

Visual Explain

DB2 för z/OS V7 och V8

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- Tune SQL like an expert in DB2 for z/OS V8
 - Runstats med Freqval
 - Runstats med Colgroup
 - Reopt(Vars)

List Databases (Subsystem)

The screenshot shows the 'Visual Explain' application window. The title bar reads 'Visual Explain' and the menu bar includes 'Subsystem', 'Tools', 'Plugin', 'Properties', 'Windows', and 'Help'. The main window is titled 'List Databases' and contains a table with the following data:

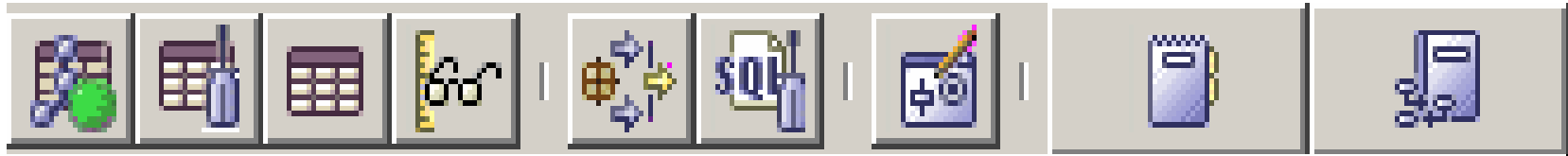
Database Alias	Status	Database Name	Comment	User ID	SQLID
EDUCDB2D	✓	EDUCDB2D		SE06664	SE06664
EDUCDB2P	✓	EDUCDB2P		SE06664	SE06664
TUTORIAL	✓	DSNVEDEMO	Visual Explain Tutorial	ADMF007	ADMF007

Below the table, there is a 'Database Properties' section for the selected 'EDUCDB2P' database:

Database Name: EDUCDB2P Protocol: tcpip
Host name: 10.31.184.12 Port number: 447
Node name: NDE879ED

Control buttons on the right side of the window include: 'Connect...', 'Disconnect', 'Refresh', 'Update...', 'Catalog...', 'Uncatalog', and 'Help'.

Knapparden



- Enable Visual Explain
- Maintain Visual Explain
- View Plan Table
- Browse Subsystem Parameters
- List Static SQL Statements
- Tune SQL
- View Properties
- Show Glossary
- Show Tutorial

Textraden



- Subsystem
 - View Statement and Function Tables
- Tools
 - Service SQL (DSNPLI8)
 - Download
- Plugin
 - List Cache Statements
 - Statistics Advisor
- Properties
 - Subsystem Settings
- Windows
- Help

