
   327 1 PUBLIC   SYSCOLUMNS            1 I  2 PUBLIC  DSNDCX01
```

```
IO SORTUJGO LK PF QBNO PLNO MXSQ
N NNNNNNNN  IS      1  1
N NNNNNNNN  IS      1  2

N NNNNNNNN  IS S    1  1
```

The above is a hard copy of the actual columns as they occur in the PLAN_TABLE.

```
STATEMENT
327 DECLARE SELECT-1 CURSOR FOR SELECT A . NAME , A . TBNAME , A
      . COLNO , A . COLTYPE , A . LENGTH FROM SYSCOLUMNS A INNER
      JOIN SYSTABLES B ON A . TBNAME = B . NAME AND A . TBCREATOR
      = B . CREATOR WHERE A . TBNAME >= : H AND A . TBCREATOR = :
      H
```

A copy if the statement is presented.

```
327 FROM REPORT.
1  ACCESSES TABLE      PUBLIC  .SYSTABLES          B
   USING INDEX PUBLIC  .DSNDTX01          USING  2 COLUMN(S).
   THE INTENT LOCK FOR THE TABLE IS IS
   THE TIMESTAMP FOR THIS EXPLAIN IS 2005041314094757
   THE TABLE HAS              404 ROWS OF      542 BYTES.
   THE NON-UNIQUE INDEX HAS              404 ENTRIES IN  2 LEVELS WITH CLUSTER
2  ACCESSES TABLE      PUBLIC  .SYSCOLUMNS        A
   USING INDEX PUBLIC  .DSNDCX01          USING  2 COLUMN(S).
   THE JOIN METHOD IS NESTED LOOP
   THE INTENT LOCK FOR THE TABLE IS IS
   THE TIMESTAMP FOR THIS EXPLAIN IS 2005041314094757
   THE TABLE HAS              6,361 ROWS OF    969 BYTES.
   THE NON-UNIQUE INDEX HAS              6,361 ENTRIES IN  2 LEVELS WITH CLUSTER
   DB2 ESTIMATES THIS QUERY WILL USE              1 MILLISECONDS OF CPU TIME
   DB2 ESTIMATES THIS QUERY WILL USE              2 SERVICE UNITS
   DB2 WAS FORCED TO USE ESTIMATES BECAUSE OF
   HOST VARIABLES
```

The basic interpretation of the access path from the data shown in the Sysprint is given along with the statistics. If the STATEMENT_TABLE is present then the cost information is shown.

```
PCK218I PROGRAM TEST13      HAS A CHANGED ACCESS PATH
QUERYNO                      338
COLLECTION                    TESTCOLLX
NEW VERSION                   2004-02-26-16.21.48.536309
OLD VERSION                   2004-02-25-23.11.27.728615
```

The DDNAME SYSCHNG will produce an entry for each change found. Examining this is a short cut to finding changes.

```
*****
*****
PCK217I TOTAL DBRMS COMPARED           1
PCK217I TOTAL STATEMENTS COMPARED     2
PCK217I TOTAL ACCESS PATH CHANGES    2
PCK217I TOTAL ACCESS PATH SAME        0
PCK217I TOTAL NEW SQL STATEMENTS      0
PCK217I TOTAL DELETED SQL STATEMENTS  0
```

There is a summary at the end of each report that will tell you how many objects were compared, how many statements were compared, and of these how many were different, new, or deleted.

Defined SPUFIs of Interest

GENCMP01 – Generate compare commands for Plans

```
--
-- SAMPLE SPUFI COMMAND TO GENERATE COMPARE REQUEST FOR PACKAGES
-- CURRENT BIND EXPLAIN(YES) DATA AVAILABLE.
--
-- THE GENERATED COMPARE PACKAGE SPECIFIES BOTH THE CURRENT
-- PLAN_TABLE (P390H.PLAN_TABLE) AND THE OLD ACCESS PATH INFO IN
-- P390H.PLAN_TABLEOLD
--
-- THIS COULD ALSO BE ACCOMPLISHED BY A SINGLE COMPARE COMMAND
--
-- COMPARE PACKAGE TESTCOLL.* IN P390H.PLAN_TABLE TO
-- TESTCOLL.* IN P390H.PLAN_TABLEOLD
--
-- THE WILD CARDING FOR THE PACKAGE NAME FOLLOWS TSO WILD
CARDING
-- RULES * = ONE TO MANY CHARACTERS AND % = A SINGLE CHARACTER
--
-- THE COLLECTION NAME CAN NOT BE WILD CARDED
--

