A Peek at IBM Optim Query Tuner

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DB2 for z/OS Technical Conference

October 5-6, 2009

Taipei, Taiwan

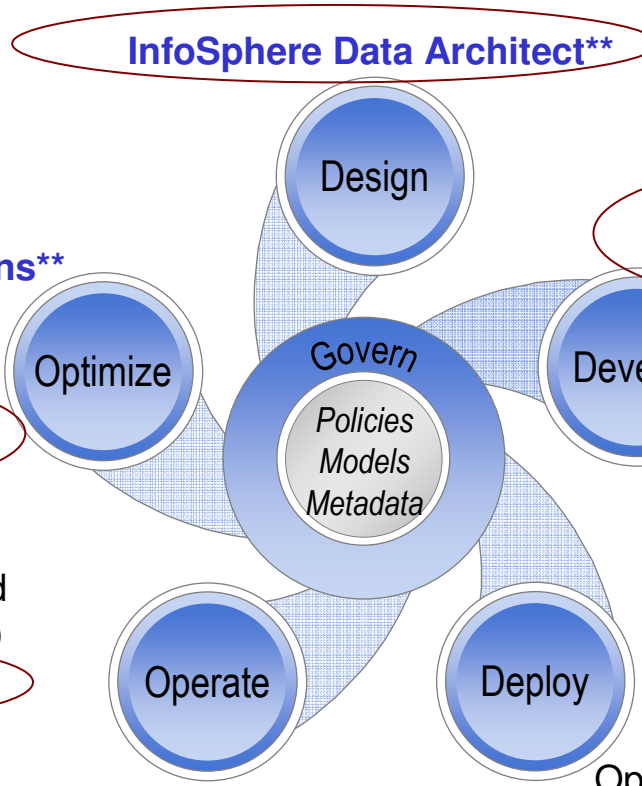
Agenda

- ***What is Optim Query Tuner***
- ***What role it plays in the Integrated Data Management Solutions***
- ***Business Value of Optim Query Tuner***
- ***Key Features/Functions Overview***
  - *Single Query tuning features*
  - *Workload Tuning features*
- ***Product Integration support***
- ***What's New for V2.2***
- ***Roadmap for the future***
- ***Summary***

What is *Optim Query Tuner?*

- *Integrated Data Management Solution that provides tools and advisors to optimize query performance and physical database design*
  - *(a.k.a DB2 Optimization expert)*
- *Reduces the complexity and manual effort required to perform query tuning*
- *Decreases the reliance on specialized Query Optimization and SQL tuning skills*
- *Provides a rich set of SQL tuning tools and design advisors that can be used Cross-Data Lifespan*
- *Eclipse Based with integration and common shell sharing with:*
  - *InfoSphere data Architect*
  - *Optim Development Studio (with pureQuery)*
  - *Optim Database Administrator*
  - *and more…*
- *Support Both DB2 for z/OS V8 and V9 and DB2 for LUW*

Optim Integrated Data Management Products – Overview



InfoSphere Data Architect**

Optim Development Studio
Optim Query Tuner**

Optim Data Growth Solutions**

Optim Test Data Management**

Optim Query Workload Tuner (DB2 z/OS)

Optim Data Privacy Solutions**

DB2 Performance Expert and Extended Insight (DB2 LUW)
Omegamon XE (z)

Optim pureQuery Runtime**

DB2 z/OS Tools

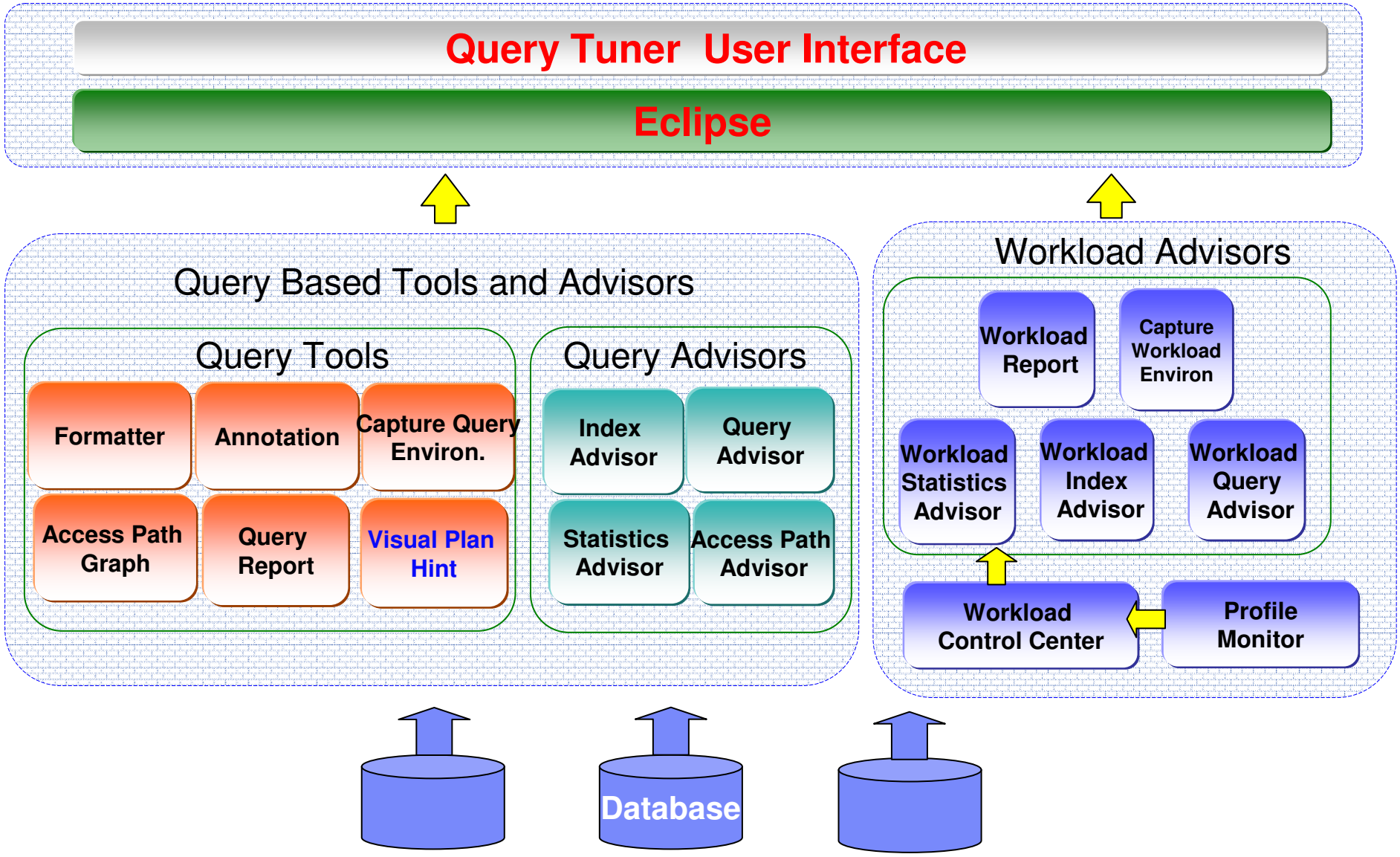
Optim Database Administrator (DB2LUW)
DB2 Admin Tool/Object Compare (z)

DB2 z/OS Utilities Suite

DB2 Audit Management Expert**
Database Encryption Expert

Heterogeneous Offerings
***** z and LUW***

Optim Query Tuner Key Features at a Glance



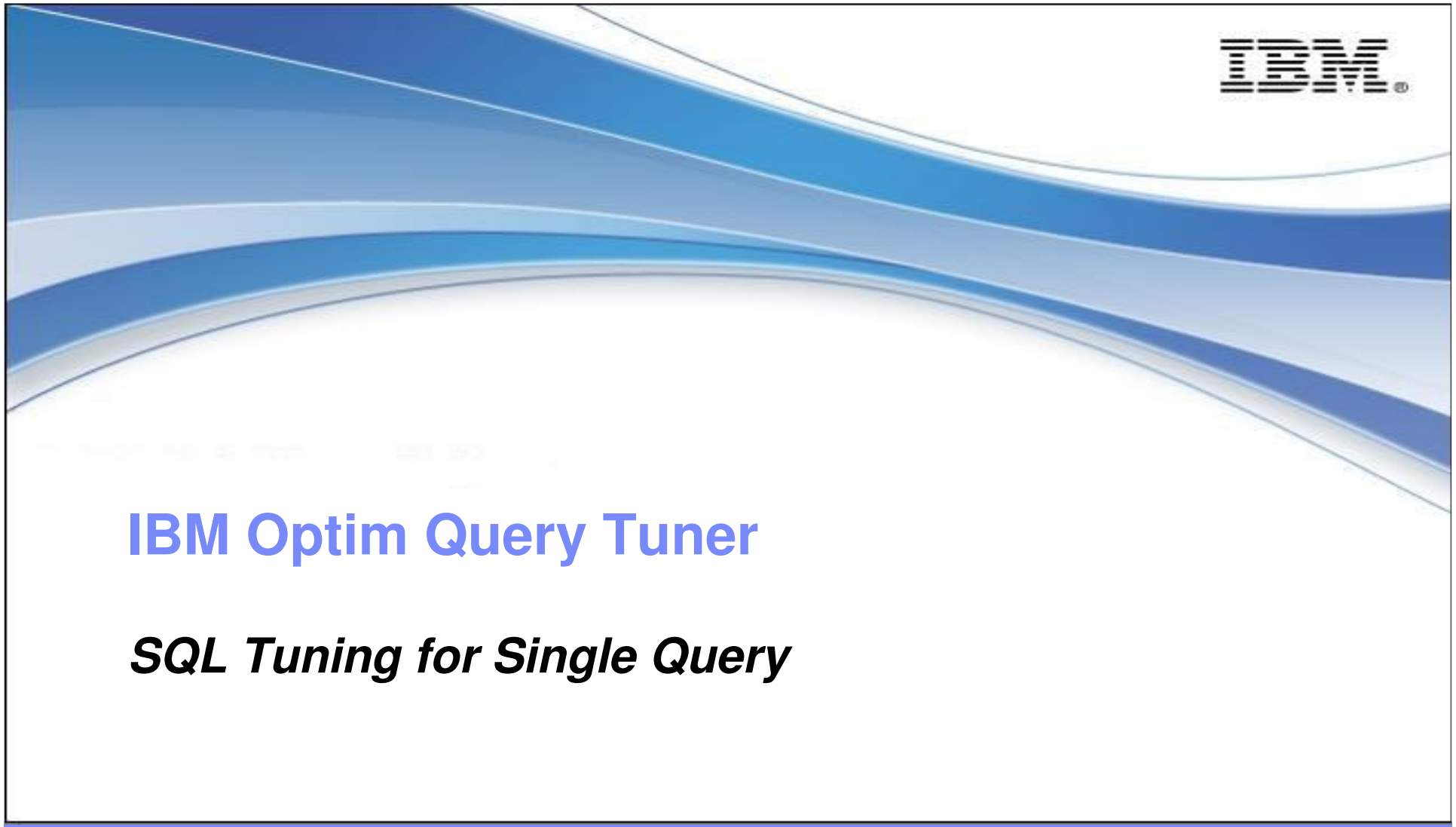
**Workload Advisors and VPH available for DB2 z/OS

IT Challenges Today

- **Applications are designed and implemented very quickly today**
- **Insufficient skill and resources to perform an adequate review of SQL performance and database physical design**
- **Entire applications can be developed and/or enhanced with performance "surprises" discovered in production**
- **Tuning an entire workload requires**
  - Analyzing each query for Access Path in the workload,
  - the frequency of query execution,
  - The expected CPU/ET of an individual query
- **Impact to business:**
  - Significant efforts and resources required to perform the SQL performance review
  - SQL Performance analysis may not be done, or done incompletely
  - *High cost of CPU and resources consumption*

Use IBM Optim Query Tuner/Workload Query Tuner Solutions

- **Identify query/workload candidates**
  - DB2 Catalog,
  - Dynamic statement Cache,
  - Text, File, package, QMF and more
- **Prevent problems before they impact the business**
  - Get early warning from Statistics advice, Access path advice, Query advice, index advice of emergent problems
  - Isolate problems quickly
  - Identify and optimize high cost queries proactively from workload Query Tuner tooling and advices
- **Improves quality of service/application development**
  - Use expert advice for performance optimization
  - Accelerate responses to performances issues
  - Enable fixes in applications before run on production systems
- **Reduce costs**
  - Increase capacity of existing systems
  - Free up DBA time for value creation activities
  - Optimize SQL in development while costs and impact are low



IBM Optim Query Tuner

SQL Tuning for Single Query

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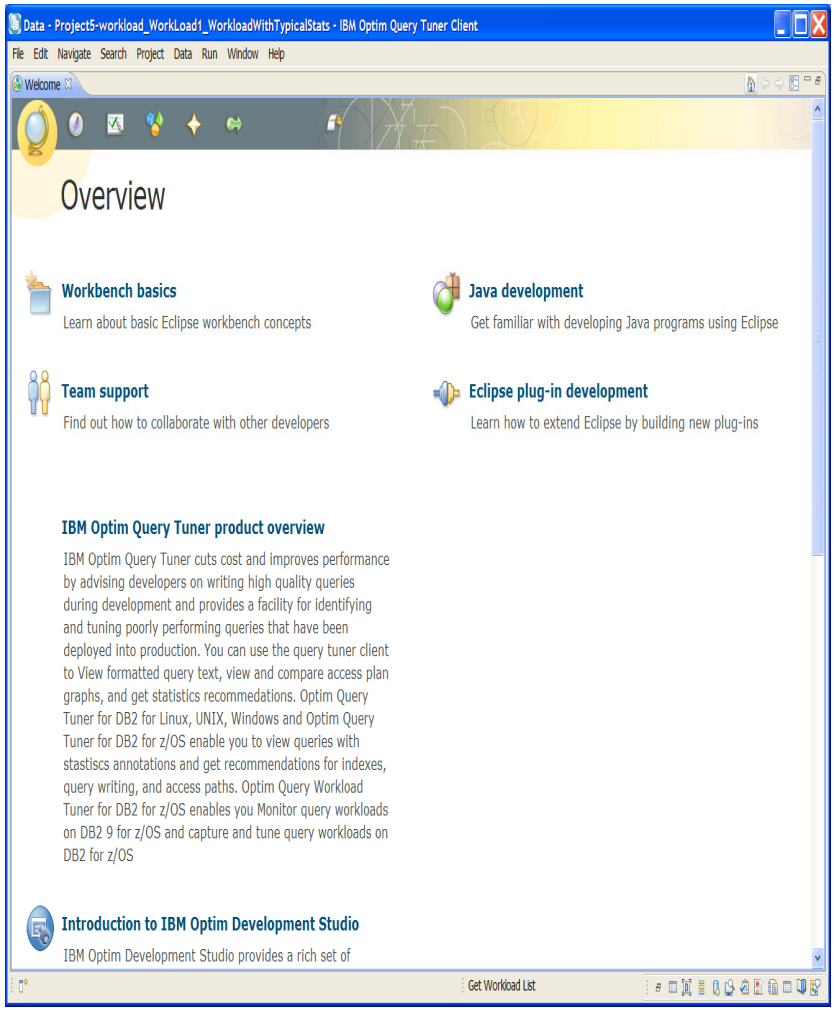
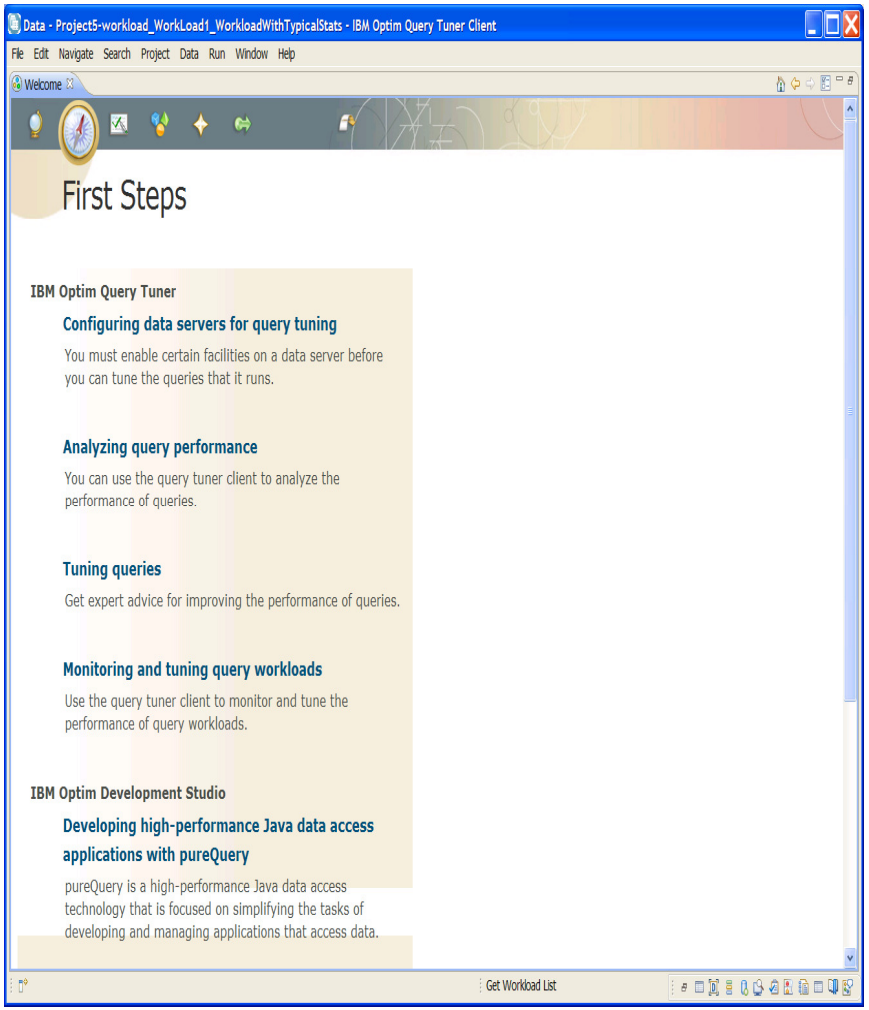
QT Welcome Page – Product Overview and First Steps