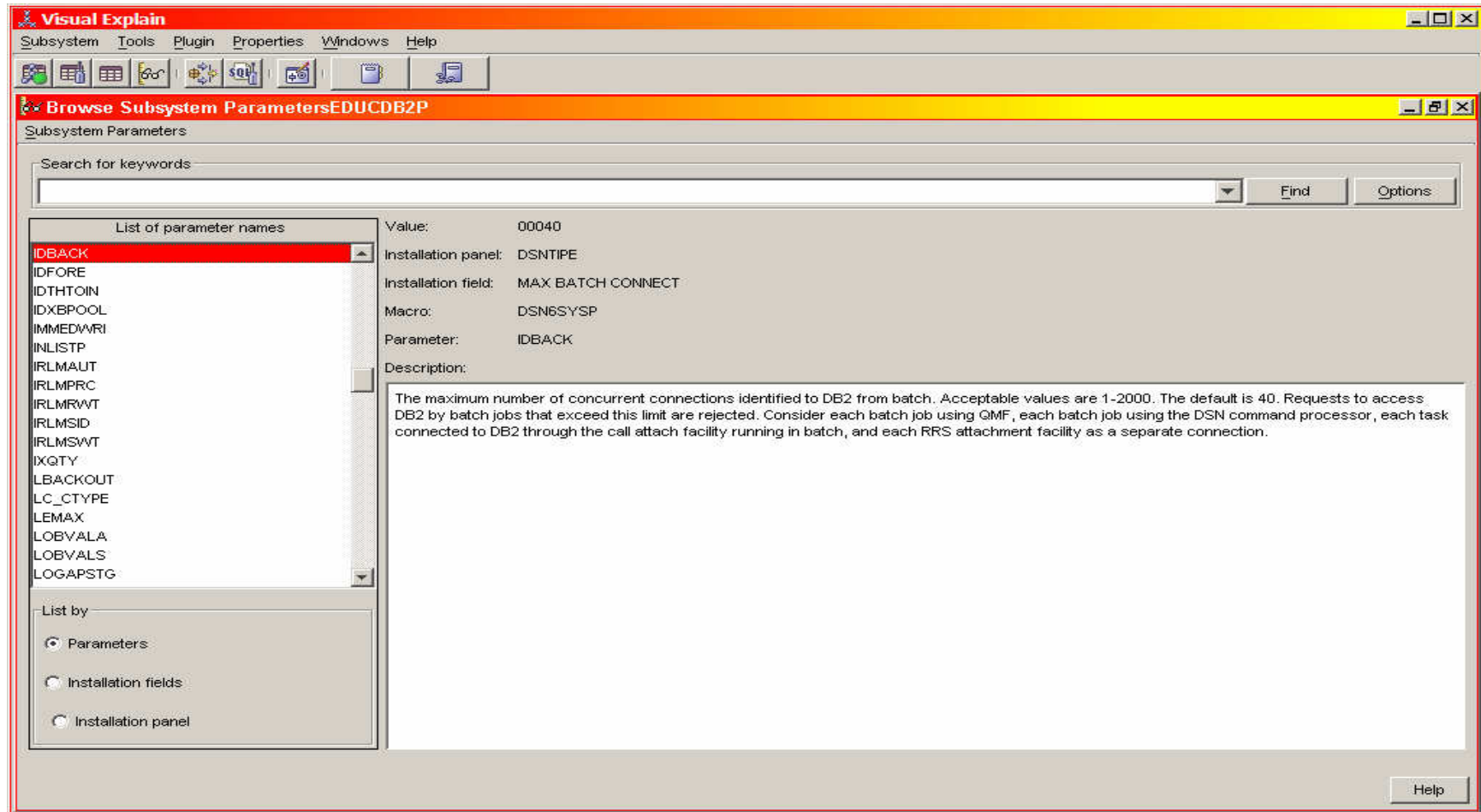
Explaintabeller – V7

- PLAN_TABLE
- DSN_STATEMNT_TABLE
- DSN_FUNCTION_TABLE

Explaintabeller – V8

- PLAN_TABLE
- DSN_STATEMNT_TABLE
- DSN_FUNCTION_TABLE
(8K)
- DSN_STATEMENT_CACHE_TABLE
- DSN_STATEMENT_CACHE_AUX
- DSN_DETCOST_TABLE
- DSN_FILTER_TABLE
- DSN_PGRANGE_TABLE
- DSN_PGGROUP_TABLE
- DSN_PREDICAT_TABLE
- DSN_PTASK_TABLE
- DSN_SORTKEY_TABLE
- DSN_SORT_TABLE
- DSN_STRUCT_TABLE
- DSN_VIEWREF_TABLE

Subsystem Parameters



Show Plan Table

Visual Explain

Subsystem Tools Plugin Properties Windows Help

Show Plan Table-EDUCDB2P

Statement View

All the rows are displayed. The number of rows is 28.

QUERYNO	QBLOCKNO	APPLNAME	PROGNAME	PLANNO	METHOD	CREATOR	TNAME	TABNO	ACCESSTYPE	MATCHCOLS	ACCESSCR...	ACCESSNA...	INC
1	1		SYSLH200	1	0	SE06664	EMP100K	1	R	0			N
1	1		SYSLH200	2	2	SE06664	DEPT100	2	R	0			N
1	1		SYSLH200	1	0	DSN8810	DEPT	1	I	0	DSN8810	XDEPT3	N
1	1		SYSLH200	1	0	SE06664	EMP100K	1	R	0			N
1	1		SYSLH200	1	0	SE06664	EMP100K	1	R	0			N
1	1		SYSLH200	1	0	SE06664	EMP100K	1	R	0			N
1	1		SYSLH200	1	0	SE06664	EMP100K	1	R	0			N
1	1		SYSLH200	1	0	SE06664	EMP100K	1	R	0			N
1	1		SYSLH200	2	2	SE06664	DEPT100	2	R	0			N
1	1		SYSLH200	1	0	SE06664	EMP100K	1	R	0			N
1	1		SYSLH200	2	2	SE06664	DEPT100	2	R	0			N
1	1		SYSLH200	1	0	SE06664	EMP100K	1	I	0	SE06664	MVK	Y
1	1		SYSLH200	1	0	SE06664	MGT_EMP	2	R	0			N
1	1		SYSLH200	1	0	SE06664	EMP100K	1	R	0			N
1	1		SYSLH200	2	3			0		0			N
1	1		SYSLH200	1	0	SE06664	EMP100K	1	R	0			N
1	1		SYSLH200	2	3			0		0			N
1	1		SYSLH200	1	0	SE06664	EMP100K	1	R	0			N
1	1		SYSLH200	2	2	SE06664	DEPT100	2	R	0			N
1	1		SYSLH200	1	0	SE06664	DEPT100	2	R	0			N
1	1		SYSLH200	2	2	SE06664	EMP100K	1	R	0			N
1	1		SYSLH200	1	0	SE06664	DEPT100	2	R	0			N
1	1		SYSLH200	2	2	SE06664	EMP100K	1	R	0			N
1	1		SYSLH200	1	0	SE06664	EMP100K	1	R	0			N
1	1		SYSLH200	2	2	SE06664	DEPT100	2	R	0			N
1	1		SYSLH200	1	0	SE06664	EMP100K	1	R	0			N
1	1		SYSLH200	2	3			0		0			N
1	1		SYSLH200	1	0	SE06664	MGT_EMP	2	R	0			N