SELECT DISTINCT
  'COMPARE PACKAGE ' CONCAT RTRIM(COLLID)
  CONCAT '.' CONCAT NAME
  CONCAT ' IN P390H.PLAN_TABLE '
  CONCAT ' TO ' CONCAT RTRIM(COLLID)
  CONCAT '.* IN P390H.PLAN_TABLEOLD '
  FROM SYSIBM.SYSPACKAGE A
  WHERE CREATOR = 'P390H'
;
```

Example Output

```
COMPARE PACKAGE ADBL.ADB27AC IN P390H.PLAN_TABLE TO ADBL.* IN
P390H.PLAN_TABLEOLD
COMPARE PACKAGE ADBL.ADB2CON IN P390H.PLAN_TABLE TO ADBL.* IN
P390H.PLAN_TABLEOLD
COMPARE PACKAGE ADBL.ADB2GET IN P390H.PLAN_TABLE TO ADBL.* IN
P390H.PLAN_TABLEOLD
COMPARE PACKAGE ADBL.ADB2PRP IN P390H.PLAN_TABLE TO ADBL.* IN
P390H.PLAN_TABLEOLD
COMPARE PACKAGE ADBL.ADB2REE IN P390H.PLAN_TABLE TO ADBL.* IN
P390H.PLAN_TABLEOLD
COMPARE PACKAGE ADBL.ADB2RIP IN P390H.PLAN_TABLE TO ADBL.* IN
P390H.PLAN_TABLEOLD
COMPARE PACKAGE ADBL.ADB2WCL IN P390H.PLAN_TABLE TO ADBL.* IN
P390H.PLAN_TABLEOLD
COMPARE PACKAGE ADBL.ADB2ZP IN P390H.PLAN_TABLE TO ADBL.* IN
P390H.PLAN_TABLEOLD
```

GENCMP02 – Generate compare commands for Packages

```
--
-- SAMPLE SPUFI COMMAND TO GENERATE COMPARE REQUEST FOR PACKAGES
-- CURRENT BIND EXPLAIN(YES) DATA AVAILABLE.
--
-- THE GENERATED COMPARE PACKAGE SPECIFIES THE ACCESS DATA IS IN
-- PLAN_TABLE (P390H.PLAN_TABLE) AND THE OLD ACCESS PATH INFO IS
-- SIMPLY THE -1 PREVIOUS BIND DATA IN THE SAME PLAN_TABLE
-- THIS COULD ALSO BE ACCOMPLISHED BY A SINGLE COMPARE COMMAND
--
-- COMPARE PACKAGE TESTCOLL.* IN P390H.PLAN_TABLE TO PREVIOUS
--
-- THE WILD CARDING FOR THE PACKAGE NAME FOLLOWS TSO WILD
CARDING
-- RULES * = ONE TO MANY CHARACTERS AND % = A SINGLE CHARACTER
-- THE COLLECTION NAME CAN NOT BE WILD CARDED
--
--
SELECT DISTINCT
'COMPARE PACKAGE ' CONCAT RTRIM(COLLID)
CONCAT '.' CONCAT NAME
CONCAT ' IN P390H.PLAN_TABLE '
CONCAT ' TO PREVIOUS '
FROM SYSIBM.SYSPACKAGE A
WHERE CREATOR = 'P390H'
;
```

Example Output:

```
COMPARE PACKAGE ADBL.ADB27AC IN P390H.PLAN_TABLE TO PREVIOUS
COMPARE PACKAGE ADBL.ADB2CON IN P390H.PLAN_TABLE TO PREVIOUS
COMPARE PACKAGE ADBL.ADB2GET IN P390H.PLAN_TABLE TO PREVIOUS
COMPARE PACKAGE ADBL.ADB2PRP IN P390H.PLAN_TABLE TO PREVIOUS
COMPARE PACKAGE ADBL.ADB2REE IN P390H.PLAN_TABLE TO PREVIOUS
COMPARE PACKAGE ADBL.ADB2RIP IN P390H.PLAN_TABLE TO PREVIOUS
COMPARE PACKAGE ADBL.ADB2WCL IN P390H.PLAN_TABLE TO PREVIOUS
```

GENCMD03 – Generate commands for compare before a given date