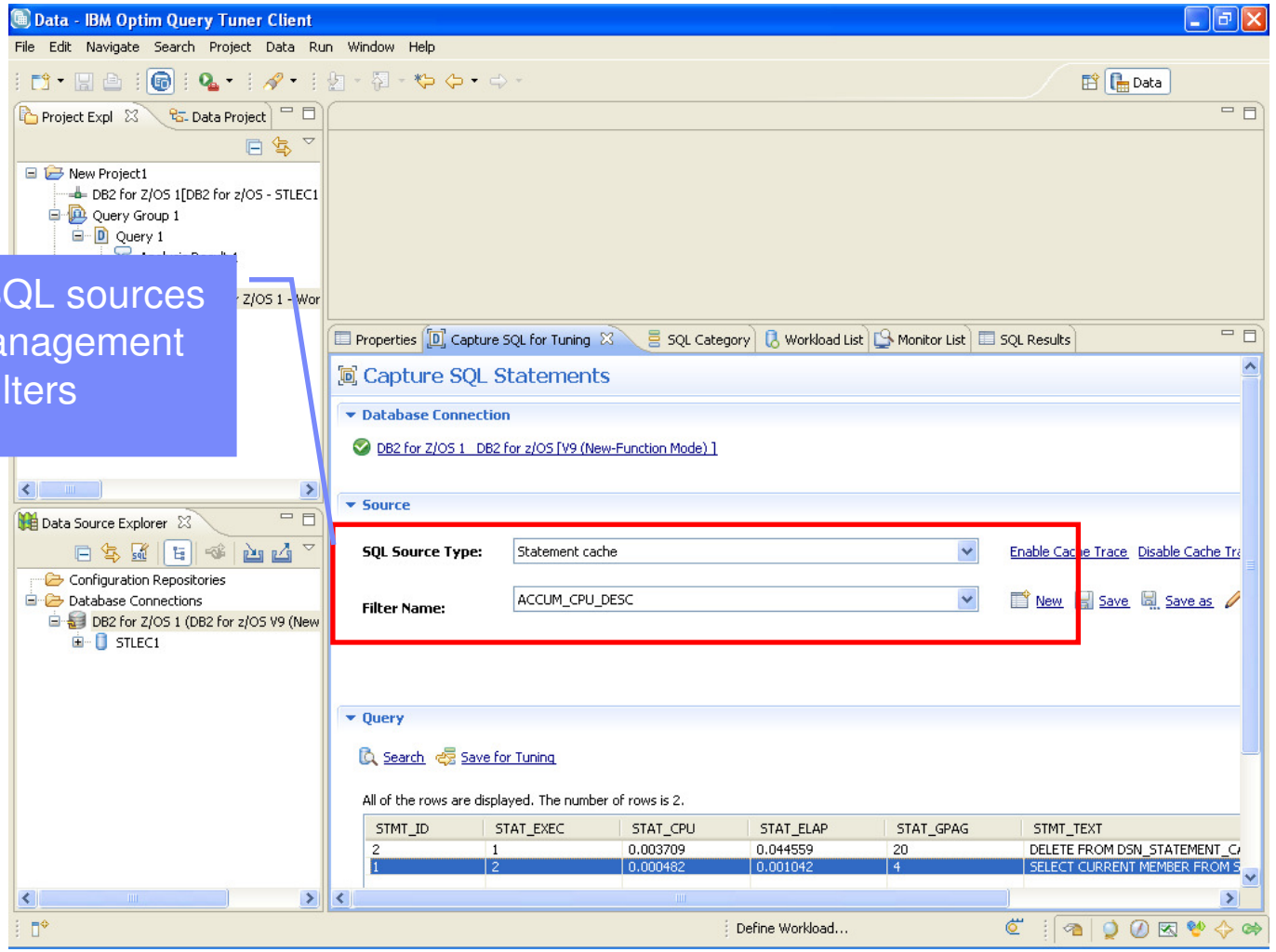


Capture SQL for Tuning

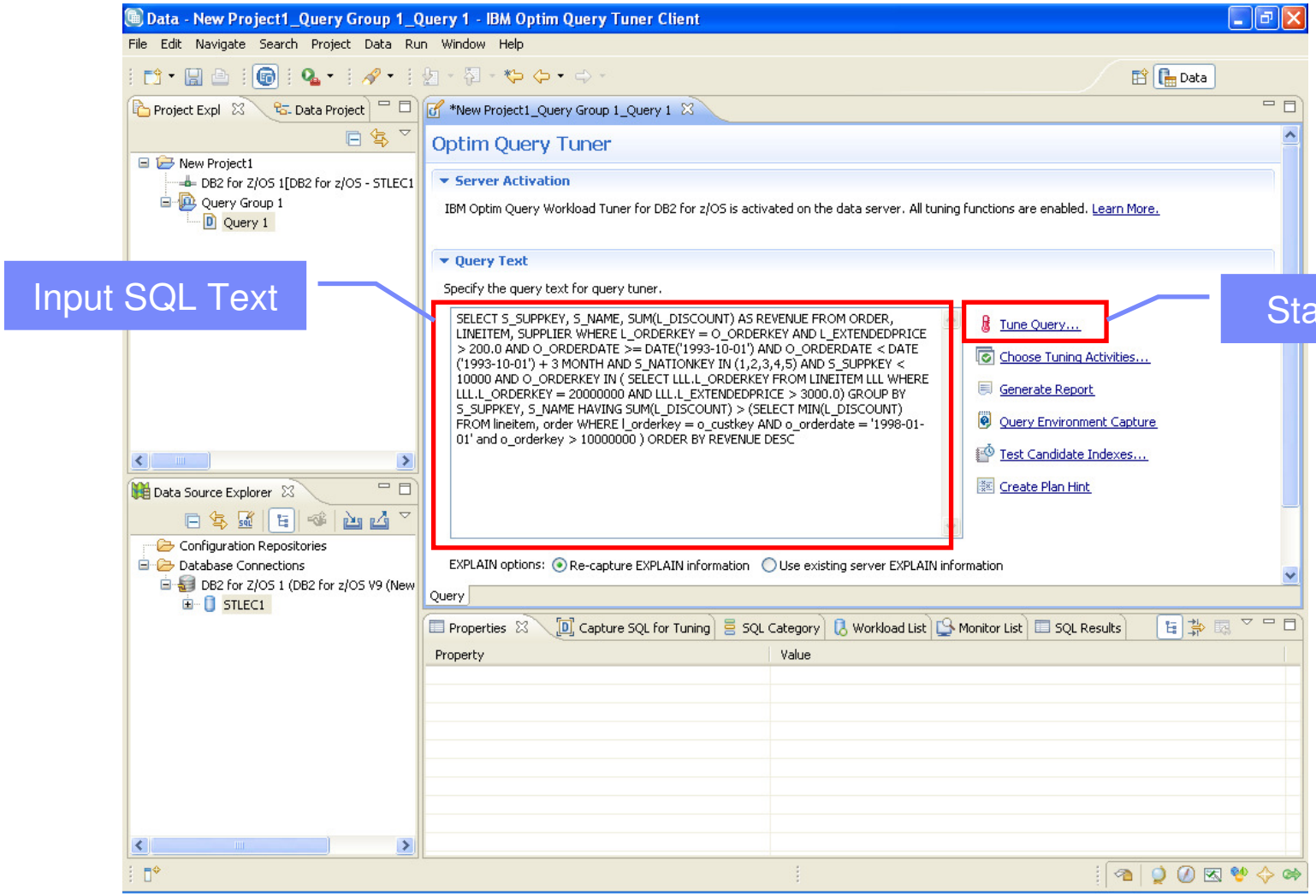
- ***Identify SQL with performance issues***
- ***Capture SQL for Tuning***
  - *DB2 for z/OS*
    - *Cache,*
    - *Catalog,*
    - *QMF, QMFHPO*
    - *Text, File, Category*
    - *PLAN Table/Statement Table/Function Table*
    - *Workload/Monitor*
  - *DB2 for Linux, Unix and Windows*
    - *Text,*
    - *File,*
    - *Category*
    - *Package*

Capture SQL for Tuning

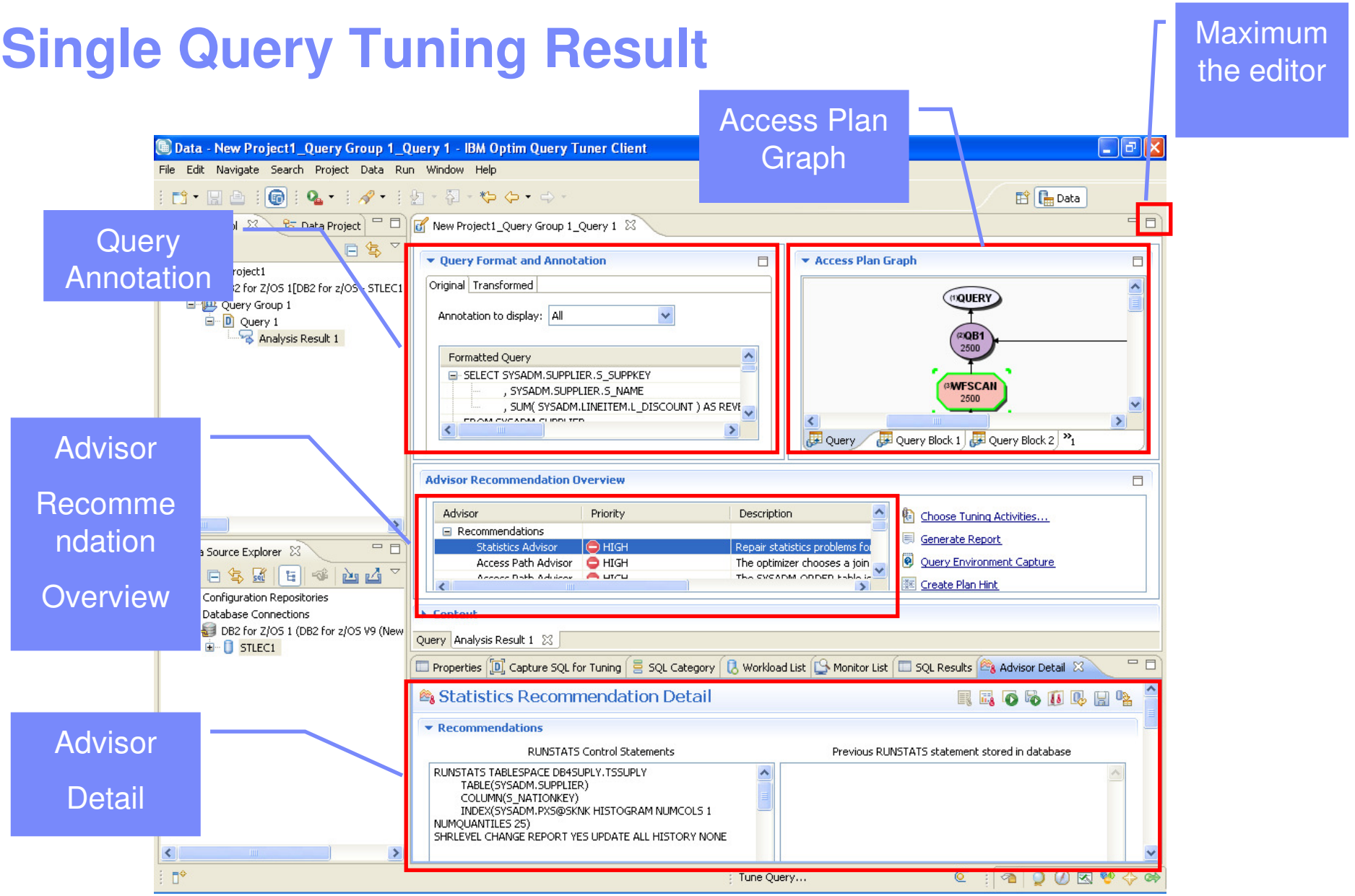
Select SQL sources and management filters



Tuning for Single Query – Input SQL Text



Single Query Tuning Result

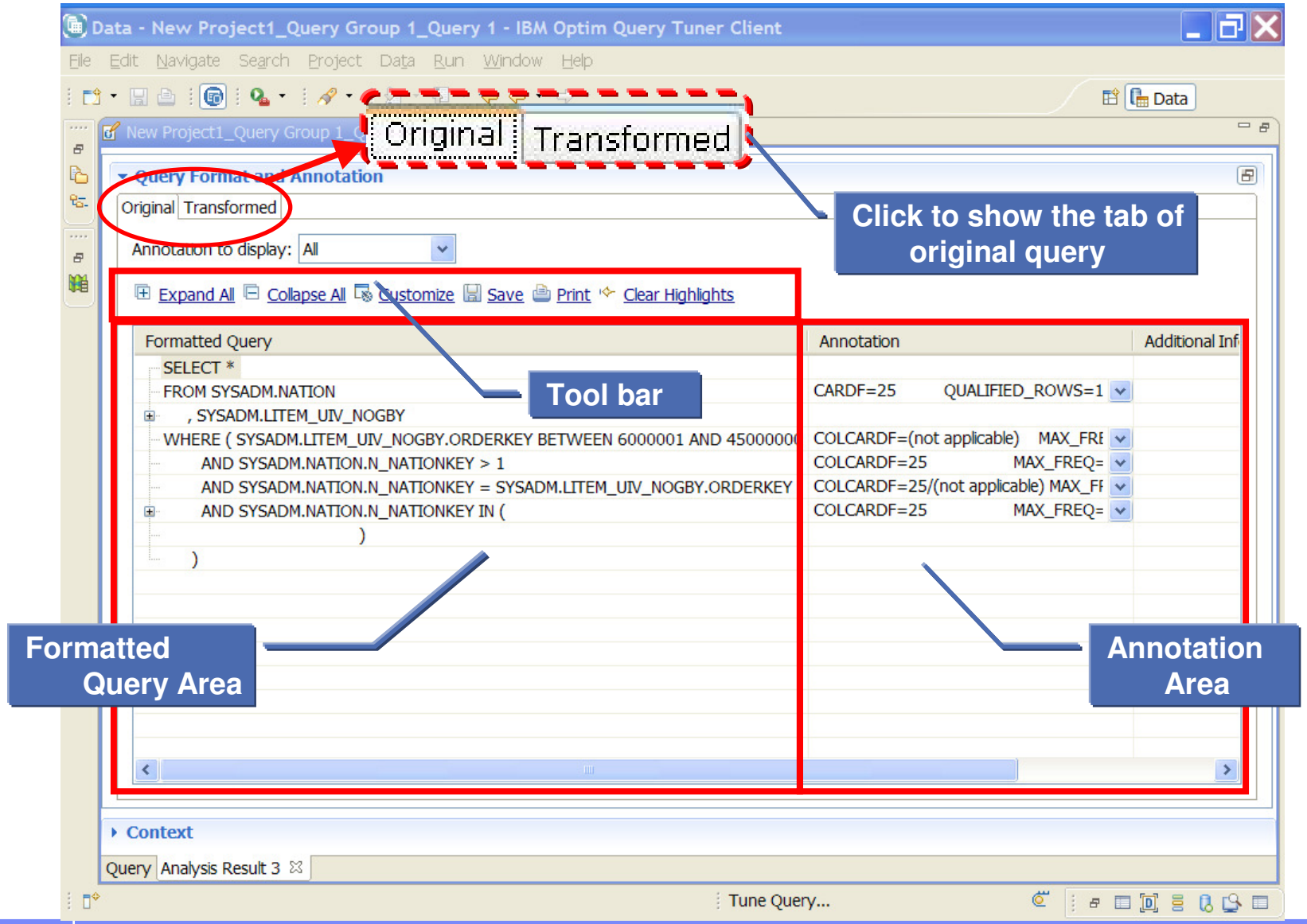


Why Query Formatting/Annotation?