Packages

Visual Explain
 Subsystem Tools Plugin Properties Windows Help

List Static SQL Statements-EDUCDB2P
 Statement View Help

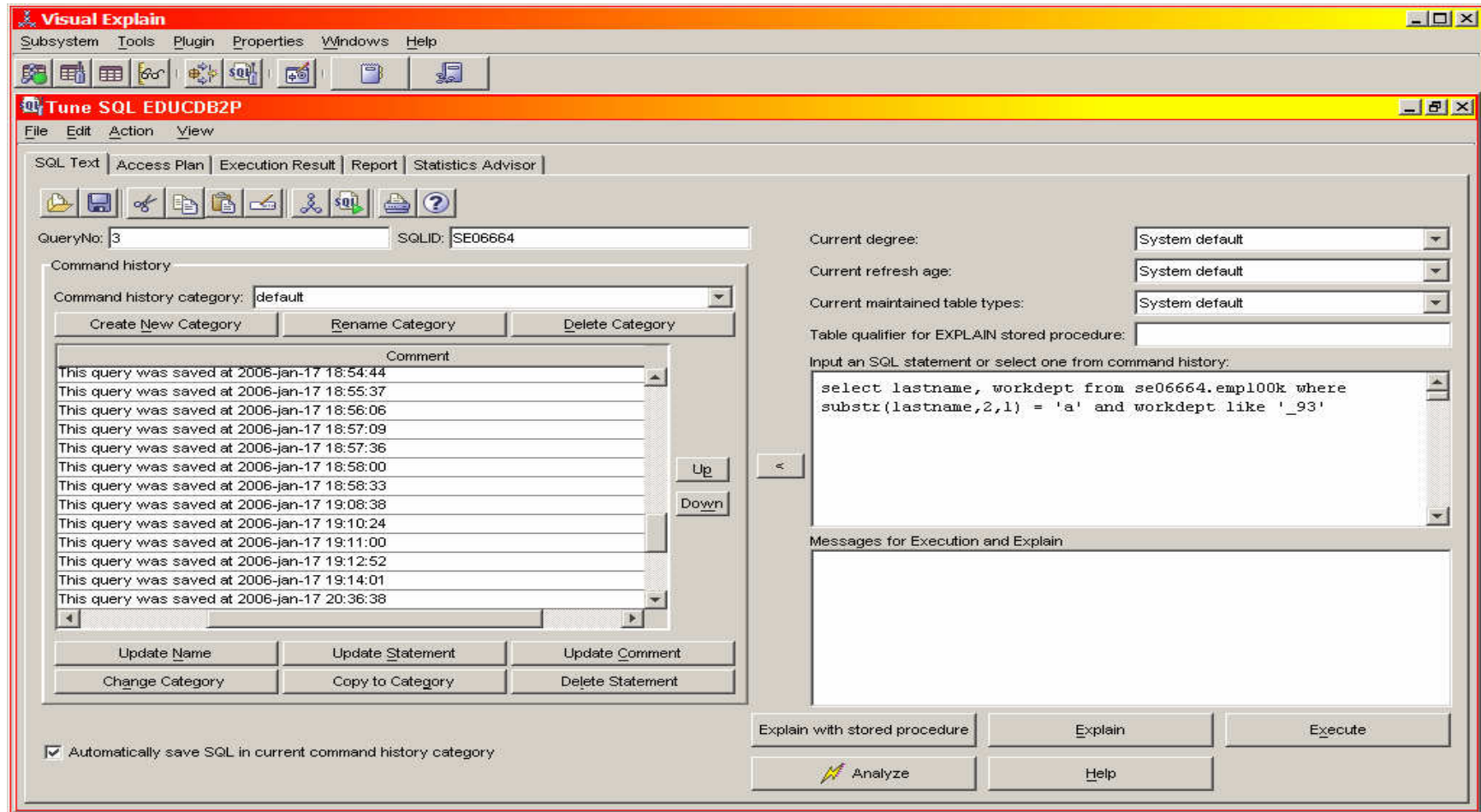
List of static SQL statements

Stmt	Queryno	Pkg/DBRM	Cost milliseconds	Cost service units	
228	228	COBMULTZ	0	0	SELECT CURRENT TIMESTAMP INTO : H FROM SYSIBM . SYSDUMMY1
250	250	DSN8EXP	0	0	SELECT 0 INTO : H FROM SYSIBM . SYSDUMMY1 WITH UR
192	192	SEC00	0	0	SELECT 0 INTO : H FROM SYSIBM . SYSDUMMY1 WITH UR
275	275	SEDSNEXP	0	0	SELECT 0 INTO : H FROM SYSIBM . SYSDUMMY1 WITH UR
414	414	SEDSNEXP	0	0	INSERT INTO EXPTRACE VALUES (: H : H)
429	429	SEDSNEXP	0		INSERT INTO EXPTRACE SELECT USER CONCAT CURRENT SQLID CONCAT CURRENT SCHEMA FRO
208	208	SEEXP	0		SELECT 0 INTO : H FROM SYSIBM . SYSDUMMY1 WITH UR
148	148	SEIDUG01	0		SELECT 0 INTO : H FROM SYSIBM . SYSDUMMY1 WITH UR
192	192	SEIDUG01	0		INSERT INTO SESSION . T (N) VALUES (1)
216	216	SERIGAD	0		SELECT 0 INTO : H FROM SYSIBM . SYSDUMMY1 WITH UR
418	418	SERIGAD	0		INSERT INTO SESSION . T VALUES (: H : H , : H : H)
472	472	SERIGAD	0		INSERT INTO SESSION . T VALUES (0 , : H : H)
595	595	SERIGAD	0		SELECT 1 INTO : H FROM SYSIBM . SYSDUMMY1 WHERE : H : H IS NULL OR : H : H IS NULL WITH UR
169	169	SEV8TEST	0	0	SELECT 0 INTO : H FROM SYSIBM . SYSDUMMY1 WITH UR
256	256	SEV8TEST	0	0	SELECT 1 INTO : H FROM SYSIBM . SYSDUMMY1 WHERE : H : H = 1 WITH UR
272	272	DRIVER	0	0	DECLARE C CURSOR FOR SELECT * FROM DSN8610 . EMP

Context menu for row 429:

- Graph access path
- Show SQL text
- Show plan table
- Filter
- Explain...
- Report...

Tune SQL



Execute

Visual Explain

Subsystem Tools Plugin Properties Windows Help

Tune SQL EDUCDB2P

File View

SQL Text Access Plan Execution Result Report Statistics Advisor

All the rows are displayed. The number of rows is 15.

LASTNAME	WORKDEPT
Bayu	A93
Bayu	A93
Bayu	A93
Bayt	A93
Aayv	A93
Bayu	A93
Bayu	A93
Aayv	A93
Aayv	A93
Aayv	A93
Bayu	A93
Bayu	A93
Bayt	A93
Cayt	A93
Bayt	A93

Explain

The screenshot shows the Visual Explain tool interface. The main window displays the execution plan for a query. The plan consists of the following steps:

- QUERY** (green oval)
- QB1** (blue circle, 50)
- TBSCAN** (blue octagon, 50)
- EMP100K** (red rectangle, 10000(default))

The left pane shows the query text and a table of attributes:

Name	Value
Type	SELECT
CPU Cost (ms)	17
CPU Cost (su)	169
Cost Category	B
Reason	TABLE CARDINALITY
Timestamp	2006-01-18 13:34:31.56

Below the table, the attribute explanation is shown:

Attribute explanation:
Type: Query type (SELECT, INSERT, UPDATE, DELETE, SELUPD, DELCUR, UPDCUR)

Påloggad som SECG382

The screenshot displays the Visual Explain SQL tool interface. The main window is titled "Visual Explain" and contains a sub-window "Tune SQL EDUCDB2P". The interface includes a menu bar (File, Edit, Action, View) and a toolbar with various icons. The main area is divided into several sections:

- Query Information:** QueryNo: 4, SQLID: SECG382.
- Command History:** A list of queries with timestamps, including "This query was saved at 2006-jan-17 18:56:06" through "2006-jan-17 20:38:55".
- Execution Parameters:** Current degree, Current refresh age, and Current maintained table types, all set to "System default".
- SQL Statement:** A text area containing the query:

```
select lastname, workdept from se06664.emp100k where substr(lastname,2,1) = 'a' and workdept like '_93'
```
- Messages for Execution and Explain:** A text area displaying an error message:

```
The input SQL statement can not be explained : SQLCODE=-551 DB2 SQL error: SQLCODE: -551, SQLSTATE: 42501, SQLERRMC: SECG382
```
- Buttons:** "Explain with stored procedure", "Explain", "Execute", "Analyze", and "Help".