```
-- SAMPLE SPUFI COMMAND TO GENERATE COMPARE REQUEST FOR PACKAGES
-- WITH CURRENT BIND EXPLAIN(YES) DATA AVAILABLE.
--
-- THE GENERATED COMPARE PACKAGE SPECIFIES BOTH THE CURRENT
-- PLAN_TABLE (P390H.PLAN_TABLE) AND THE OLD ACCESS PATH INFO IN
-- THE SAME PLAN TABLE BUT EXPLAIN TIME BEFORE THE SPECIFIED
-- DATE.
-- THIS COULD ALSO BE ACCOMPLISHED BY A SINGLE COMPARE COMMAND
--
-- COMPARE PACKAGE TESTCOLL.* IN P390H.PLAN_TABLE TO
-- TESTCOLL.* BEFORE '20041201000000'
--
-- THE BEFORE PARM USES THE FORMAT OF THE COLUMN TIMESTAMP IN
-- PLAN_TABLE WHICH IS --NOT-- A TIMESTAMP DATA TYPE
--
-- THE WILD CARDING FOR THE PACKAGE NAME FOLLOWS TSO WILD
CARDING
-- RULES * = ONE TO MANY CHARACTERS AND % = A SINGLE CHARACTER
-- THE COLLECTION NAME CAN NOT BE WILD CARDED
--
--
```

```
SELECT DISTINCT
'COMPARE PACKAGE ' CONCAT RTRIM(COLLID)
CONCAT '.' CONCAT NAME
CONCAT ' IN P390H.PLAN_TABLE '
CONCAT ' TO ' CONCAT RTRIM(COLLID)
CONCAT '.* BEFORE ''20021031121016'''
FROM SYSIBM.SYSPACKAGE A
WHERE CREATOR = 'P390H'
;
```

Example Output

```
COMPARE PACKAGE ADBL.ADB27AC IN P390H.PLAN_TABLE TO ADBL.* BEFORE
'200210311210
COMPARE PACKAGE ADBL.ADB2CON IN P390H.PLAN_TABLE TO ADBL.* BEFORE
'200210311210
COMPARE PACKAGE ADBL.ADB2GET IN P390H.PLAN_TABLE TO ADBL.* BEFORE
'200210311210
COMPARE PACKAGE ADBL.ADB2PRP IN P390H.PLAN_TABLE TO ADBL.* BEFORE
'200210311210
COMPARE PACKAGE ADBL.ADB2REE IN P390H.PLAN_TABLE TO ADBL.* BEFORE
'200210311210
```

GENCMD04 –Generate commands for Package compares where the COLLID is different

```
--
-- SAMPLE SPUFI COMMAND TO GENERATE COMPARE REQUEST FOR PACKAGES
-- CURRENT BIND EXPLAIN(YES) DATA AVAILABLE.
--
-- THE GENERATED COMPARE PACKAGE SPECIFIES BOTH THE CURRENT
-- PLAN_TABLE (P390H.PLAN_TABLE) AND THE OLD ACCESS PATH INFO IN
-- THE SAME PLAN TABLE BUT BUT WITH A DIFFERENT COLLID
--
-- THIS COULD ALSO BE ACCOMPLISHED BY A SINGLE COMPARE COMMAND
--
-- COMPARE PACKAGE TESTCOLL.* IN P390H.PLAN_TABLE TO
-- TEMPCOLL.*
--
-- THE WILD CARDING FOR THE PACKAGE NAME FOLLOWS TSO WILD
CARDING
-- RULES * = ONE TO MANY CHARACTERS AND % = A SINGLE CHARACTER
-- THE COLLECTION NAME CAN NOT BE WILD CARDED
--
--
SELECT DISTINCT
  'COMPARE PACKAGE ' CONCAT RTRIM(COLLID)
  CONCAT '.' CONCAT NAME
  CONCAT ' IN P390H.PLAN_TABLE '
  CONCAT ' TO TEMPCOLL'
  CONCAT '.* '
FROM SYSIBM.SYSPACKAGE A
WHERE CREATOR = 'P390H'
;
```

Example Output

```
-----+-----+-----+-----+-----+-----+-----
COMPARE PACKAGE ADBL.ADB27AC IN P390H.PLAN_TABLE TO TEMPCOLL.*
COMPARE PACKAGE ADBL.ADB2CON IN P390H.PLAN_TABLE TO TEMPCOLL.*
COMPARE PACKAGE ADBL.ADB2GET IN P390H.PLAN_TABLE TO TEMPCOLL.*
COMPARE PACKAGE ADBL.ADB2PRP IN P390H.PLAN_TABLE TO TEMPCOLL.*
COMPARE PACKAGE ADBL.ADB2REE IN P390H.PLAN_TABLE TO TEMPCOLL.*
COMPARE PACKAGE ADBL.ADB2RIP IN P390H.PLAN_TABLE TO TEMPCOLL.*
```

GENEXP01 – Generate explain commands for Plans where there is none