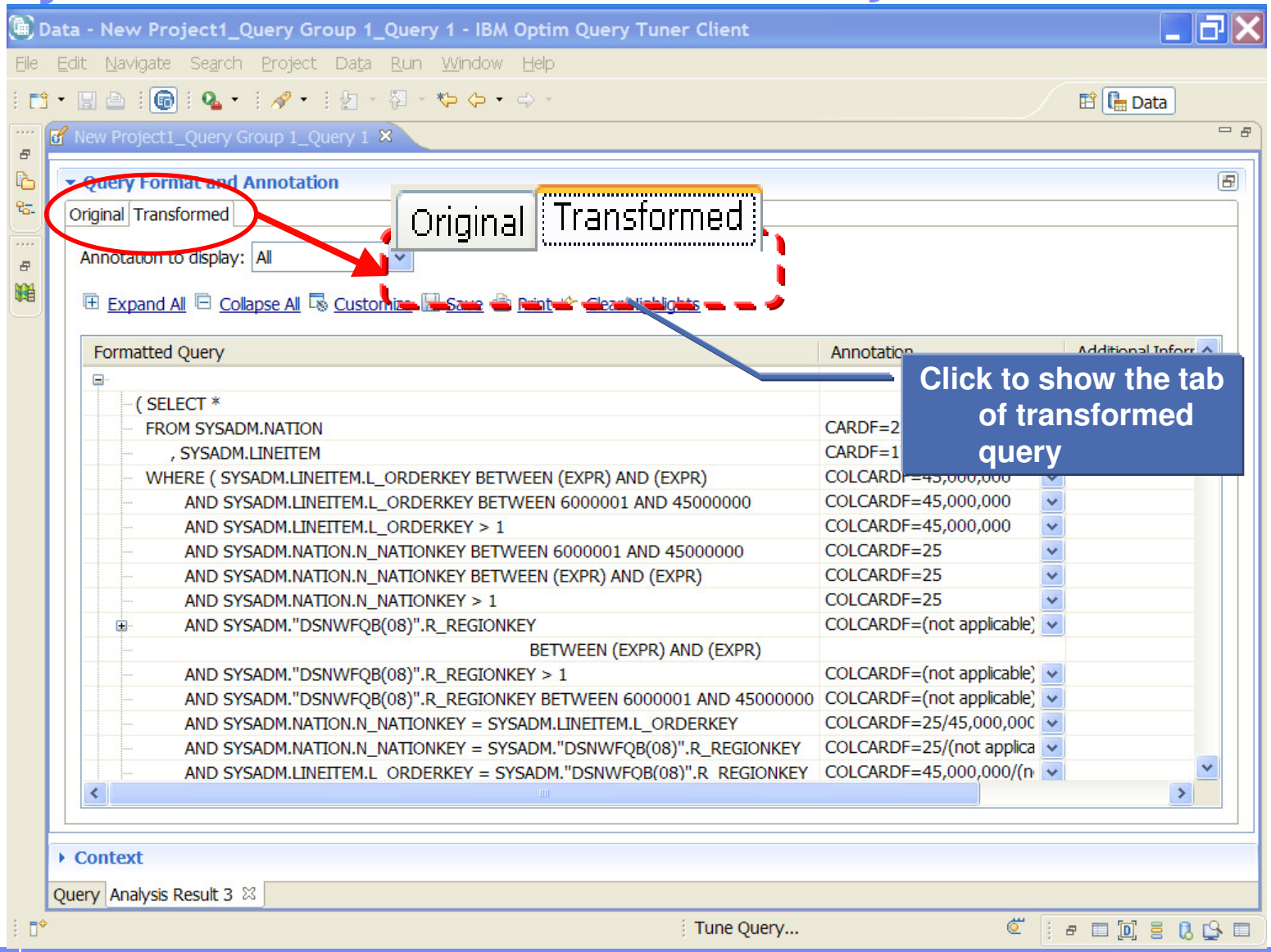
A peek at an unformatted Query

```
SELECT B.BRANCH_NO, B.BRANCH_NAME ,B.BRANCH_ACCT_NO,
B.BRANCH_CITY, B.BRANCH_ST, A.BRANCH_ADDR_TYPE_CD ,
S.TRANS_SETL_AMT FROM TRANS_SETLMNT S ,BRANCH C ,
BRANCH_ADDR A
WHERE S.TRANS_NO = ? AND S.TRANS_PROC_DT < '9999-12-31‘
AND  YEAR(S.TRANS_TARGET_DT) = ‘2002’ S.TRANS_TYPE  IN
(‘A1', ‘A2', ‘A3', ‘Z9')
AND S.TRANS_CD IN  ('EOD', 'IMD', ‘UGT') AND
S.TRANS_SETL_DT = ? AND S.BRANCH_NO = C.BRANCH_NO AND
B.BRANCH_EFF_DT <= ? AND B.BRANCH_INACTIVE_DT >  ? AND
A.BRANCH_NO = C.BRANCH_NO AND A.BRANCH_EFF_DT    <= ?
 AND A.BRANCH_INACTIVE_DT    >  ?  AND
A.BRANCH_ADDR_TYPE_CD   = ' '
```

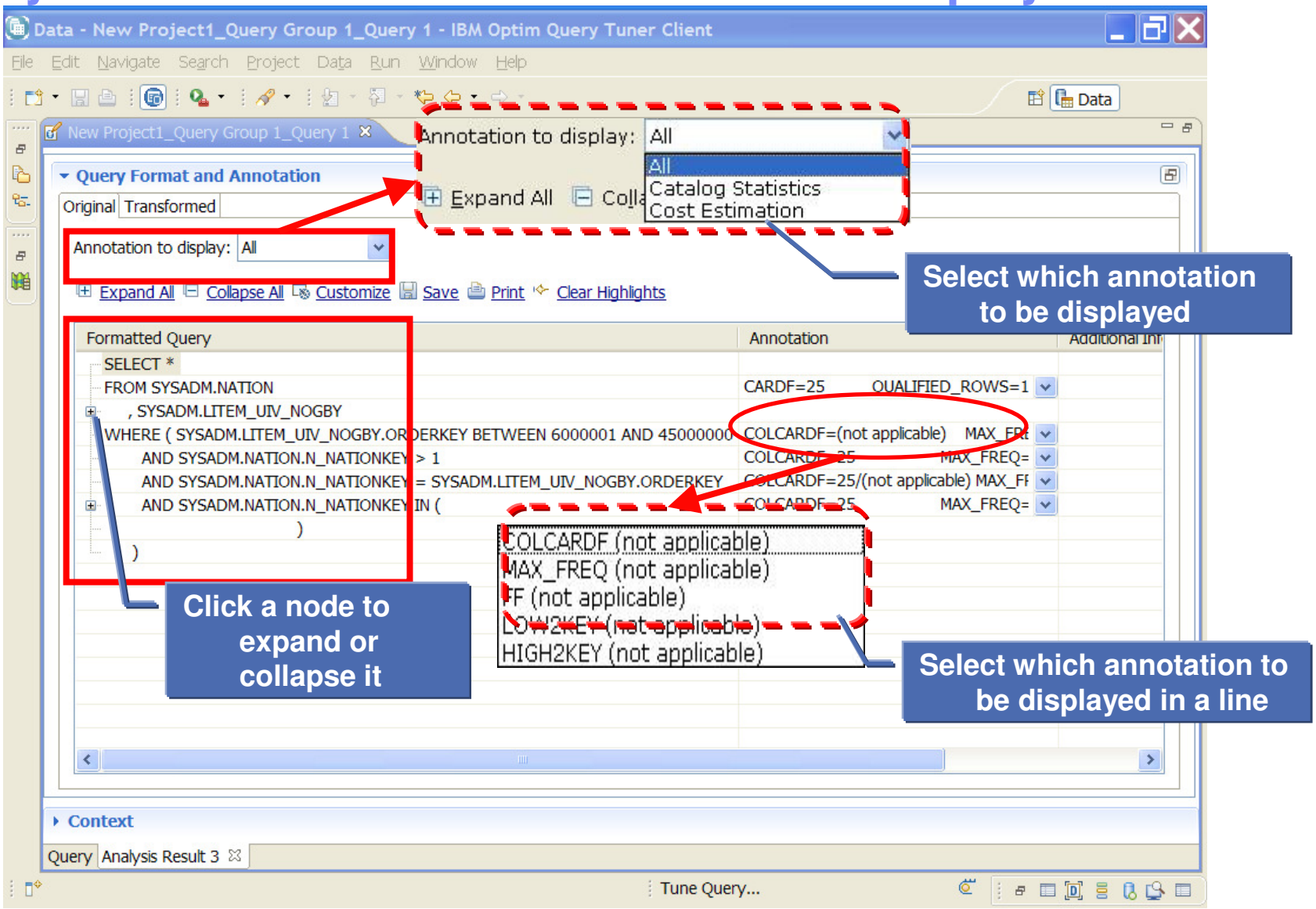
Query Annotation - Annotate a statement



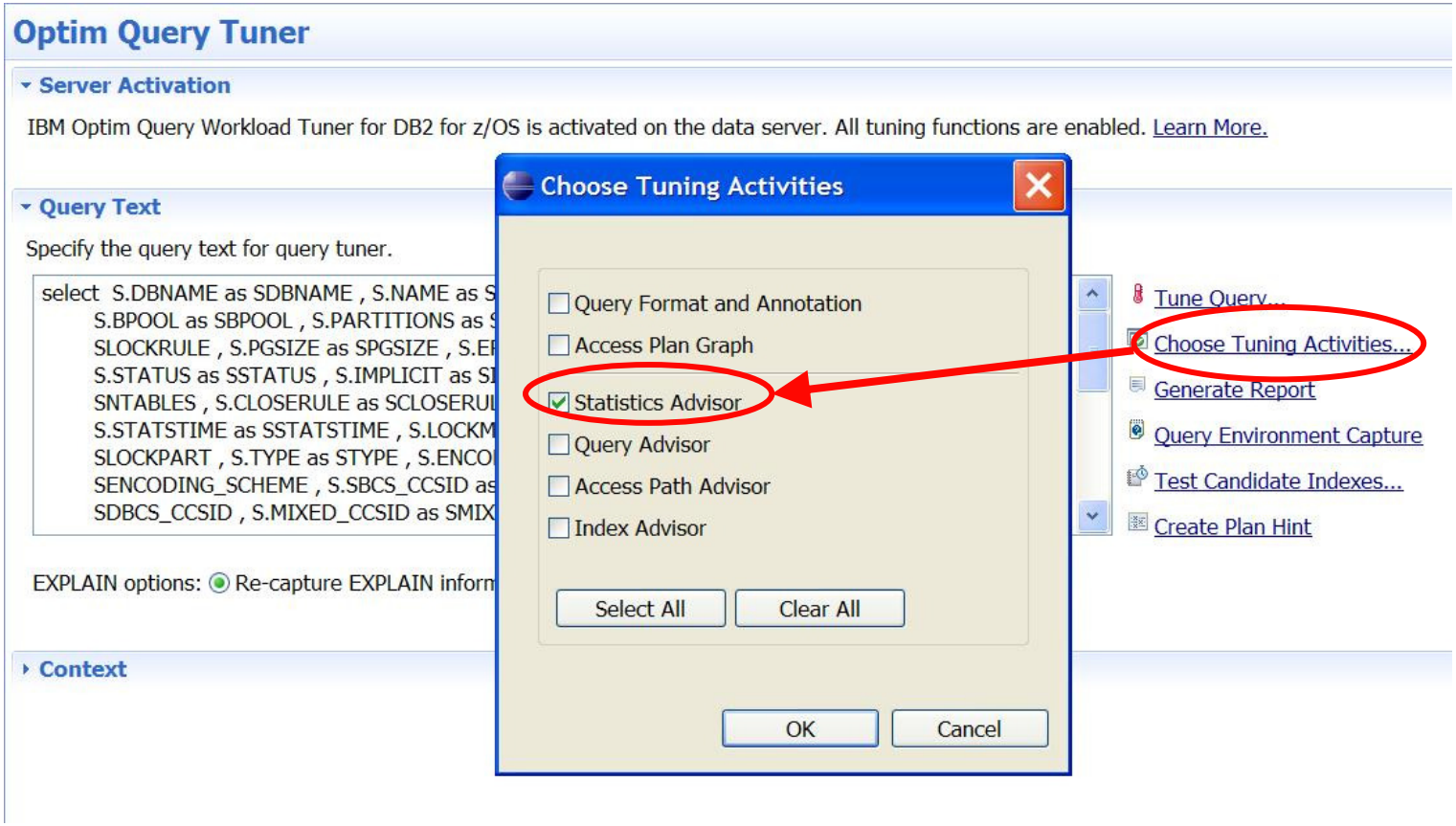
Query Annotation - Transformed Query Annotation



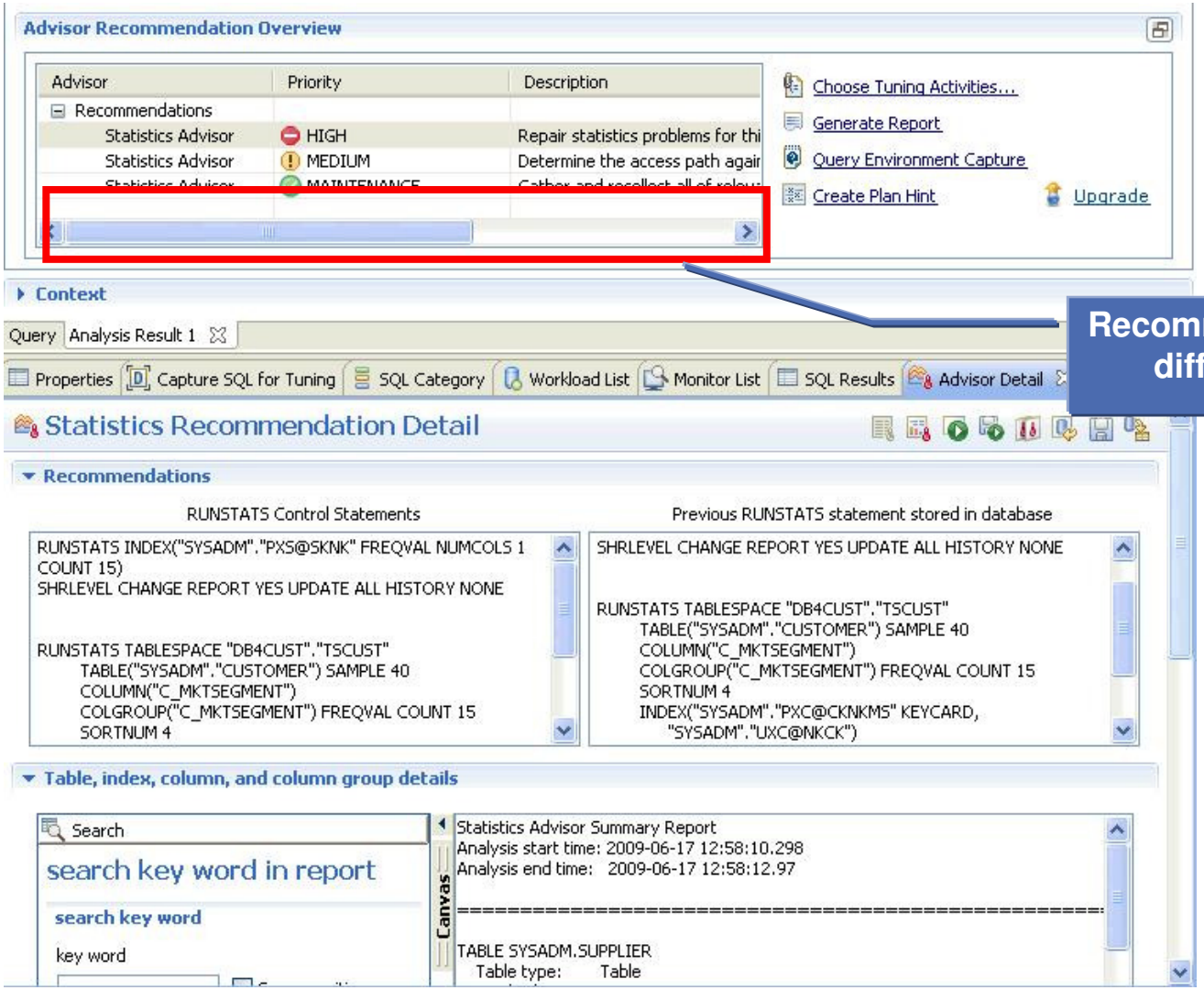
Query Annotation - Select Annotation to display



Stats Advisor (SA)