At the bottom left, there is a checkbox labeled "Automatically save SQL in current command history category" which is checked.

Explain with Procedure

Visual Explain

Subsystem Tools Plugin Properties Windows Help

Tune SQL EDUCDB2P

File Access Plan Selected Action View

SQL Text Access Plan Execution Result Report Statistics Advisor

DB2 Platform: Z/OS DB2 Version: v8 Explain Time: 2006-01-18 13:38:47.98

query

Show attribute explanation Views: Cost estimation

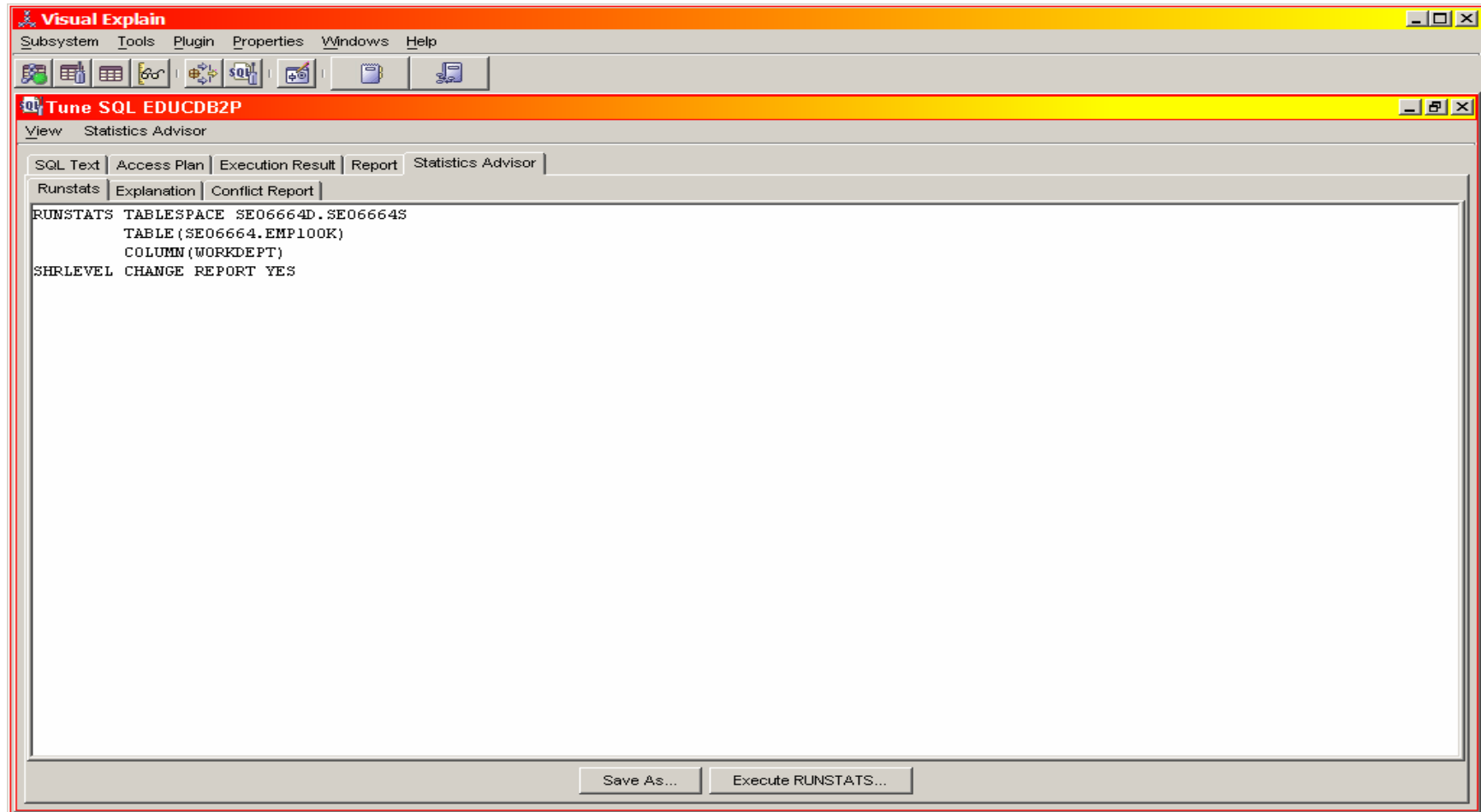
Name	Value
Type	SELECT
CPU Cost (ms)	17
CPU Cost (su)	169
Cost Category	B
Reason	TABLE CARDINALITY
Timestamp	2006-01-18 13:38:47.98

Attribute explanation:
Type: Query type (SELECT, INSERT, UPDATE, DELETE, SELUPD, DELCUR, UPDCUR)

Save As... Print... Suggestions Help Query

```
graph TD; QUERY((QUERY)) --> QB1((QB1  
50)); QB1 --> TBSCAN{{TBSCAN  
50}}; TBSCAN --> EMP100K[EMP100K  
10000(default)]; style EMP100K stroke:#f00
```

Analyze - Statistics Advisor



Access Path Graph

Visual Explain

Subsystem Tools Plugin Properties Windows Help

Tune SQL EDUCDB2P

File Access Plan Selected Action View

SQL Text Access Plan Execution Result Report Statistics Advisor

DB2 Platform: Z/OS DB2 Version: v8 Explain Time: 2006-01-18 13:43:02.95

query

Show attribute explanation Views: Cost estimation

Name	Value
Type	SELECT
CPU Cost (ms)	17
CPU Cost (su)	169
Cost Category	B
Reason	TABLE CARDINALITY
Timestamp	2006-01-18 13:43:02.95

Attribute explanation:
Type: Query type (SELECT, INSERT, UPDATE, DELETE, SELUPD, DELCUR, UPDCUR)