```
--  
-- SAMPLE SPUFI COMMAND TO GENERATE DATA FOR PLAN_TABLE IF THERE ISN'T  
-- CURRENT BIND EXPLAIN(YES) DATA AVAILABLE.  
--
```

```
SELECT 'EXPLAIN DBRM ' CONCAT NAME  
CONCAT ' TO PLAN ' CONCAT PLNAME  
CONCAT ' IN P390I.PLAN_TABLE '  
FROM SYSIBM.SYSDBRM A  
WHERE PLCREATOR = 'P390H'  
AND NOT EXISTS  
(SELECT 1 FROM P390I.PLAN_TABLE B  
WHERE A.PLNAME = B.APPLNAME  
AND A.NAME = B.PROGNAME);
```

Example Output

```
EXPLAIN DBRM PATHCHK TO PLAN PATHCHK IN P390I.PLAN_TABLE  
EXPLAIN DBRM CKPPTHCK TO PLAN CKPPTHCK IN P390I.PLAN_TABLE  
EXPLAIN DBRM BNDPTHCK TO PLAN BNDPTHCK IN P390I.PLAN_TABLE  
EXPLAIN DBRM CKPBLD TO PLAN BNDPTHCK IN P390I.PLAN_TABLE  
EXPLAIN DBRM TESTPG4 TO PLAN TESTPG4 IN P390I.PLAN_TABLE  
EXPLAIN DBRM TESTPG3 TO PLAN TESTPG3 IN P390I.PLAN_TABLE
```

GENEXP02 – Generate explain commands for packages

```
--
-- SAMPLE SPUI COMMAND TO GENERATE DATA FOR PLAN_TABLE IF THERE ISN'T
-- CURRENT BIND EXPLAIN(YES) DATA AVAILABLE.
-- NOTICE THE SELECT DISTINCT BECAUSE THE DBRMLIB CAN ONLY HAVE ONE
-- VERSION OF THE DBRM.
-- THE ONLY WAY TO GENERATE ACCESS DATA FOR OLD DBRMS IS TO REBUILD
-- THE DBRMS TO A WORK DATASET.
--

SELECT DISTINCT 'EXPLAIN DBRM ' CONCAT RTRIM(NAME)
CONCAT ' TO PACKAGE ' CONCAT RTRIM(COLLID)
CONCAT ' IN P390I.PLAN_TABLE '
FROM SYSIBM.SYSPACKAGE A
WHERE CREATOR = 'P390H'
AND VALID = 'Y'
AND OPERATIVE = 'Y'
AND VERSION = ''
AND NOT EXISTS
(SELECT 1 FROM P390I.PLAN_TABLE B
WHERE A.COLLID = B.COLLID
AND A.NAME = B.PROGNAME);
```

Example Output

```
EXPLAIN DBRM ADB2CON TO PACKAGE ADBL IN P390I.PLAN_TABLE
EXPLAIN DBRM ADB2GET TO PACKAGE ADBL IN P390I.PLAN_TABLE
EXPLAIN DBRM ADB2PRP TO PACKAGE ADBL IN P390I.PLAN_TABLE
EXPLAIN DBRM ADB2REE TO PACKAGE ADBL IN P390I.PLAN_TABLE
EXPLAIN DBRM ADB2RIP TO PACKAGE ADBL IN P390I.PLAN_TABLE
EXPLAIN DBRM ADB2WCL TO PACKAGE ADBL IN P390I.PLAN_TABLE
EXPLAIN DBRM ADB2ZP TO PACKAGE ADBL IN P390I.PLAN_TABLE
```

GENEXP03 – Generate explain commands for a specific creator

```
--
-- SAMPLE SPUI COMMAND TO GENERATE DATA FOR PLAN_TABLE IF THERE ISN'T
-- CURRENT BIND EXPLAIN(YES) DATA AVAILABLE.
-- NOTICE THE SELECT DISTINCT BECAUSE THE DBRMLIB CAN ONLY HAVE ONE
-- VERSION OF THE DBRM.
-- IF THERE ARE MULTIPLE DBRMLIB'S THEY CAN BE CONCATENATED IN THE
-- JCL IF THERE ARE NO DUPLICATES OR THEY CAN BE PROCESSED IN
-- MULTIPLE RUNS TO GENERATE MULTIPLE VERSIONS OF THE ACCESS DATA.
-- THE VERSIONS SHOULD BE GENERATED IN LOGICAL SEQUENCE SINCE
-- PATH CHECK WILL DEFAULT TO PROCESS MOST CURRENT ACCESS DATA.
-- THE ONLY WAY TO GENERATE ACCESS DATA FOR OLD DBRMS IS TO REBUILD
-- THE DBRMS TO A WORK DATASET.