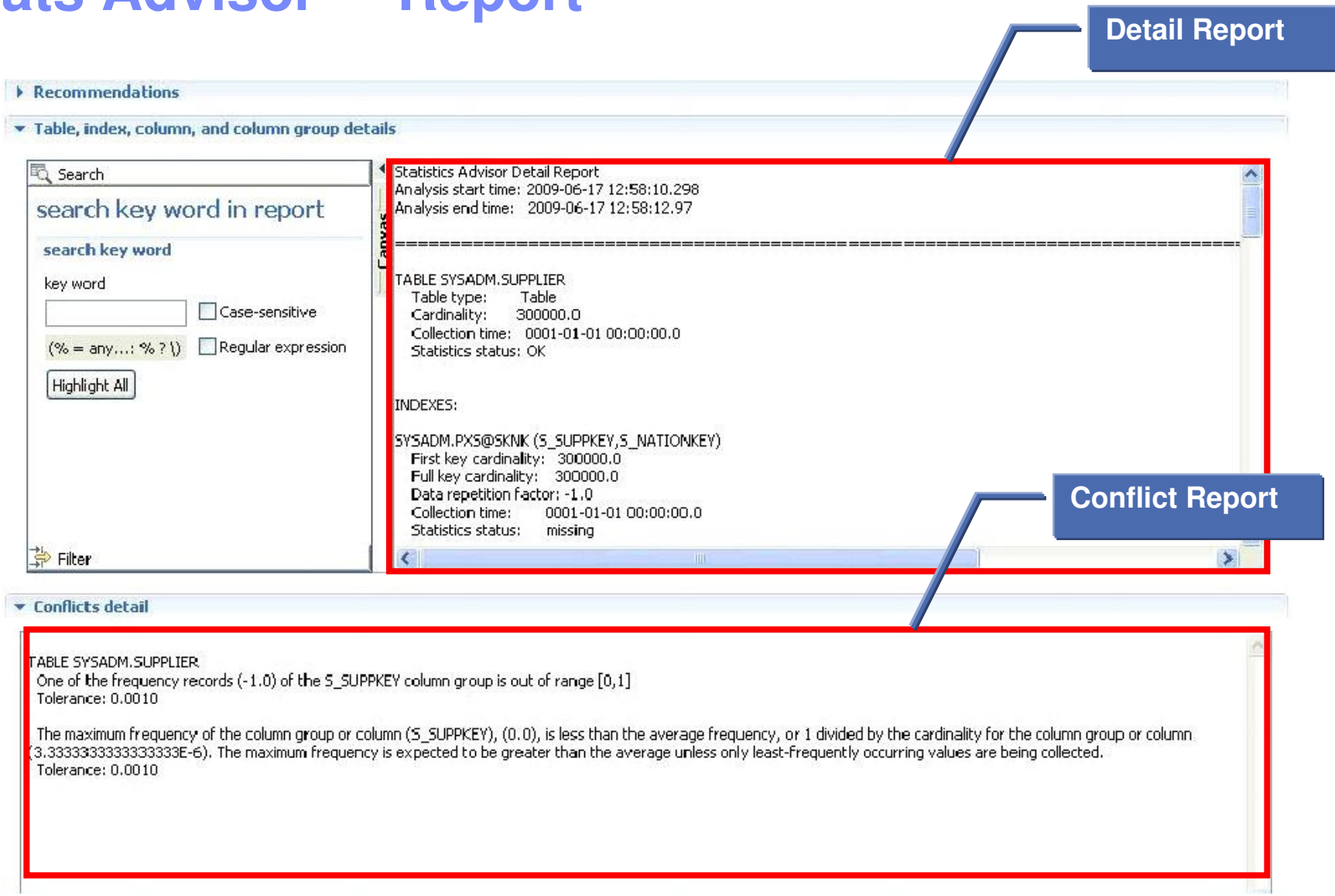


Stats Advisor – Recommendation Summary



Recommendations with different priority

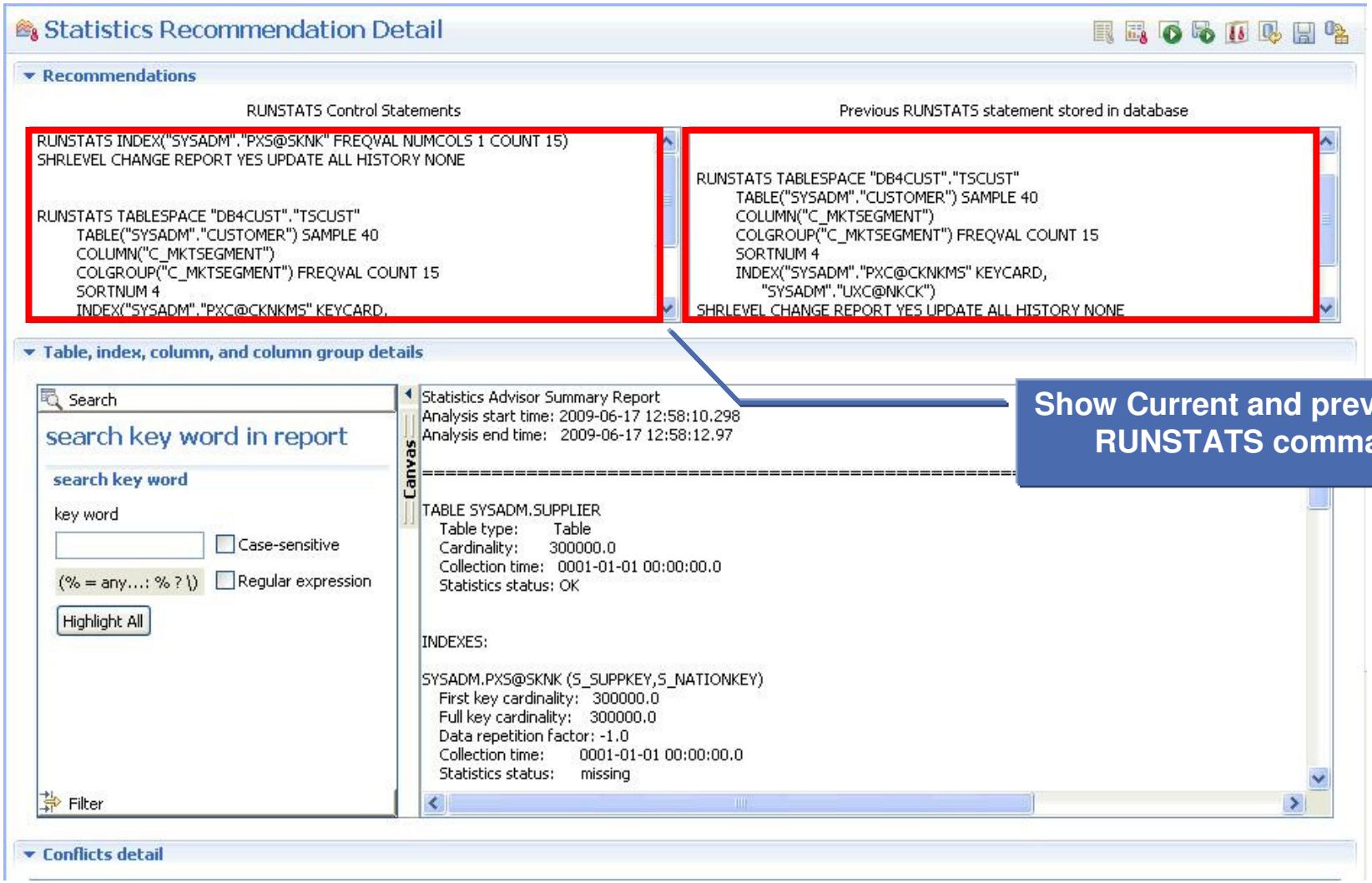
Stats Advisor – Report



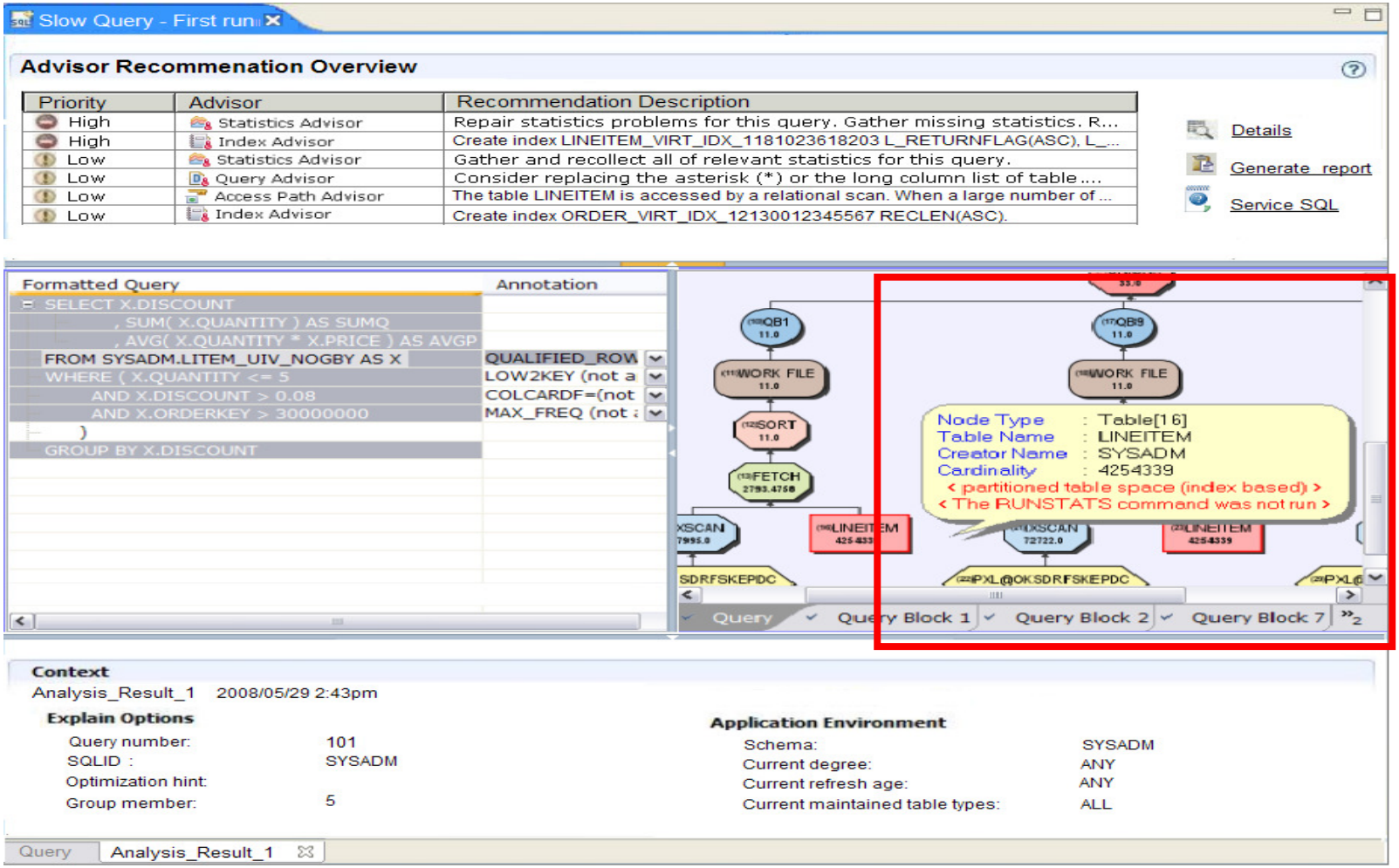
Stats Profile Support – new for V2.2

- **Produce consolidated recommendation**
  - SA will intersect/merge previous saved RUNSTATS command with the new RUNSTATS command to provide a consolidated RUNSTATS command.
  - For data server without statistical profile support, server side stats profile table will be created while creating the EXPLAIN tables to store information about the table (name, schema) and the current stats profile for the table.
  - User can save current or load previous SA recommendations (REPAIR or CONSOLIDATE) .

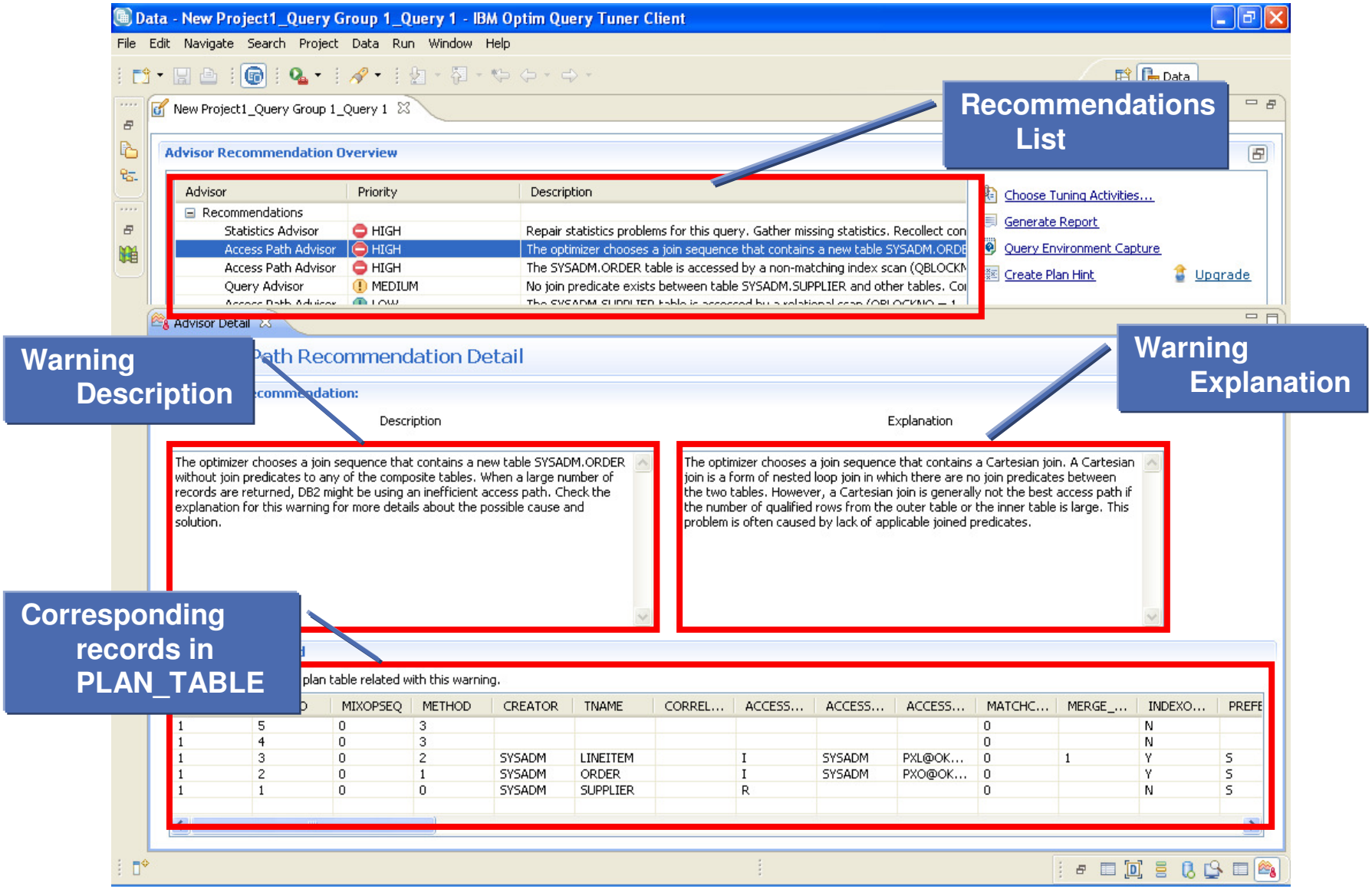
Statistics Advisor – A case of Stats Profile



Stats Advisor – Integration with APG (new)