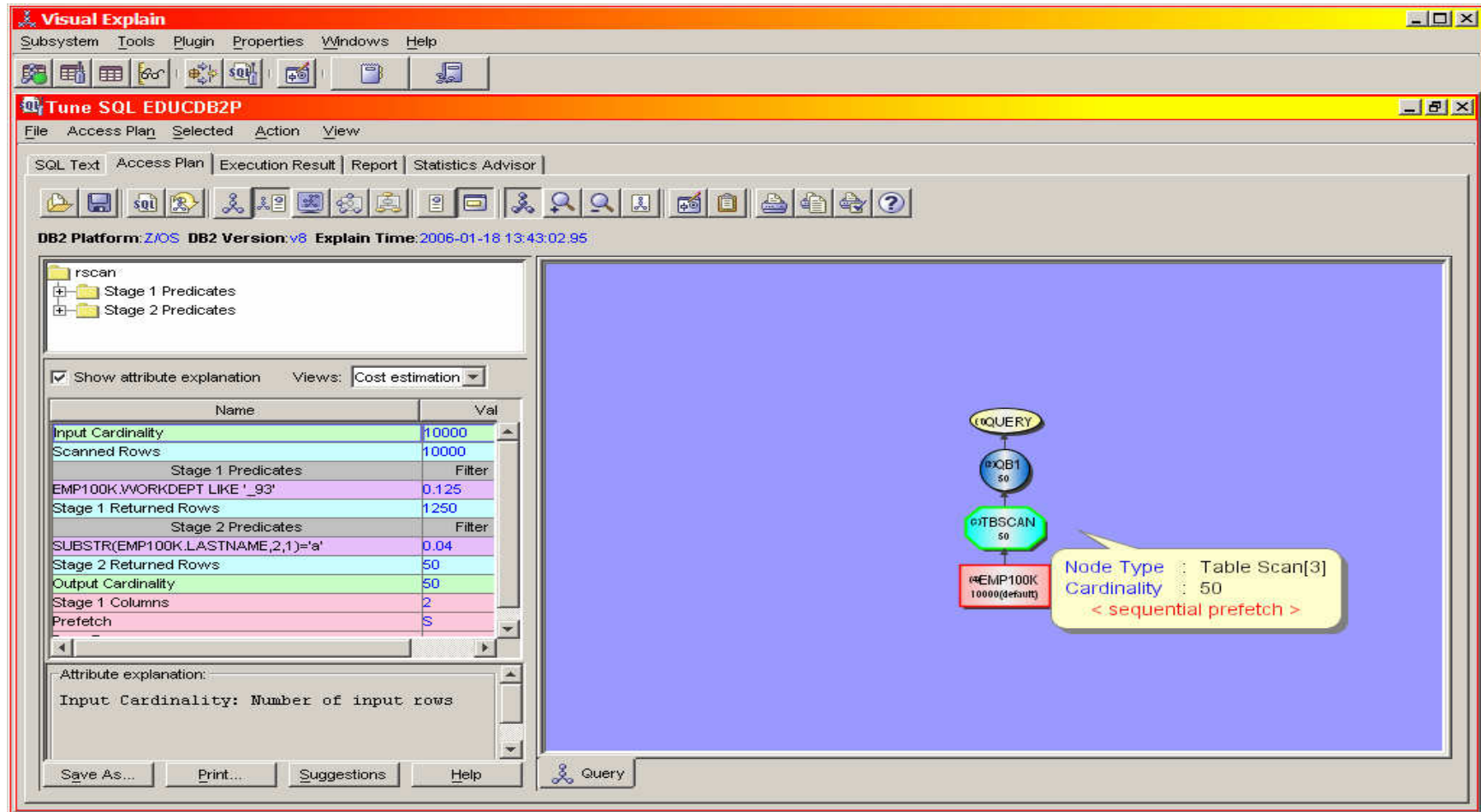
Save As... Print... Suggestions Help Query

Access Path Graph:

- @QUERY
- @QB1 50
- @TBSCAN 50
- @EMP100K 10000(default)

Node Type : Table[4]
Table Name : EMP100K
Creator Name : SE06664
Cardinality : 10000(default)
< segmented table space >
< Runstats not executed >

Access Path Graph



select empno from emp100k where empno
in(select mgrno from dept100)

The screenshot shows the Visual Explain interface for a DB2 query. The main window displays the query execution plan, which is a tree structure of operations. The root node is a QUERY node, which branches into two query blocks: QB1 and QB2. QB1 is a TBSCAN node (600000) that scans the EMP100K table. QB2 is a WORK FILE node (1) that feeds into a SORT node (1), which then feeds into another TBSCAN node (1) scanning the DEPT100 table. The attribute explanation table is visible on the left side of the interface.

Name	Value
Type	SELECT
CPU Cost (ms)	10658
CPU Cost (su)	109871
Cost Category	A
Reason	
Timestamp	2006-01-20 08:49:26.24

Attribute explanation:
Type: Query type (SELECT, INSERT, UPDATE, DELETE, SELUPD, DELCUR, UPDCUR)

Select Workdept, Count(*) from Emp100K Group by Workdept

The screenshot shows the Visual Explain interface for a query on the EMP100K table. The query text is: `SELECT Workdept, Count(*) from Emp100K Group by Workdept`. The execution plan is displayed as a vertical flow of steps:

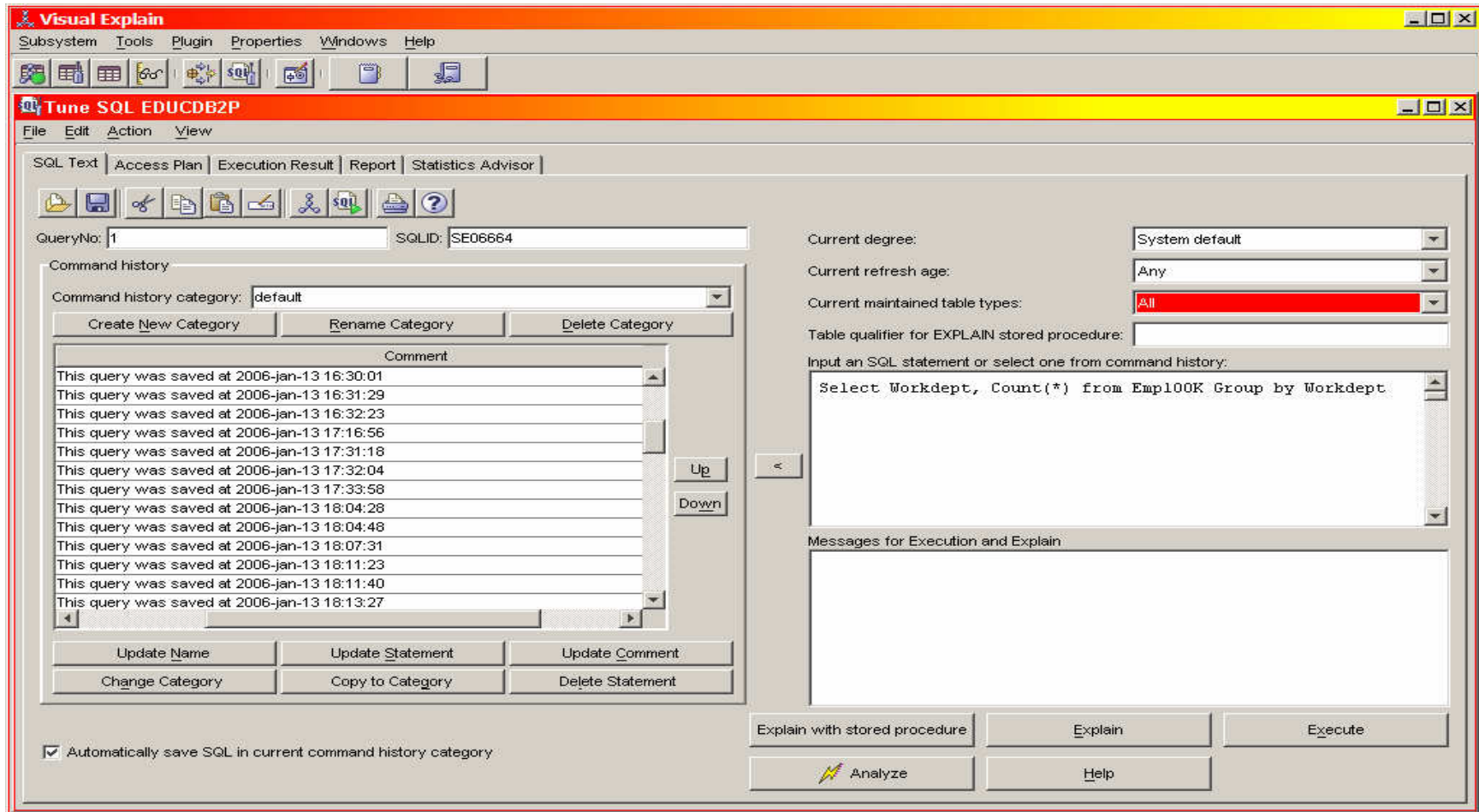
- QUERY (green oval)
- QB1 (blue circle, 25)
- WFSKAN (cyan hexagon, 25)
- WORK FILE (purple hexagon, 25)
- SORT (red hexagon, 25)
- TBSCAN (cyan hexagon, 10000)
- EMP100K (red rectangle, 10000(default))

On the left, the 'query' tab is active, showing a table with attribute explanation details:

Name	Value
Type	SELECT
CPU Cost (ms)	89
CPU Cost (su)	916
Cost Category	B
Reason	TABLE CARDINALITY
Timestamp	2006-01-19 15:53:32.22

Below the table, the 'Attribute explanation' section shows: `Type: Query type (SELECT, INSERT, UPDATE, DELETE, SELUPD, DELCUR, UPDCUR)`. The interface also includes a menu bar (File, Access Plan, Selected, Action, View), a toolbar, and a status bar at the bottom with buttons for 'Save As...', 'Print...', 'Suggestions', and 'Help'.

Select Workdept, Count(*) from Emp100K Group by Workdept



MQT

The screenshot shows the Visual Explain interface for a DB2 database. The main window displays the execution plan for a query. The plan consists of a root node 'QUERY' (green oval) connected to a 'QB1' node (blue circle), which is connected to a 'TBSCAN' node (blue hexagon), which finally connects to the 'MQT_EMP' table (red trapezoid). All nodes show a cardinality of 100. The 'Reason' for the table scan is 'TABLE CARDINALITY'. The 'Cost estimation' view is selected, showing a CPU cost of 20 and a cost category of 'B'. The timestamp is 2006-01-19 16:00:25.97.

DB2 Platform: Z/OS DB2 Version: v8 Explain Time: 2006-01-19 16:00:25.97

query

Show attribute explanation Views: Cost estimation

Name	Value
Type	SELECT
CPU Cost (ms)	2
CPU Cost (su)	20
Cost Category	B
Reason	TABLE CARDINALITY
Timestamp	2006-01-19 16:00:25.97

Attribute explanation:
Type: Query type (SELECT, INSERT, UPDATE, DELETE, SELUPD, DELCUR, UPDCUR)

Save As... Print... Suggestions Help Query

Parallelism

Visual Explain window showing a query plan for a table scan. The plan consists of a single path: QUERY -> OBI -> PTBSCAN -> CUSTOMER. A tooltip for the CUSTOMER node shows the following details:

- Node Type : Table[4]
- Table Name : CUSTOMER
- Creator Name : SE06664
- Cardinality : 400000
- < partitioned table space (table based) >

Name	Value
Type	SELECT
CPU Cost (ms)	3934
CPU Cost (su)	40551
Cost Category	A
Reason	
Timestamp	2006-01-20 07:27:00.6

Attribute explanation:
Type: Query type (SELECT, INSERT, UPDATE, DELETE, SELUPD, DELCUR, UPDCUR)

Visual Explain window showing a parallel query plan. The plan consists of a single path: QUERY -> OBI -> MERGE Degree: 2 -> PTBSCAN -> PARTITION Degree: 2 -> CUSTOMER. The attribute explanation for the CUSTOMER node is identical to the first screenshot.