SELECT DISTINCT 'EXPLAIN DBRM ' CONCAT RTRIM(NAME)
CONCAT ' TO PACKAGE ' CONCAT RTRIM(COLLID)
CONCAT ' IN P390I.PLAN_TABLE '
FROM SYSIBM.SYSPACKAGE A
WHERE CREATOR = 'P390H'
AND VALID = 'Y'
AND OPERATIVE = 'Y'
AND NOT EXISTS
(SELECT 1 FROM P390I.PLAN_TABLE B
WHERE A.COLLID = B.COLLID
AND A.NAME = B.PROGNAME
AND A.VERSION = B.VERSION );
```

Example Output

```
EXPLAIN DBRM ADB27AC TO PACKAGE ADBL IN P390I.PLAN_TABLE
EXPLAIN DBRM ADB2CON TO PACKAGE ADBL IN P390I.PLAN_TABLE
EXPLAIN DBRM ADB2GET TO PACKAGE ADBL IN P390I.PLAN_TABLE
EXPLAIN DBRM ADB2PRP TO PACKAGE ADBL IN P390I.PLAN_TABLE
EXPLAIN DBRM ADB2REE TO PACKAGE ADBL IN P390I.PLAN_TABLE
EXPLAIN DBRM ADB2RIP TO PACKAGE ADBL IN P390I.PLAN_TABLE
```

GENTST01 – Generate test commands for Plans

```
--
-- SAMPLE SPUFI COMMAND TO GENERATE TEST REQUEST FOR PLANS
-- WITH CURRENT BIND EXPLAIN(YES) DATA AVAILABLE.
--
-- THE GENERATED TEST PLAN COMPARES ACCESS PATH FOR A DBRM
-- AGAINST THE OLD INFO IN PLAN_TABLE (P390H.PLAN_TABLE)
--
-- THIS CAN NOT BE ACCOMPLISHED BY THE TEST COMMAND
-- TEST DBRM DBRMNAME AS PLAN TESTPLAN.* IN P390H.PLAN_TABLE
-- BECAUSE THE TEST COMMAND WILL GET THE DBRM LIST FROM THE
-- DBRMLIB SPECIFIED AS DBRMIN NOT FROM SYSIBM.SYSPACKAGE
-- AND THE PLAN NAMES USUALLY VARY TOO MUCH
--
-- THE WILD CARDING FOR THE PACKAGE NAME FOLLOWS TSO WILD CARDING
-- RULES * = ONE TO MANY CHARACTERS AND % = A SINGLE CHARACTER
--
-- WILD CARDING FOR THE PACKAGE NAME IS DETERMINED BY THE MEMBER
-- NAME IN DDNAME DBRMIN NOT BY SYSIBM.SYSDBRM LIKE THE
-- COMPARE AND REPORT COMMANDS
--
-- THE PLAN NAME CAN NOT BE WILD CARDED
--
SELECT DISTINCT
'TEST DBRM ' CONCAT RTRIM(NAME) CONCAT ' AS PLAN '
CONCAT RTRIM(PLNAME) CONCAT '.* '
CONCAT ' IN P390H.PLAN_TABLE '
FROM SYSIBM.SYSDBRM A
WHERE PLCREATOR = 'P390H'
;
```

Example Output:

```
TEST DBRM BNDPTHCK AS PLAN BNDPTHCK.* IN P390H.PLAN_TABLE
TEST DBRM CKPBLD AS PLAN BNDPTHCK.* IN P390H.PLAN_TABLE
TEST DBRM CKPPTHCK AS PLAN CKPPTHCK.* IN P390H.PLAN_TABLE
TEST DBRM PATHCHK AS PLAN PATHCHK.* IN P390H.PLAN_TABLE
TEST DBRM TESTPG3 AS PLAN TESTPG3.* IN P390H.PLAN_TABLE
```

GENTST02 Generate Test commands for Packages