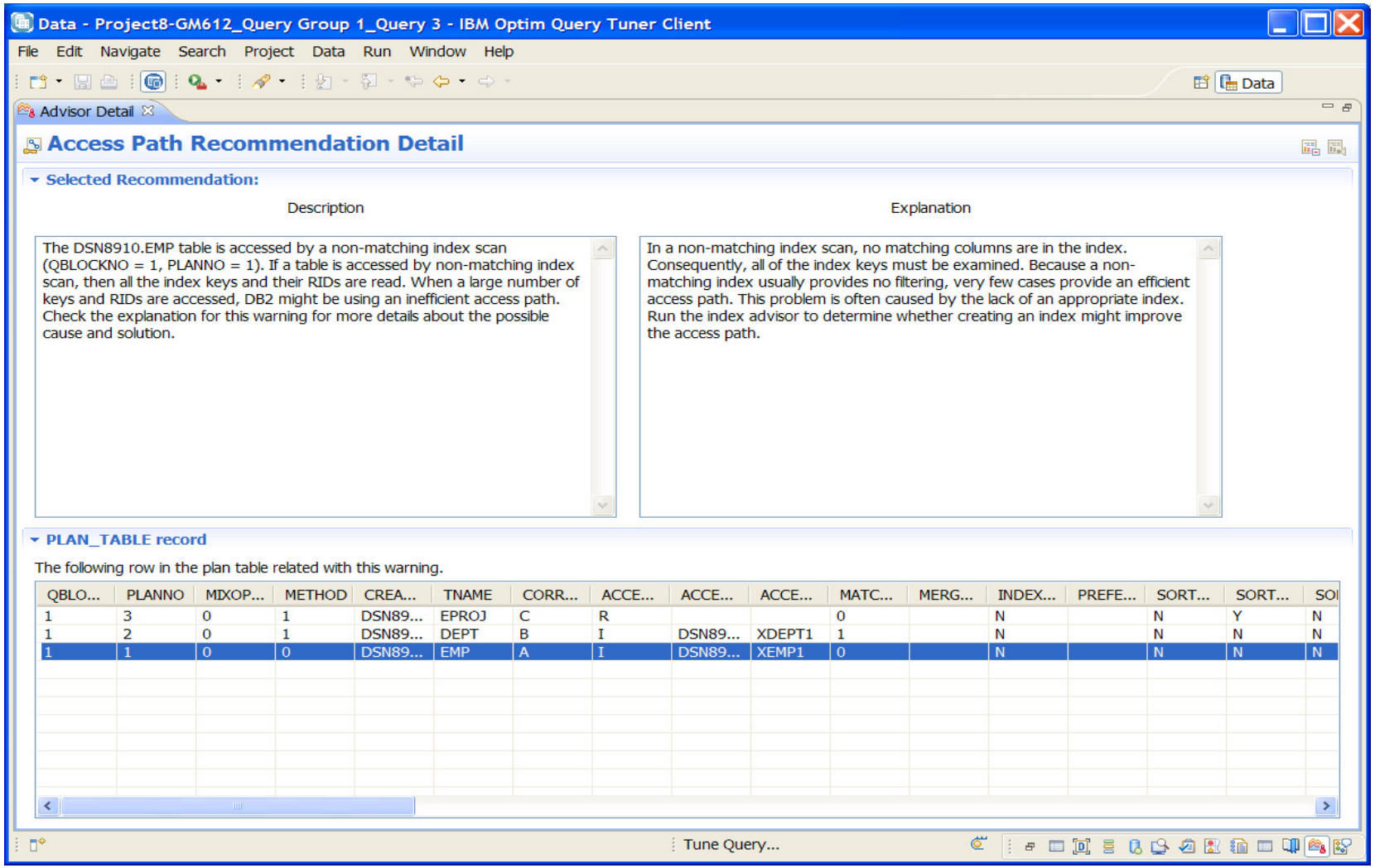


Access Path Advisor – Access Path Warning

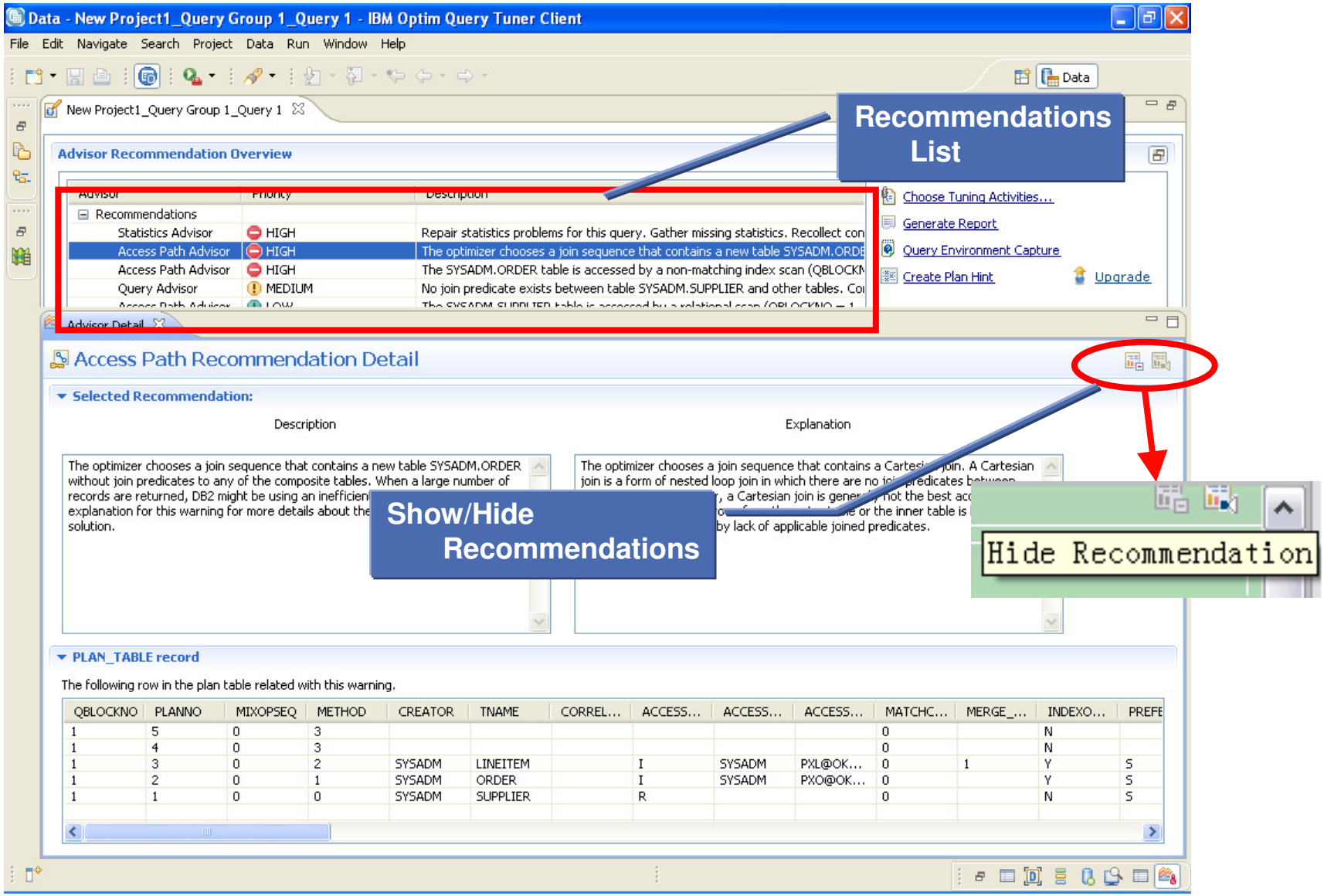


Access Path Advisor and its recommendations

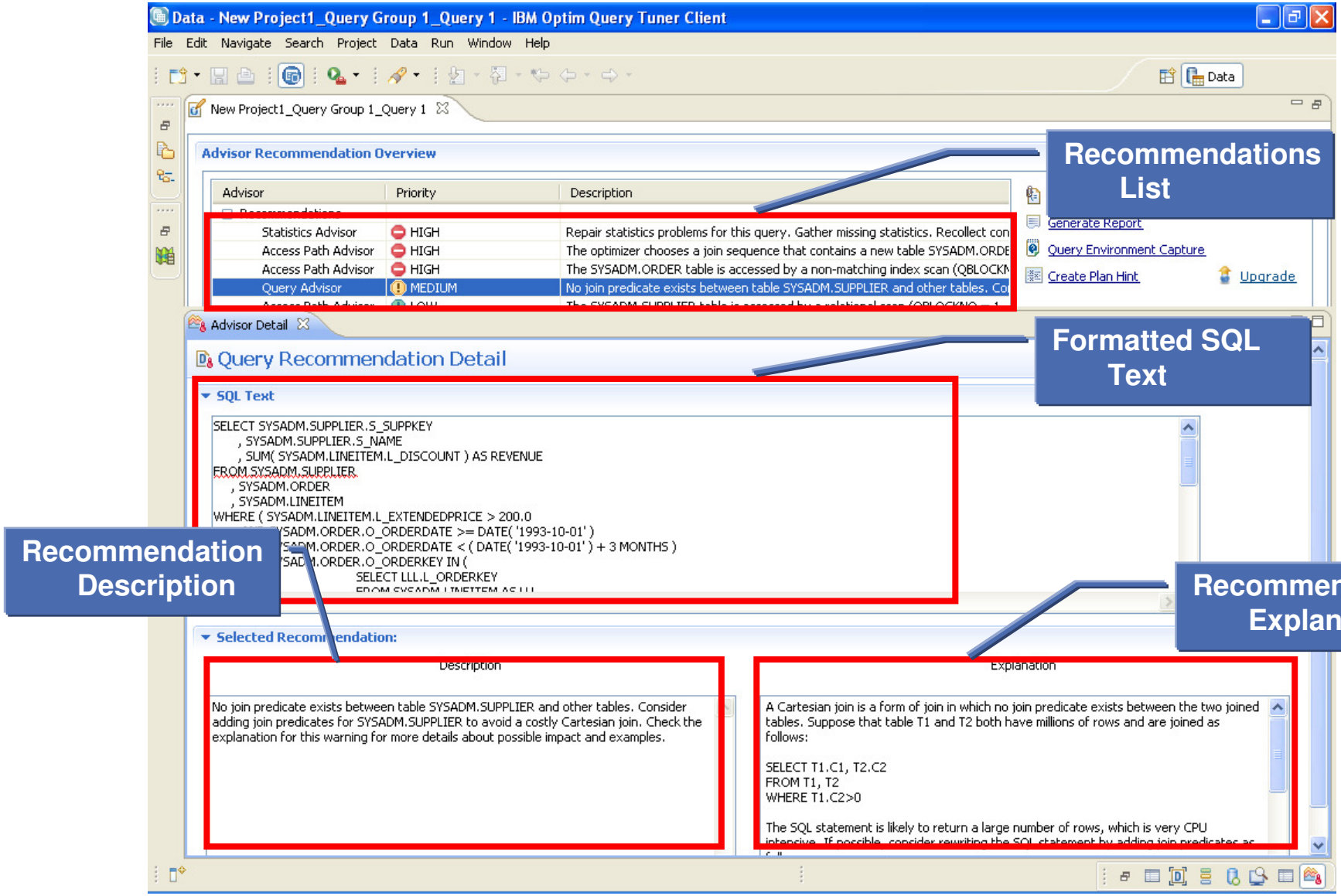
- *A example Query with Access plan of Non-matching index access*



Access Path Advisor – Hide/Show Recommendations



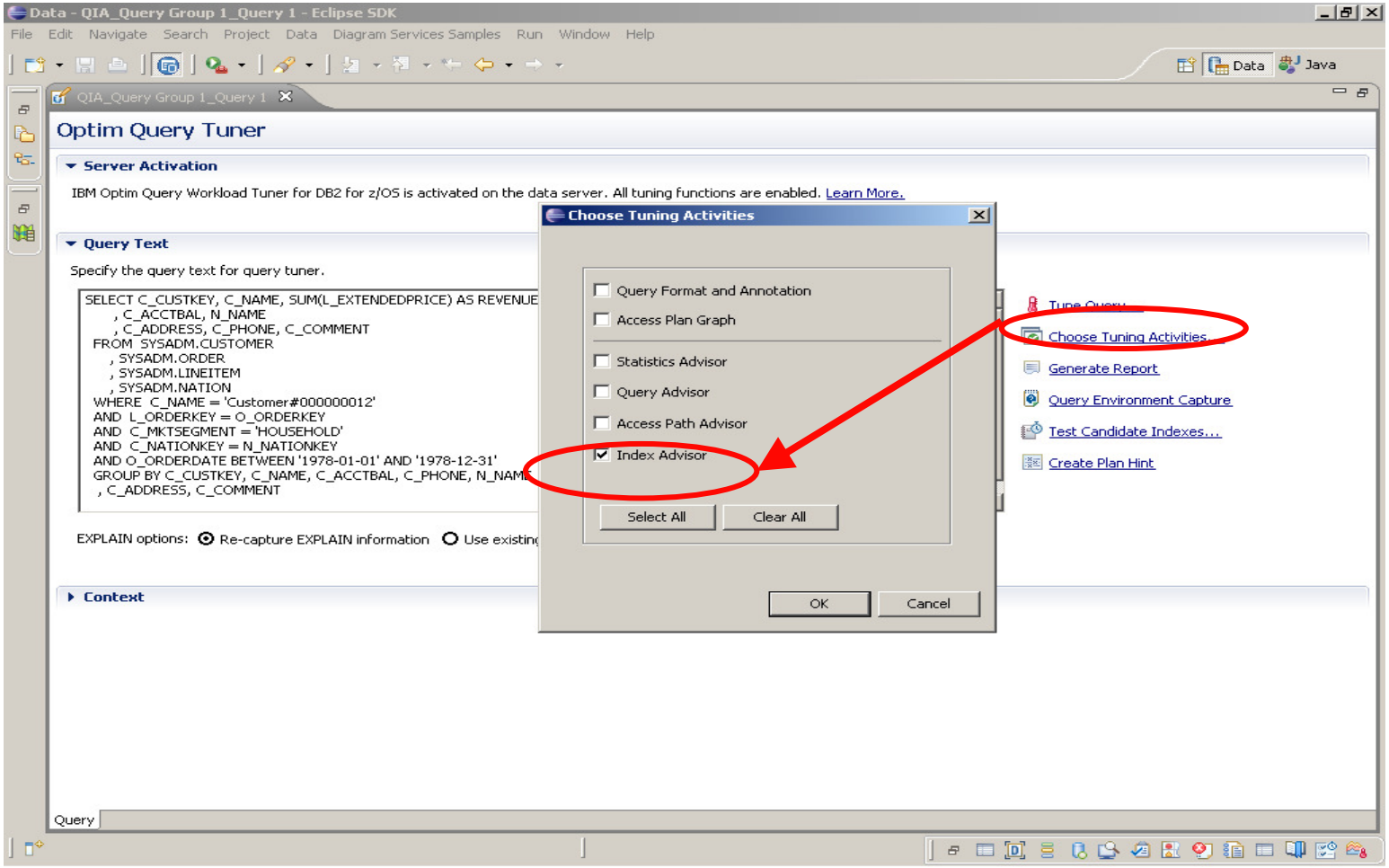
Query Advisor - Recommendations



Index Advisor - Business Value

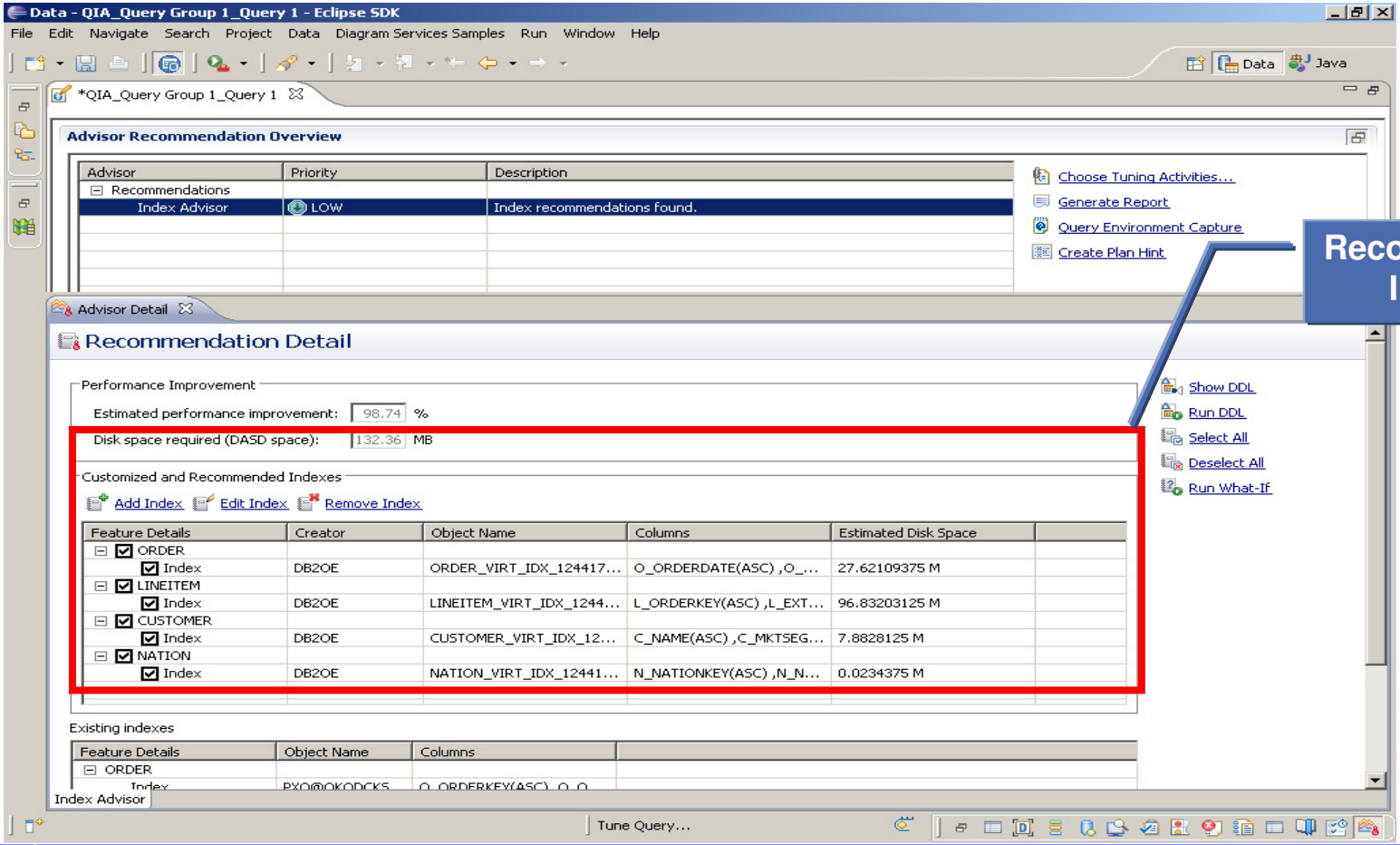
- Reduce the cost of index design and evaluation
- Facilitate users to design appropriate indexes at development phase
- Lower the effort to diagnose and resolve performance problems caused by inappropriate indexes
- Identify, evaluate and drop inefficient indexes to recycle disk space