Name	Value
Type	SELECT
CPU Cost (ms)	3934
CPU Cost (su)	40551
Cost Category	A
Reason	
Timestamp	2006-01-20 07:29:26.32

Attribute explanation:
Type: Query type (SELECT, INSERT, UPDATE, DELETE, SELUPD, DELCUR, UPDCUR)

"Stor" query

Visual Explain interface showing a query execution plan for a "Stor" query. The main window displays the query text, execution statistics, and a detailed execution plan graph. A tooltip for a Nested Loop Join node indicates a cardinality of 14 and a left outer join.

DB2 Platform: Z/OS DB2 Version: v8 Explain Time: 2006-01-19 16:17:32.71

query

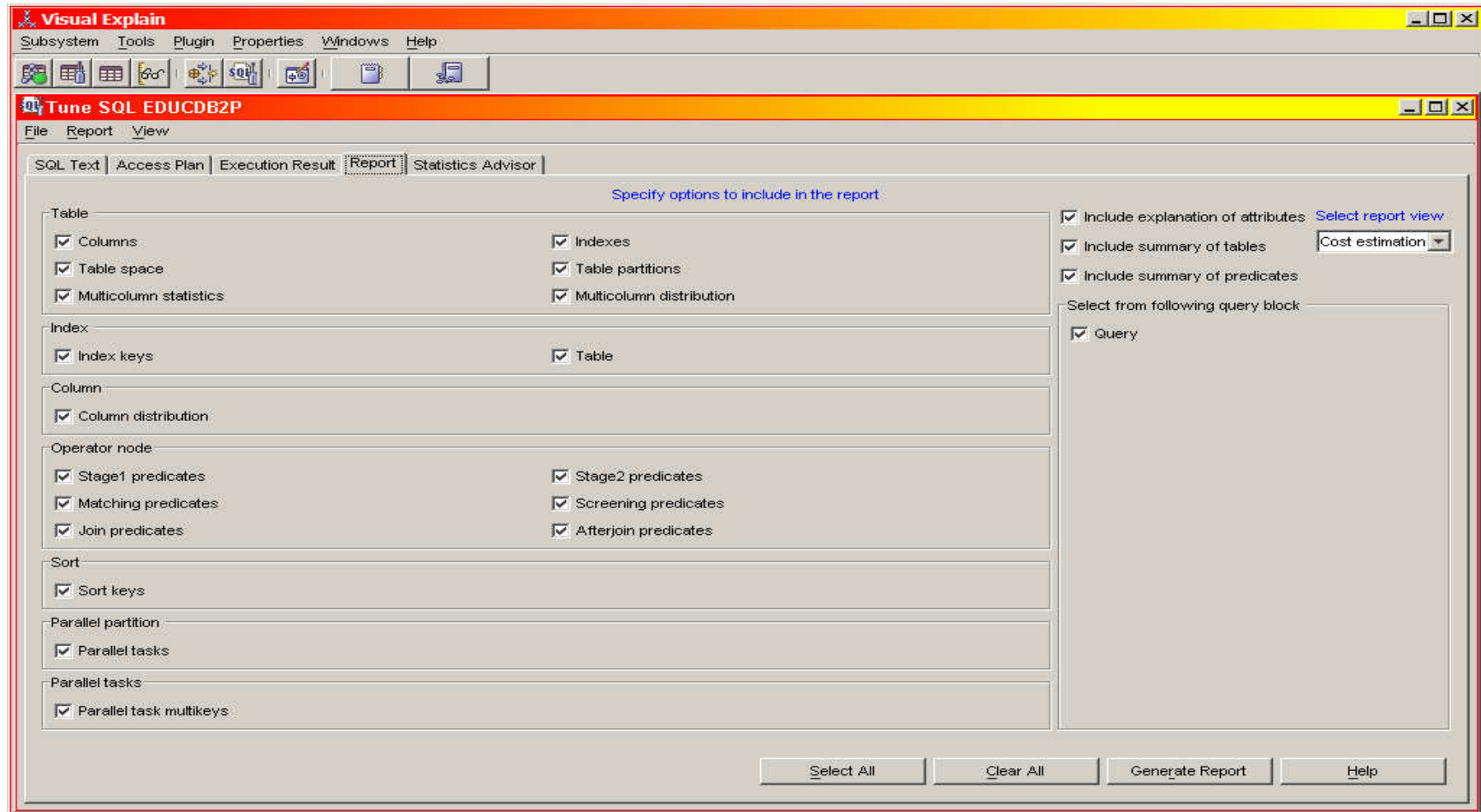
Views: Cost estimation

Name	Value
Type	SELECT
CPU Cost (ms)	2
CPU Cost (su)	17
Cost Category	A
Reason	
Timestamp	2006-01-19 16:17:32.71

Attribute explanation:
Type: Query type (SELECT, INSERT, UPDATE, DELETE, SELUPD, DELCUR, UPDCUR)

Node Type : Nested Loop Join[7]
Cardinality : 14
< left outer join >

Report



Report – V7

Access Path Report

- [Query Summary](#)
- [Table Summary](#)
- Access Path Description**
 - ◆ **Query Block 1**
 - [EMP \(table\) \(4\)](#)
 - [TBSCAN \(3\)](#)
 - [QB1 \(2\)](#)
 - [QUERY \(1\)](#)