```
--
-- SAMPLE SPUFI COMMAND TO GENERATE TEST REQUEST FOR PACKAGES
-- WITH CURRENT BIND EXPLAIN(YES) DATA AVAILABLE.
--
-- THE GENERATED TEST PACKAGE COMPARES ACCESS PATH FOR A DBRM
-- AGAINST THE OLD INFO IN PLAN_TABLE (P390H.PLAN_TABLE)
--
-- THIS CAN NOT BE ACCOMPLISHED BY THE TEST COMMAND
-- TEST DBRM DBRMNAME AS PACKAGE TESTCOLL.* IN P390H.PLAN_TABLE
-- BECAUSE THE TEST COMMAND WILL GET THE DBRM LIST FROM THE
-- DBRMLIB SPECIFIED AS DBRMIN NOT FROM SYSIBM.SYSPACKAGE
--
-- THE WILD CARDING FOR THE PACKAGE NAME FOLLOWS TSO WILD CARDING
-- RULES * = ONE TO MANY CHARACTERS AND % = A SINGLE CHARACTER
--
-- WILD CARDING FOR THE PACKAGE NAME IS DETERMINED BY THE MEMBER
-- NAME IN DDNAME DBRMIN NOT BY SYSIBM.SYSPACKAGE LIKE THE
-- COMPARE AND REPORT COMMANDS
--
-- THE COLLECTION NAME CAN NOT BE WILD CARDED
--
SELECT DISTINCT
  'TEST DBRM ' CONCAT RTRIM(NAME) CONCAT ' AS PACKAGE '
  CONCAT RTRIM(COLLID) CONCAT '.* '
  CONCAT ' IN P390H.PLAN_TABLE '
  FROM SYSIBM.SYSPACKAGE A
  WHERE CREATOR = 'P390H'
  ;
```

ZIP File with XMIT Files to recreate the Test Cases:

The website www.hlstechnologies.com has a downloadable zip file that contains what is required to recreate the test case in your environment. The files are:

- p390h.test04.jcl -- This contains the readme and the JCL for each step.
- p390h.test01.dbrmlib -- These are the DBRMs for the first state in each test case.
- p390h.test02.dbrmlib -- These are the DBRMs for the second state in each test case.
- p390.sysrec00 -- This is the load data for the PUBLIC tables that are created.
- p390.sysrec01 -- This is the load data for the indexes on the PUBLIC tables.

The following is the readme file:

```

JCL IS SETUP AS WE RAN IT AND REQUIRES CERTAIN
CUSTOMIZATIONS
  JOBCARD TO MATCH LOCAL REQUIREMENTS
  CORRECT VERSION OF DSNTIAD AND RUNLIB
  UTILITY JCL FOR LOAD, RUNSTATS AND REORG

J00GRANT GRANT USE OF BP1, BP2 AND STOGROUP SYSDEFLT
J01DDL  BUILD DBD TEST01 WITH PUBLIC.SYSCOLUMNS,
SYSTABLES,
                                     PUBLIC.PLAN_TABLE,
DSN_STATEMNT_TABLE
J02LOAD  LOAD PUBLIC.SYSTABLES AND SYSCOLUMNS
J03DDL06 BUILD DBD TEST06 - NO RUNSTATS
J04DDL07 BUILD DBD TEST07 - NO DATA SO ROW COUNTS=0
J05DDL08 BUILD DBD TEST08 - UPDATE CLUSTER RATIO TO 50%
J06DDL09 BUILD DBD TEST09 - DBRM REFERENCES A HOST
VARIABLE WITH
                                     WRONG LENGTH CHARACTERISTICS
J07DDL10 BUILD DBD TEST10  INDEX CHANGE
J08DDL11 BUILD DBD TEST11  DROP COLUMN FROM INDEX
J09DDL12 BUILD DBD TEST12 DON'T BUILD INDEX ON
SYSCOLUMNS
J10DDL13 BUILD DBD TEST13  MOVE COLUMN POSITION IN INDEX
J11DDL15 BUILD DBD TEST15 NO SQL CHANGES - JUST
REPOSITIONING CURSORS
J12DDL16 BUILD DBD TEST16- INDEX CLUSTERED AND REORG
J13RUNST RUNSTATS FOR EVERYTHING BUT TEST06
J14UPD   UPDATE SYSIBM STATISTICS FOR INDEX DSNDX01
J15REORG REORG TEST16 SO CLUSTER RATIO = 100
J16BIND1 BIND INITIAL VERSIONS OF TEST DBRM'S
J17BIND2 BIND MODIFIED VERSION OF DBRMS TEST01- TEST05
          AND BIND SAME DBRM WITH NEW ENVIRONMENTS FOR
TEST06 - TEST16

```

J18COMP PRODUCE THE ACCESS PATH COMPARISON REPORT FOR
THE OLD AND NEW
ACCESS PATHS
J30REPT SAMPLE JOB TO REPORT ON CURRENT ACCESS PATHS FOR
EACH TEST CASE
J31EXPL SAMPLE JOB TO REPORT ON ACCESS PATH FOR EACH TEST
CASE WITHOUT
BIND
J90DROP DROP TEST DATABASES
J91FREE FREE PACKAGES
J92REVOKREVOKE THE GRANTS FROM JO0GRANT

TEST CASE DESCRIPTIONS

SQL CHANGES

1. CHG WHERE CLAUSE