Query Index Advisor – Launch for Indexes Tuning and recommendations

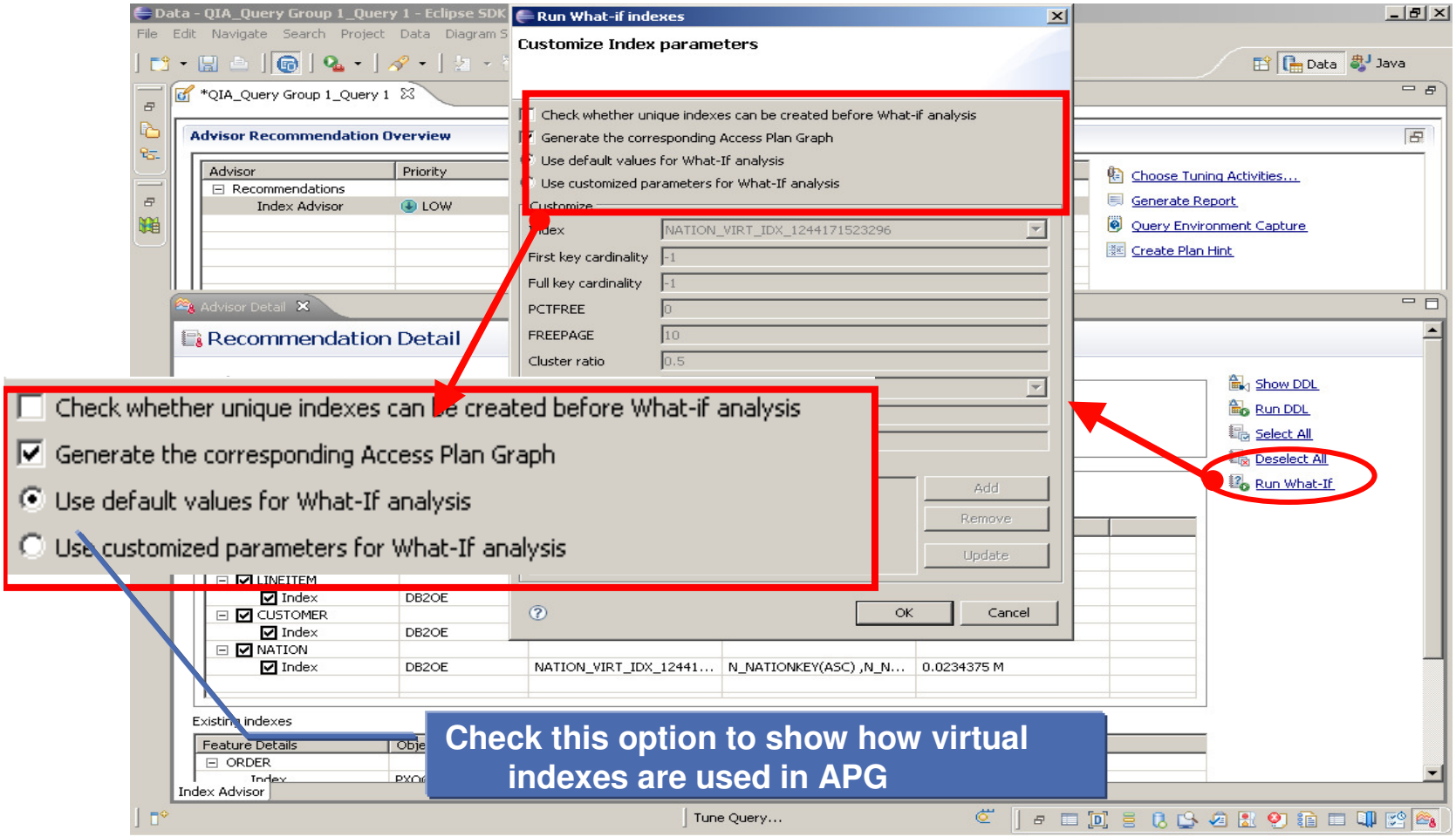


Index Advisor with Recommendations - Scenario 1

- **Query Tuner Index Advisor Recommended with a list of indexes with estimated performance improvement below.**

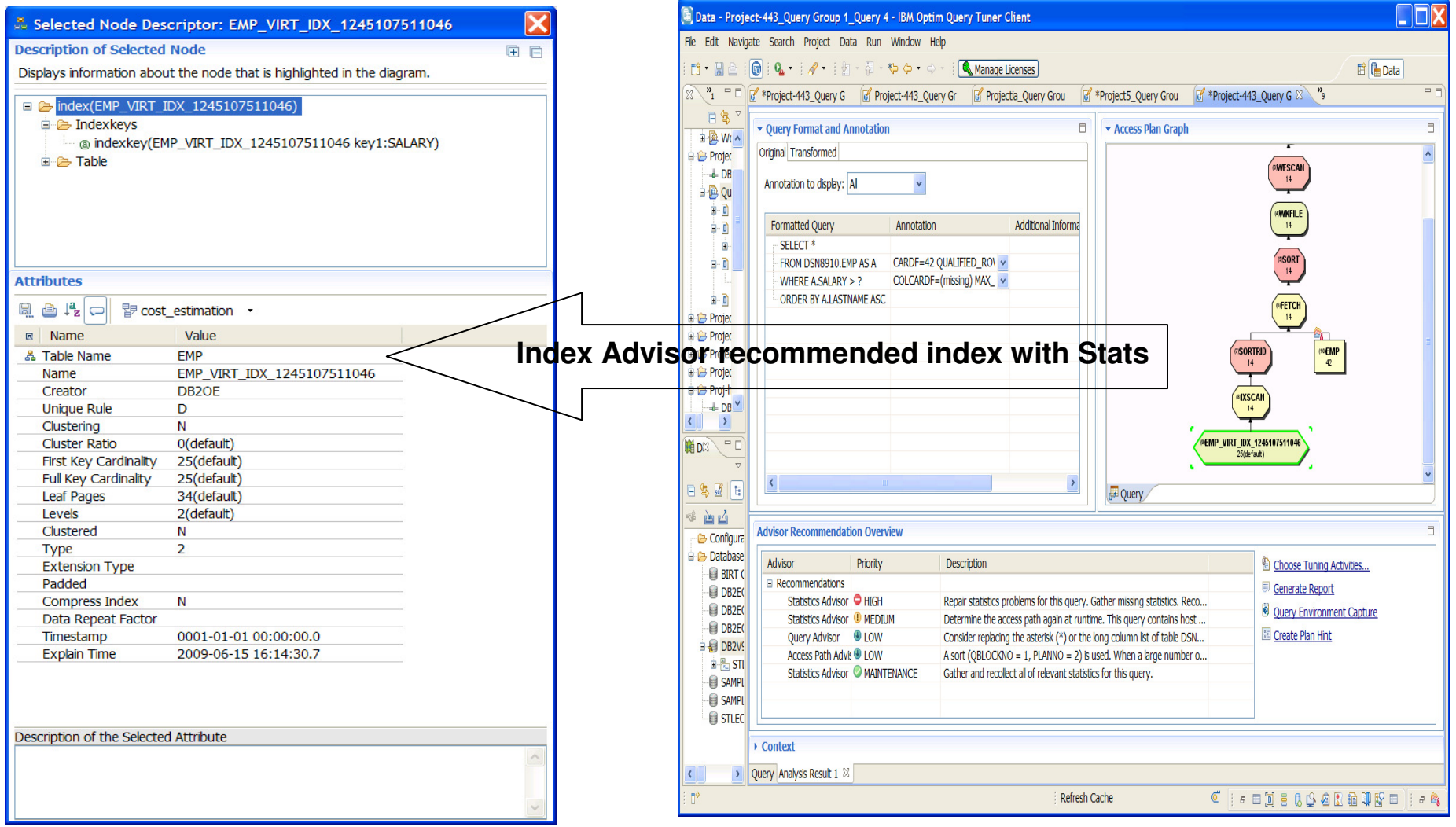


Index Advisor - Run what-if with APG integration - Scenario 2 (new)

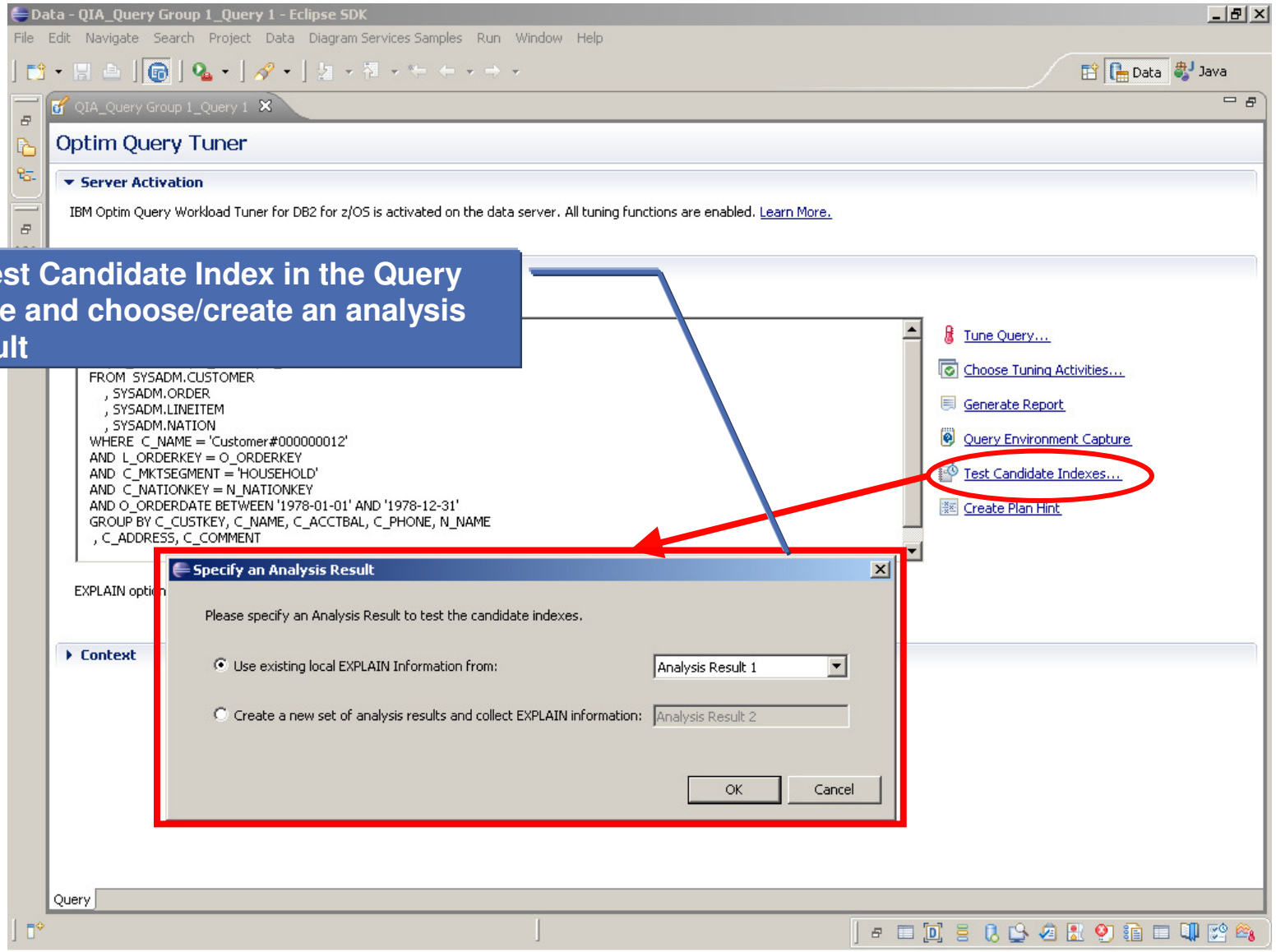


Note: for this case, user can define index attributes based on the IA recommended index and run What If this index is selected for access path and the performance gain of it.

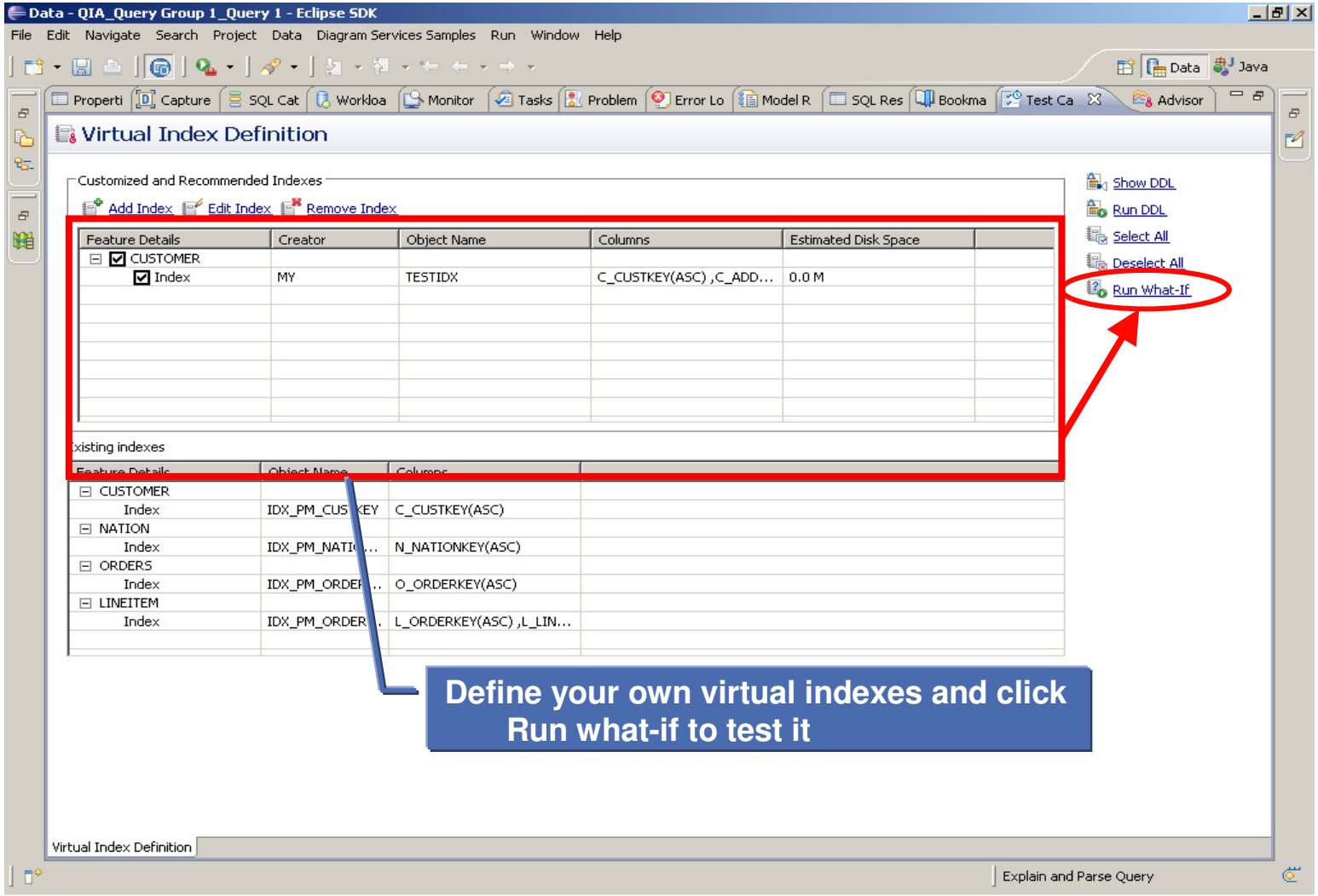
APG display IA recommend index and index stats



Test Candidate Index – with user defined index Scenario 3 ((New)

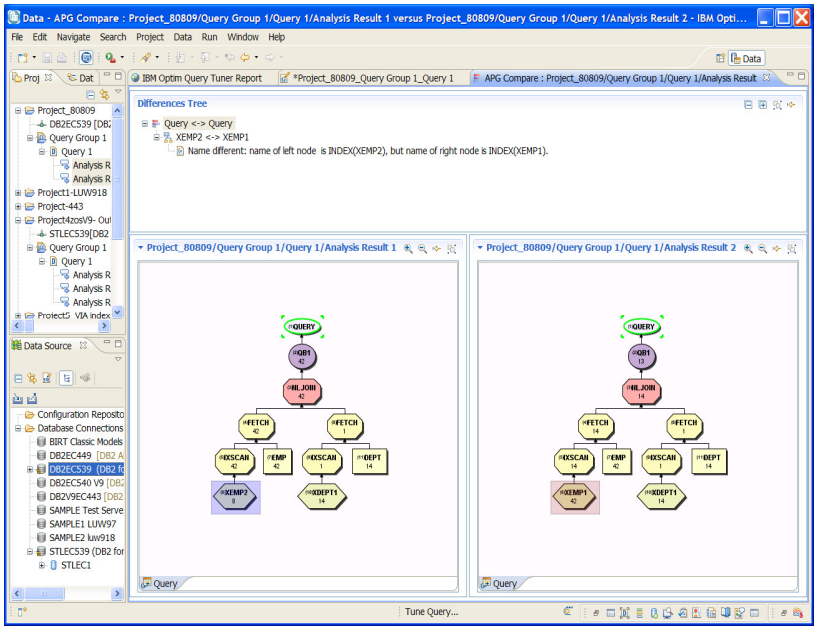


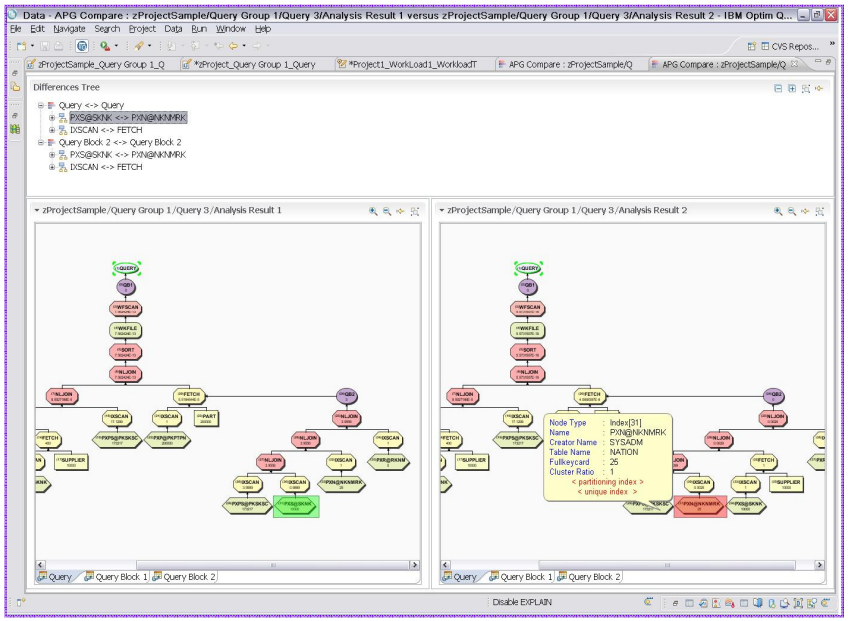
Test Candidate Index – with user defined index (New in 2.2)…