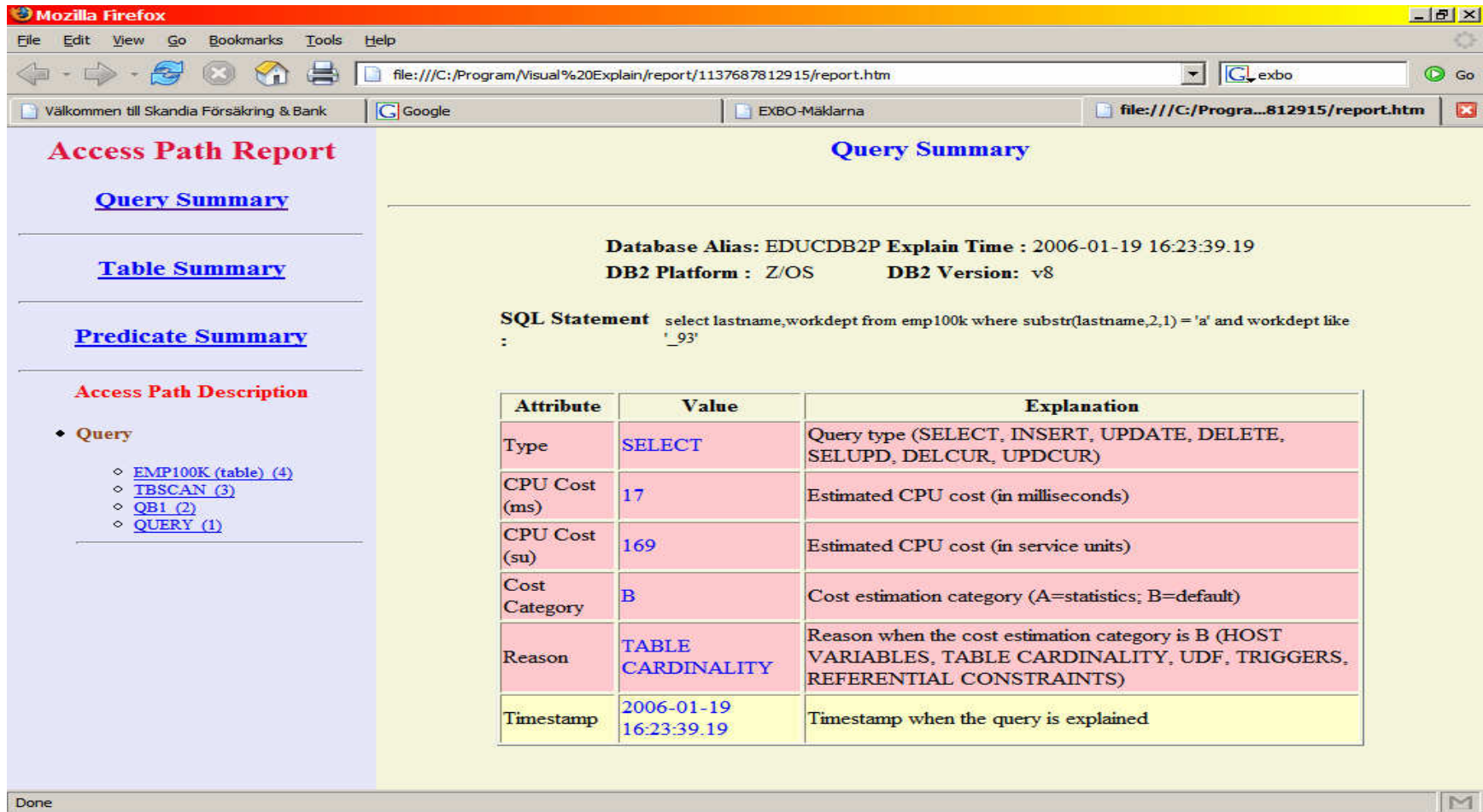
Query Summary

Database Alias: EDUCDB2D Explain Time : 2006-01-19 17:00:13.42
DB2 Platform : Z/OS DB2 Version: v7

SQL Statement select lastname,workdept from dsn8710.emp where substr(lastname,2,1) = 'a' and workdept like '_93'

Attribute	Value	Explanation
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)
Timestamp	2006-01-19 17:00:13.42	Timestamp when the query is explained

Report – V8



Access Path Report

[Query Summary](#)

[Table Summary](#)

[Predicate Summary](#)

Access Path Description

- Query
 - [EMP100K \(table\) \(4\)](#)
 - [TBSCAN \(3\)](#)
 - [QB1 \(2\)](#)
 - [QUERY \(1\)](#)

Query Summary

Database Alias: EDUCDB2P Explain Time : 2006-01-19 16:23:39.19
DB2 Platform : Z/OS DB2 Version: v8

SQL Statement select lastname,workdept from emp100k where substr(lastname,2,1) = 'a' and workdept like ' 93'

Attribute	Value	Explanation
Type	SELECT	Query type (SELECT, INSERT, UPDATE, DELETE, SELUPD, DELCUR, UPDCUR)
CPU Cost (ms)	17	Estimated CPU cost (in milliseconds)
CPU Cost (su)	169	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)
Timestamp	2006-01-19 16:23:39.19	Timestamp when the query is explained

Report – Parallelism

Access Path Report

[Query Summary](#)

[Table Summary](#)

[Predicate Summary](#)

Access Path Description

- Query
 - [CUSTOMER \(table\) \(6\)](#)
 - [PARTITION \(5\)](#)
 - [TBSCAN \(4\)](#)
 - [MERGE \(3\)](#)
 - [QB1 \(2\)](#)
 - [QUERY \(1\)](#)

PARTITION (5)

Attribute	Value	Explanation
Parallel Group ID	1	Parallel group ID
Low Key		Low key value in this parallel group
High Key		High key value in this parallel group
Key Columns		Number of key columns to determine partitions if is partitioned by key range
First Page	2	First page number in this parallel group
Last Page	1048575	Last page number in this parallel group
Parallel Tasks	2	Number of concurrent parallel tasks
Partition Type	P	Indicator for how partitioning should be done (K:Key range; P:Page range)
Input and Output Style	RIRO	Input and Output style (WIWO:workfile in, workfile out; WIRO:workfile in, record out; RIRO:record in, record out)
Partitioned Table	CUSTOMER	Partitioned table or index name in this parallel group
Parallelism Mode	C	Parallel mode (I:Query IO parallelism; C:Query CPU parallelism; X:Sysplex query parallelism; blank:parallelism is disabled)

Parallel Tasks: **paralleltask 1**

Done

Vad är viktigast – V7?

- Report
- Explain med procedur
- Grafen (med bubblor)

Vad är viktigast – V8?

- Report – *Stage 1 o 2, filterfaktorer*
- Explain med procedur
- Grafen (med bubblor och *info*)
- *Runstats (förslag och exekvering)*