```

      ADD      TBCREATOR = :SYSCOL-SYSCOLUMNS.SYSCOL-
TBCREATOR
      TO MAKE IT MATCHING INDEX SINCE FIRST IX COLUMN ISN'T
SPECIFIED
```
2. CHANGE SINGLE TABLE SELECT TO JOIN


```

SELECT
OLD      NAME,      TBNAME,      COLNO,      COLTYPE,      LENGTH
NEW      A.NAME,    A.TBNAME,    A.COLNO,    A.COLTYPE,    A.LENGTH
NEW      INNER JOIN
          SYSIBM.SYSTABLES B
          ON  A.TBNAME = B.NAME
          AND A.TBCREATOR = B.CREATOR
      ADDED WITH RR
```
3. CHANGE JOIN CRITERIA


```

DELETED          AND A.TBCREATOR = B.CREATOR
          WITH RR
      TO MAKE IT A PARTIAL CARTESIAN
```
4. CHANGE DATA LIST


```

      ADDED      ,B.DBID
      CHG WHERE          = :SYSCOL-SYSCOLUMNS.SYSCOL-
TBNAME
          B.NAME
          A.TBNAME
      AND          = :SYSCOL-SYSCOLUMNS.SYSCOL-
TBCREATOR
          B.CREATOR
          A.TBCREATOR
      ADDED      ,:SYSTAB-DBID
```
5. CHANGE JOIN TO SUBSELECT


```

      REMOVED -- INNER JOIN  A.TBNAME = B.NAME
          AND A.TBCREATOR = B.CREATOR
      INSERTED  WHERE EXISTS
          (SELECT B.NAME
           FROM SYSIBM.SYSTABLES B
           WHERE  A.TBNAME = B.NAME
           AND A.TBCREATOR = B.CREATOR)
      SAME ACCESS PATH BECAUSE SAME DATA REQUIREMENTS
```
- STATS CHANGES
6. -1 STATS NO RUNSTATS
7. RUNSTATS WITH 0 ROWS / PAGES
8. CLUSTER RATIO CHG TO LESS THAN 80 %


```

      UPDATE SYSIBM.SYSTABLES
```

```

      SET CARD          = 2000
        ,CARDF          = +0.20000000000000000E+03
        ,NPAGES        = 1200
WHERE CREATOR = 'PUBLIC8'
      AND NAME = 'SYSCOLUMNS'
;
UPDATE SYSIBM.SYSINDEXES
      SET CLUSTERRATIO = 50
        ,CLUSTERRATIOF = +0.05000000000000000E+01
        ,FIRSTKEYCARD = 300
        ,FULLKEYCARD  = 300
        ,FIRSTKEYCARDF = +0.20000000000000000E+03
        ,FULLKEYCARDF  = +0.20000000000000000E+03
WHERE CREATOR = 'PUBLIC8'
      AND NAME = 'DSNDCX01'
;

```

9. CHANGE HOST VARIABLE TO NOT MATCH COLUMN

```

OLD
EXEC SQL
DECLARE SELECT-1 CURSOR FOR
  SELECT A.NAME, A.TBNAME, A.COLNO, A.COLTYPE, A.LENGTH
  FROM      SYSCOLUMNS A
    INNER JOIN
      SYSTABLES B
    ON  A.TBNAME = B.NAME
      AND A.TBCREATOR = B.CREATOR
  WHERE A.TBNAME  = :SYSCOL-SYSCOLUMNS.SYSCOL-TBNAME
    AND A.TBCREATOR = :SYSCOL-SYSCOLUMNS.SYSCOL-TBCREATOR
END-EXEC.
NEW
  05 WS-PARM-VALUEC          PIC  X(20).
EXEC SQL
DECLARE SELECT-1 CURSOR FOR
  SELECT A.NAME, A.TBNAME, A.COLNO, A.COLTYPE, A.LENGTH
  FROM      SYSCOLUMNS A
    INNER JOIN
      SYSTABLES B
    ON  A.TBNAME = B.NAME
      AND A.TBCREATOR = B.CREATOR
  WHERE A.TBNAME  = :SYSCOL-SYSCOLUMNS.SYSCOL-TBNAME
    AND A.TBCREATOR = :WS-PARM-VALUEC
END-EXEC.

```

10. CHANGE FROM IX1 TO IX2