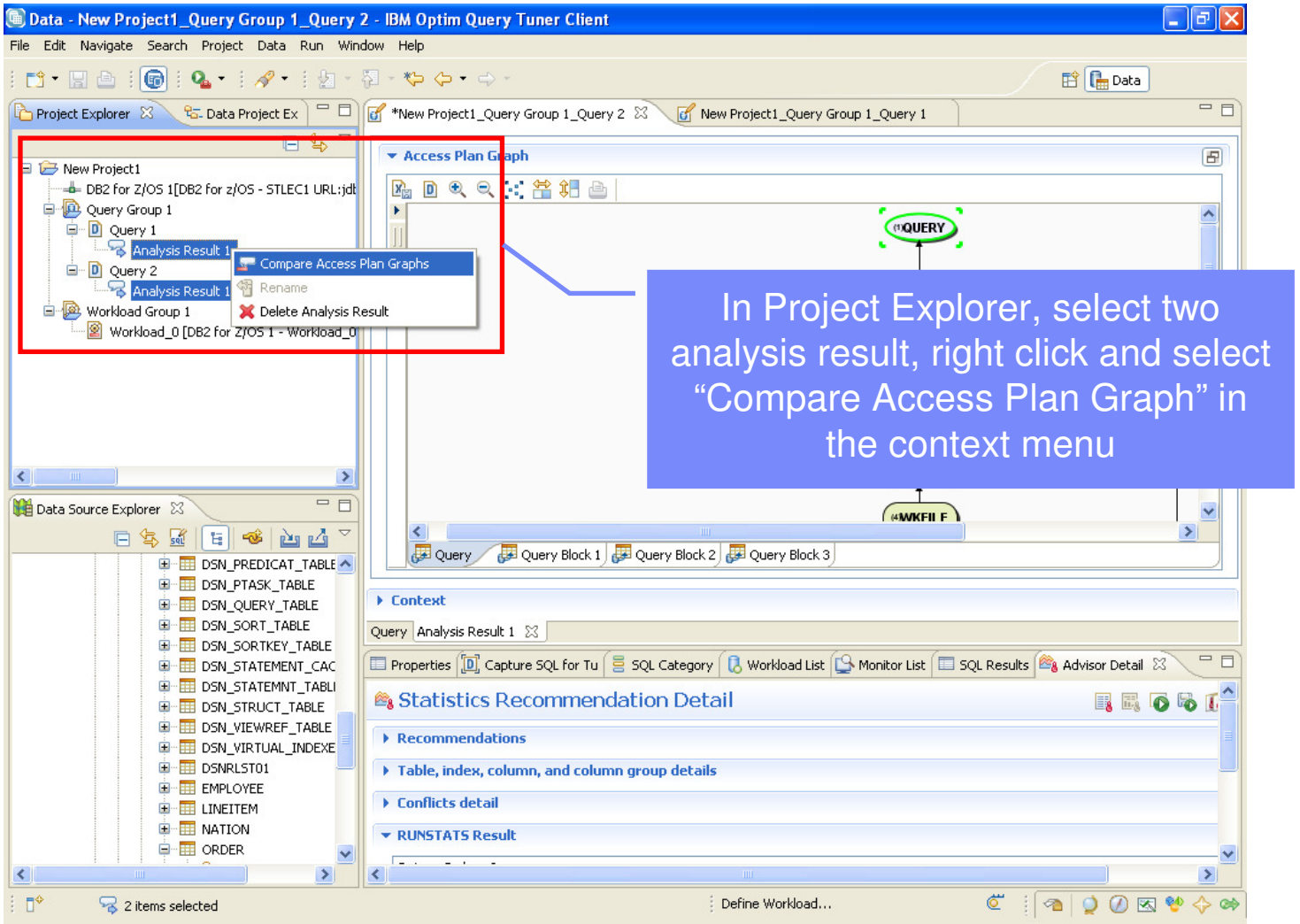
Access Path Graph Comparison

- Single query APG Comparison of 2 SQL Tuning analysis results.
- Can be from the same project or different project
- Can be from same server or different server for example: Tuning analysis APG comparison from DB2 z/OS and LUW

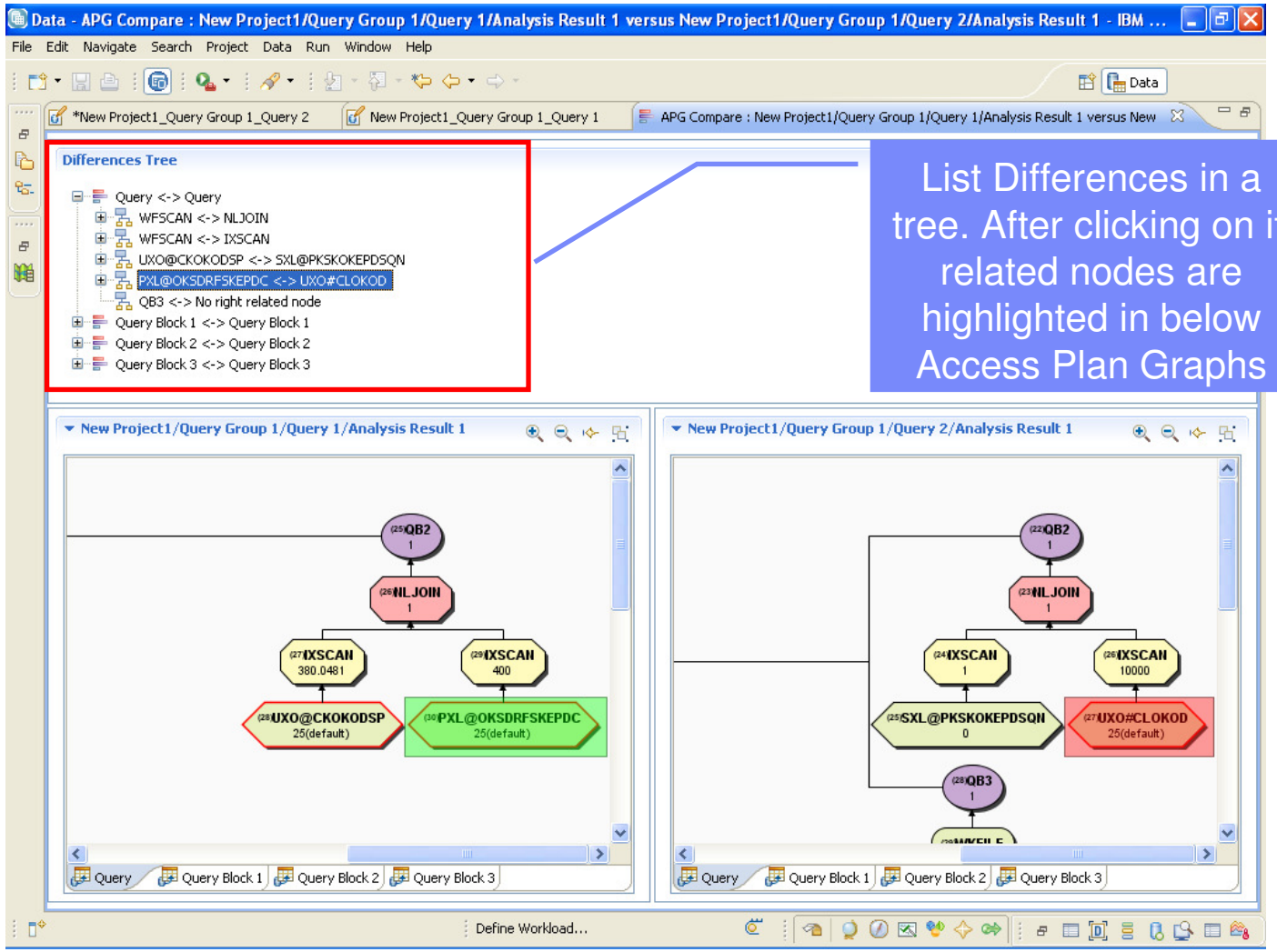




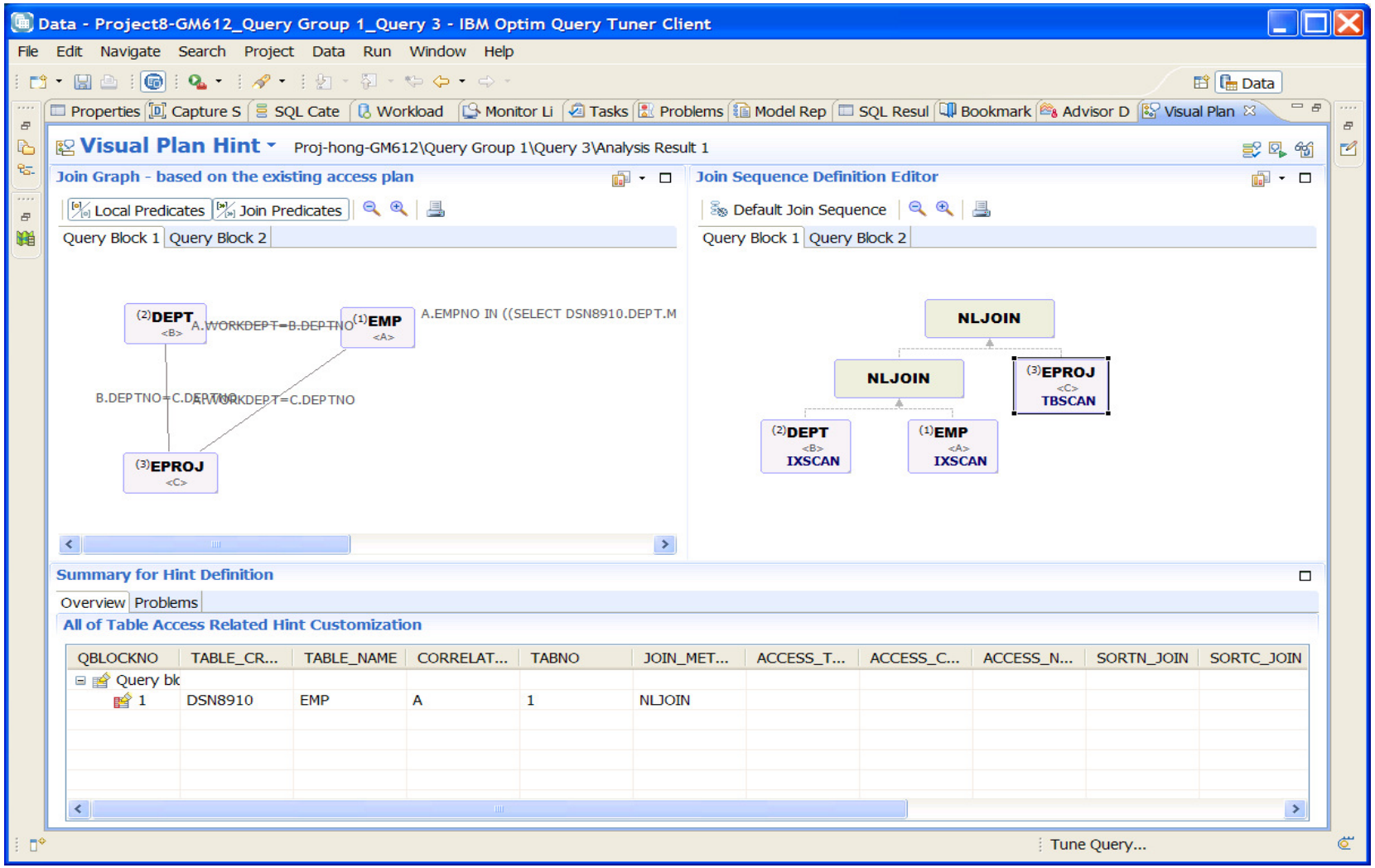
How to Compare Access Plan Graph

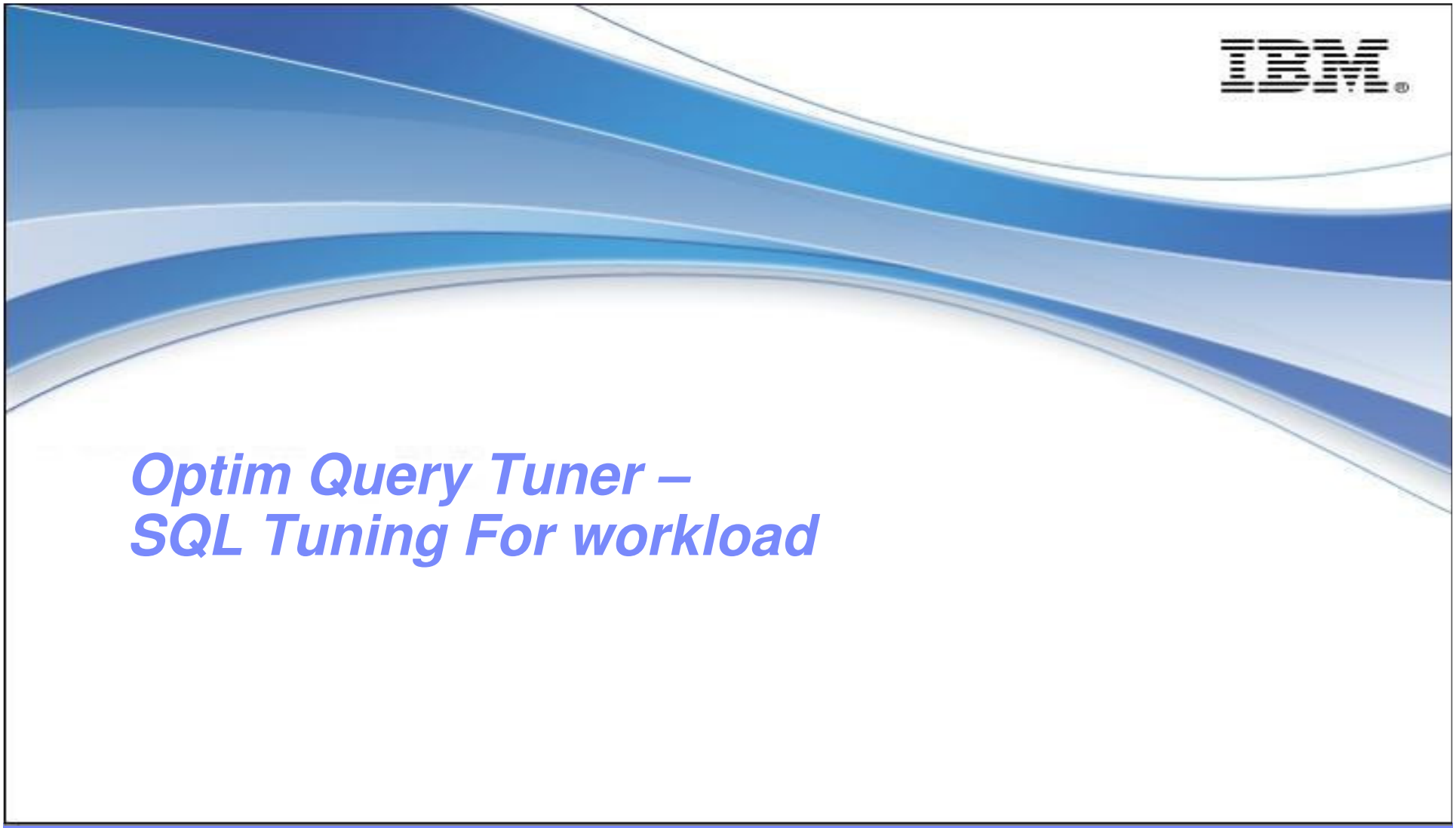


APG Comparison Results



Visual Plan Hint – A example Query with Join seq. change (emp->dept to dept-> emp)





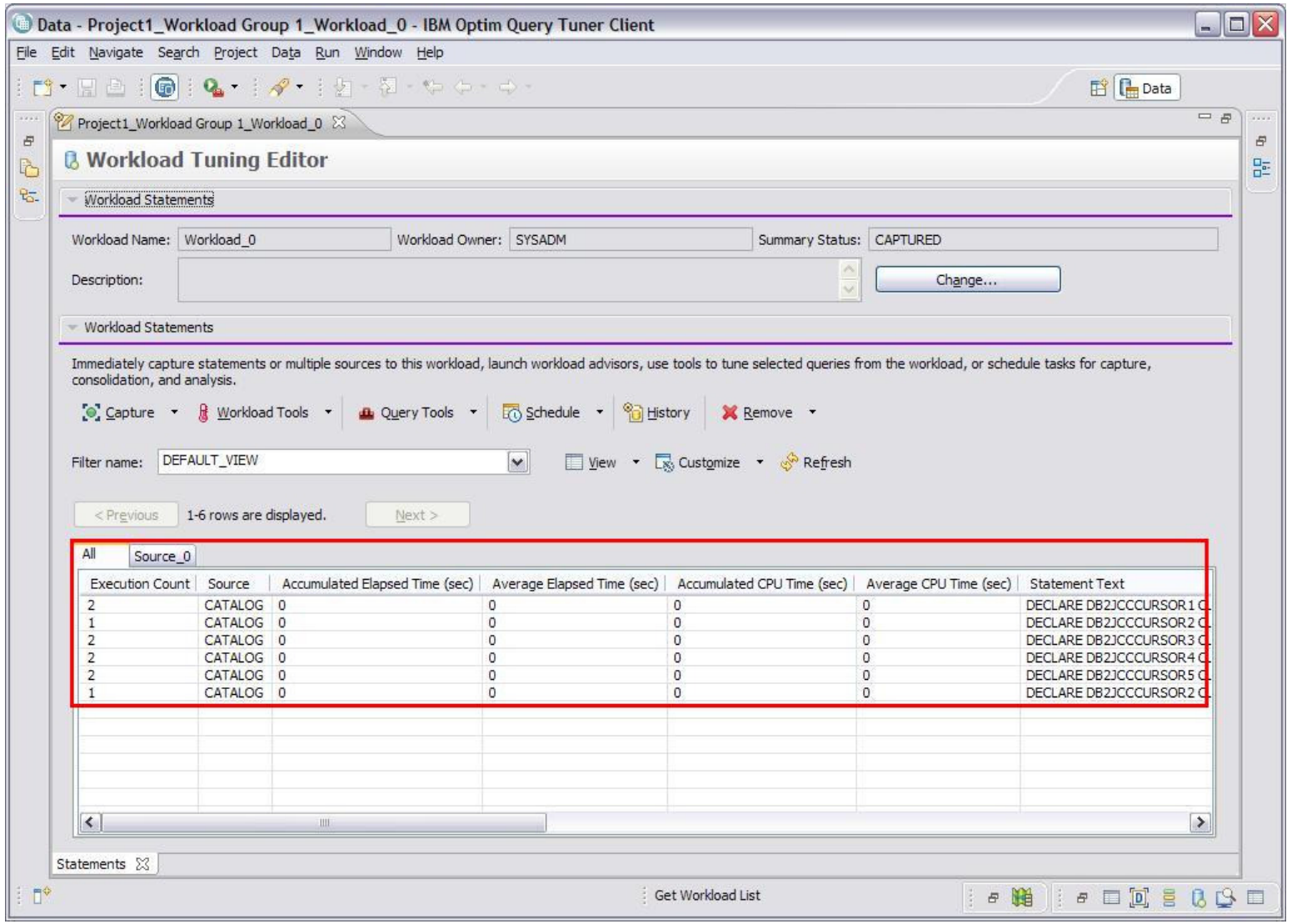
Optim Query Tuner – SQL Tuning For workload