```

OLD
  CREATE INDEX          DSNDCX01
    ON SYSCOLUMNS
  (TBCREATOR

```

```

    ,TBNAME
    ,NAME      )
    USING STOGROUP SYSDEFLT PRIQTY 7200 SECQTY 7200
    CLOSE NO;
NEW
CREATE INDEX DSNDXX1
           ON SYSCOLUMNS
(TBCREATOR
 ,TBNAME )
    USING STOGROUP SYSDEFLT PRIQTY 7200 SECQTY 7200
    CLOSE NO;
STRUCTURE CHANGES
11. DROP COL FROM INDEX
    OLD
    CREATE INDEX          DSNDXX1
           ON SYSCOLUMNS
(TBCREATOR
 ,TBNAME
 ,NAME      )
    USING STOGROUP SYSDEFLT PRIQTY 7200 SECQTY 7200
    CLOSE NO;
NEW
CREATE INDEX DSNDXX1
           ON SYSCOLUMNS
(TBCREATOR)
    USING STOGROUP SYSDEFLT PRIQTY 7200 SECQTY 7200
    CLOSE NO;
12. DROP INDEX FROM SYSCOLUMNS
    OLD
    CREATE INDEX          DSNDXX1
           ON SYSCOLUMNS
(TBCREATOR
 ,TBNAME
 ,NAME      )
    USING STOGROUP SYSDEFLT PRIQTY 7200 SECQTY 7200
    CLOSE NO;
    NEW CASE - DROP THE INDEX
13. CHANGE COL SEQUENCE IN INDEX
    OLD
    CREATE INDEX          DSNDXX1
           ON SYSCOLUMNS
(TBCREATOR
 ,TBNAME
 ,NAME      )
    USING STOGROUP SYSDEFLT PRIQTY 7200 SECQTY 7200
    CLOSE NO;
NEW

```

```

CREATE INDEX DSNDX01
      ON SYSCOLUMNS
(TBCREATOR
,NAME
,TBNAME )
  USING STOGROUP SYSDEFLT PRIQTY 7200 SECQTY 7200
  CLOSE NO;
14. SELECT MIN INDEX SUPPORT AND SELECT MAX WITH SAME INDEX
  USE PUBLIC. TABLES
  EXEC SQL
  DECLARE SELECT-2 CURSOR FOR
    SELECT MIN(A.TBNAME )
    FROM      SYSCOLUMNS A
    WHERE A.TBCREATOR = :SYSCOL-SYSCOLUMNS.SYSCOL-
TBCREATOR
  END-EXEC.
  EXEC SQL
  DECLARE SELECT-3 CURSOR FOR
    SELECT MAX(A.TBCREATOR)
    FROM      SYSCOLUMNS A
  END-EXEC.
15. SCROLLING CURSOR (AKA REPOSITIONING CURSOR)
  USE PUBLIC. TABLES
  EXEC SQL
  DECLARE SELECT-1 CURSOR FOR
    SELECT A.NAME, A.TBNAME, A.COLNO, A.COLTYPE,
A.LENGTH
    FROM      SYSCOLUMNS A
    INNER JOIN
      SYSTABLES B
    ON  A.TBNAME = B.NAME
      AND A.TBCREATOR = B.CREATOR
    WHERE A.TBNAME >= :SYSCOL-SYSCOLUMNS.SYSCOL-TBNAME
      AND A.TBCREATOR = :SYSCOL-SYSCOLUMNS.SYSCOL-
TBCREATOR
  END-EXEC.
  EXEC SQL
  DECLARE SELECT-2 CURSOR FOR
    SELECT NAME, CREATOR, TYPE, DBNAME, TSNAME
    FROM      SYSTABLES
    WHERE CREATOR > :SYSTAB-SYSTABLES.SYSTAB-CREATOR
      OR (CREATOR = :SYSTAB-SYSTABLES.SYSTAB-CREATOR
      AND NAME >= :SYSTAB-SYSTABLES.SYSTAB-NAME )
  END-EXEC.
16. REORG WITH CLUSTER RATIO 100

```

IBM Presentations on V8 Issues:

<ftp://ftp.software.ibm.com/software/data/db2zos/INAShibamiyaSL1.pdf>

V8 Performance Topics

<http://www.redbooks.ibm.com/redbooks/pdfs/sg246465.pdf>

Health Checking

<ftp://ftp.software.ibm.com/software/data/db2zos/INACampbellJ12.pdf>

Early Customer Experiences

<ftp://ftp.software.ibm.com/software/data/db2zos/INACampbellC6.pdf>