98年10月7日星期三

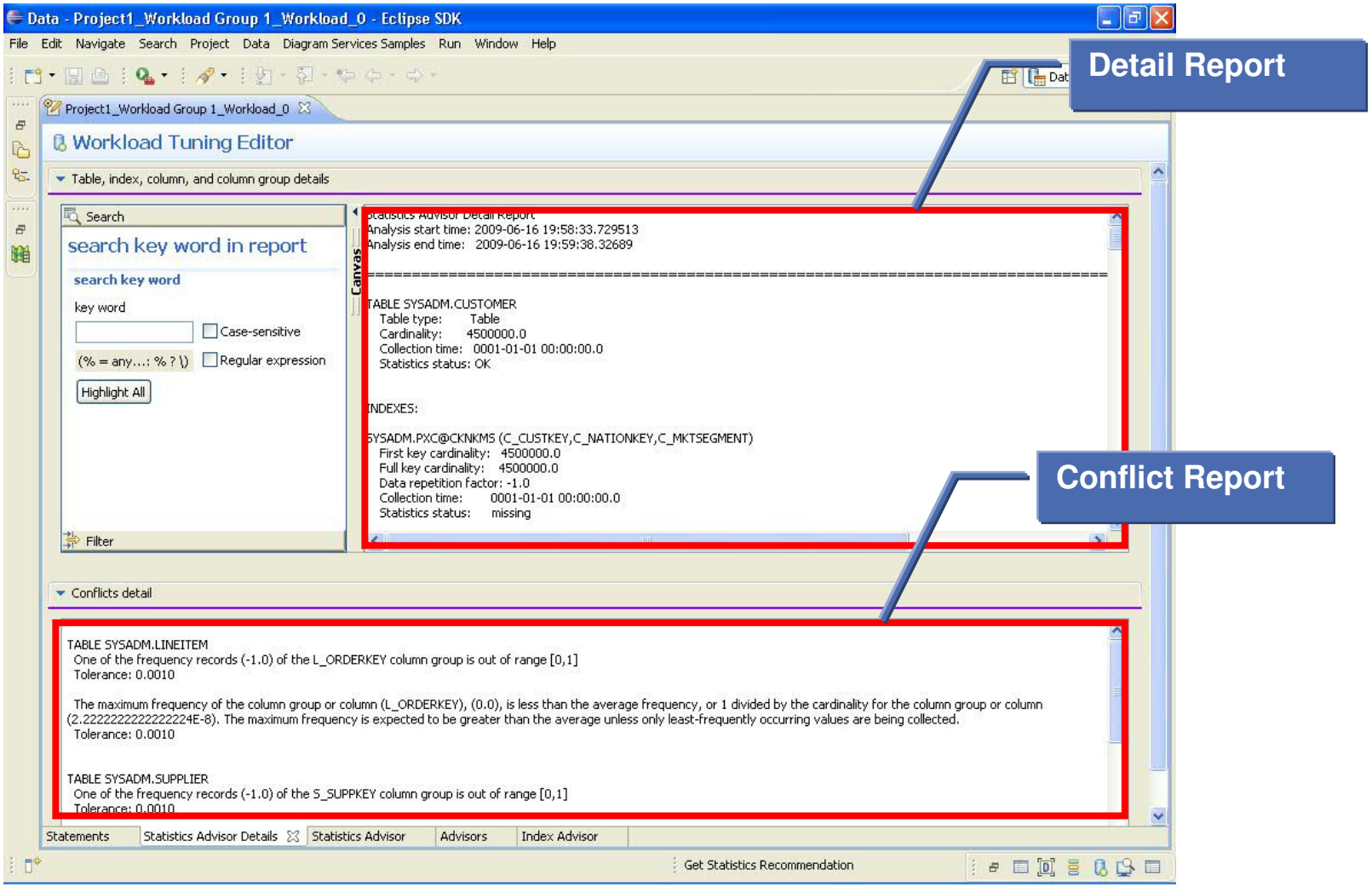
Tune Workload

- **Identify workload with performance issues**
- **Capture workload from Source in :**
  - –Statement cache
  - –Catalog
    - plan
    - package
  - –QMF
  - –QMF HPO
  - –Category
  - –File, text
  - –Other workloads

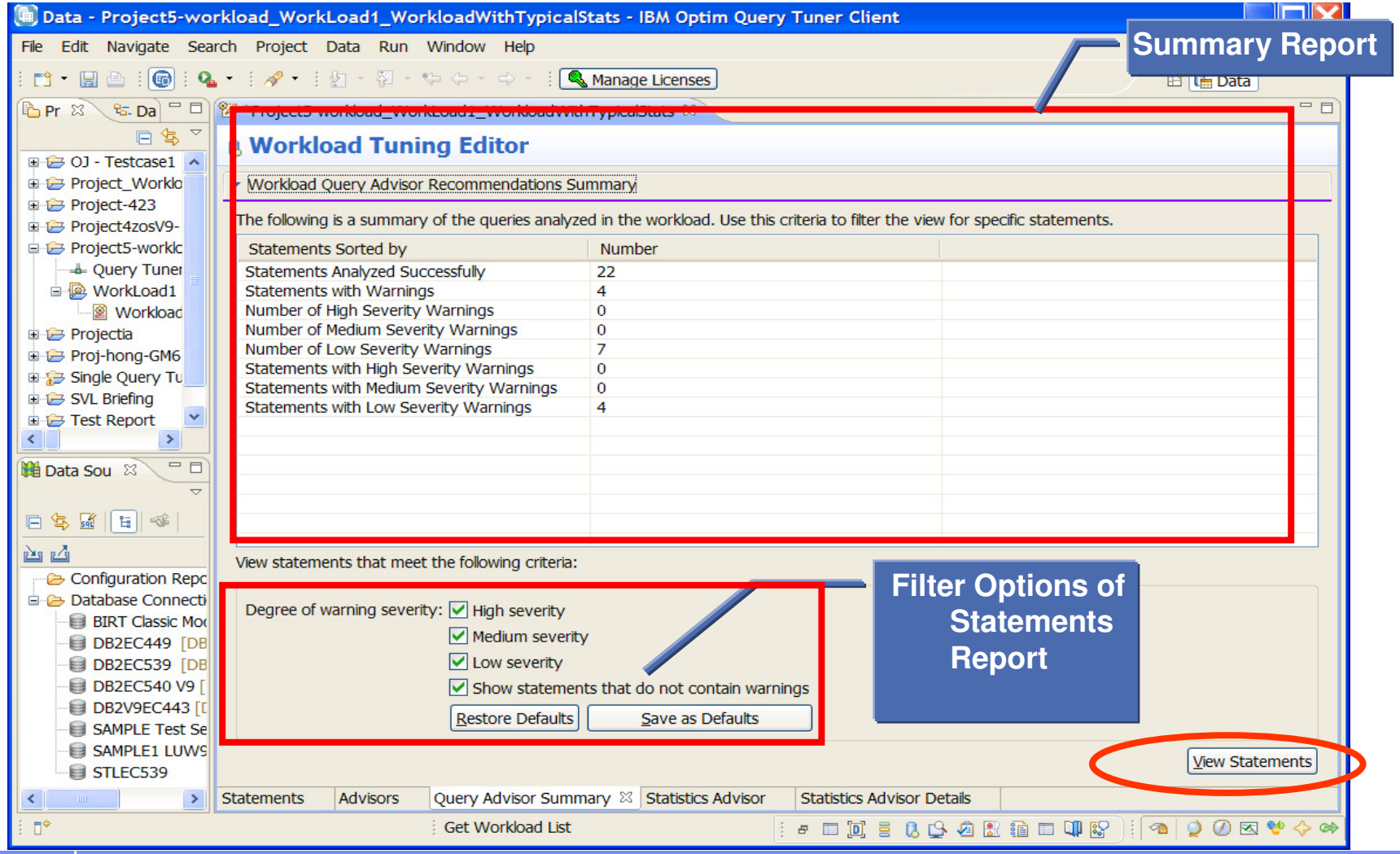
View captured statements



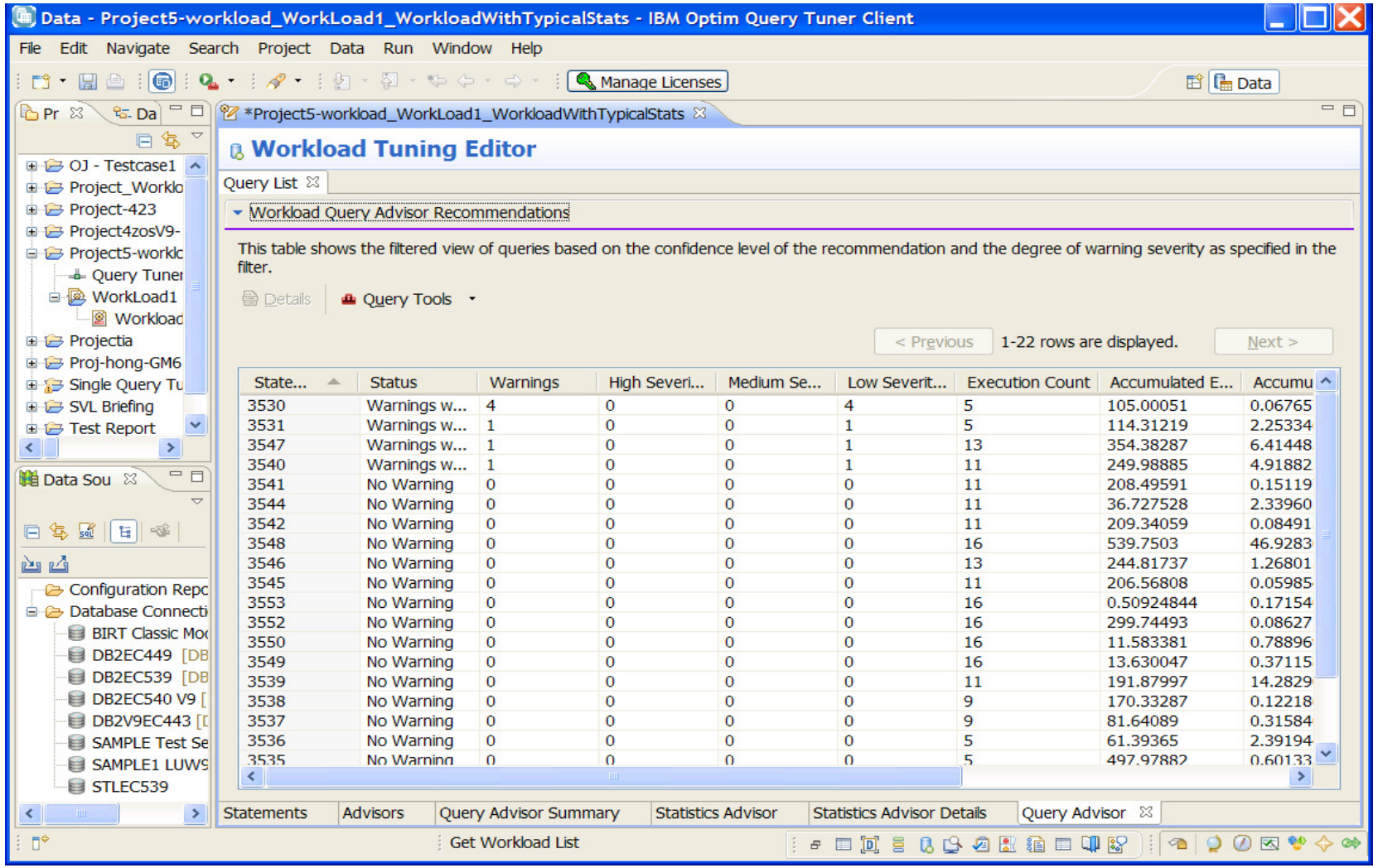
Workload Stats Advisor - Report



Workload Query Advisor summary

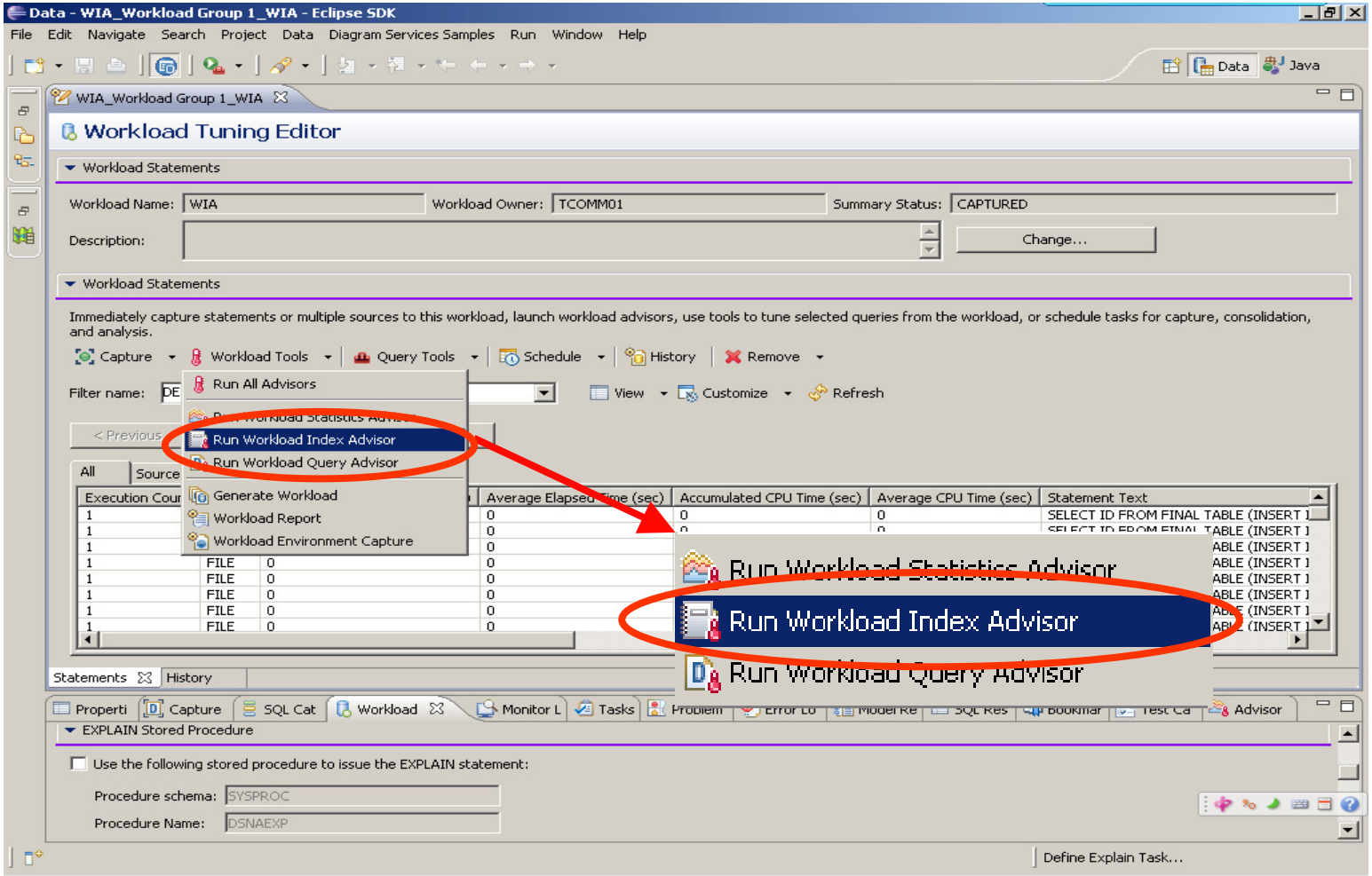


Query Advisor view statements

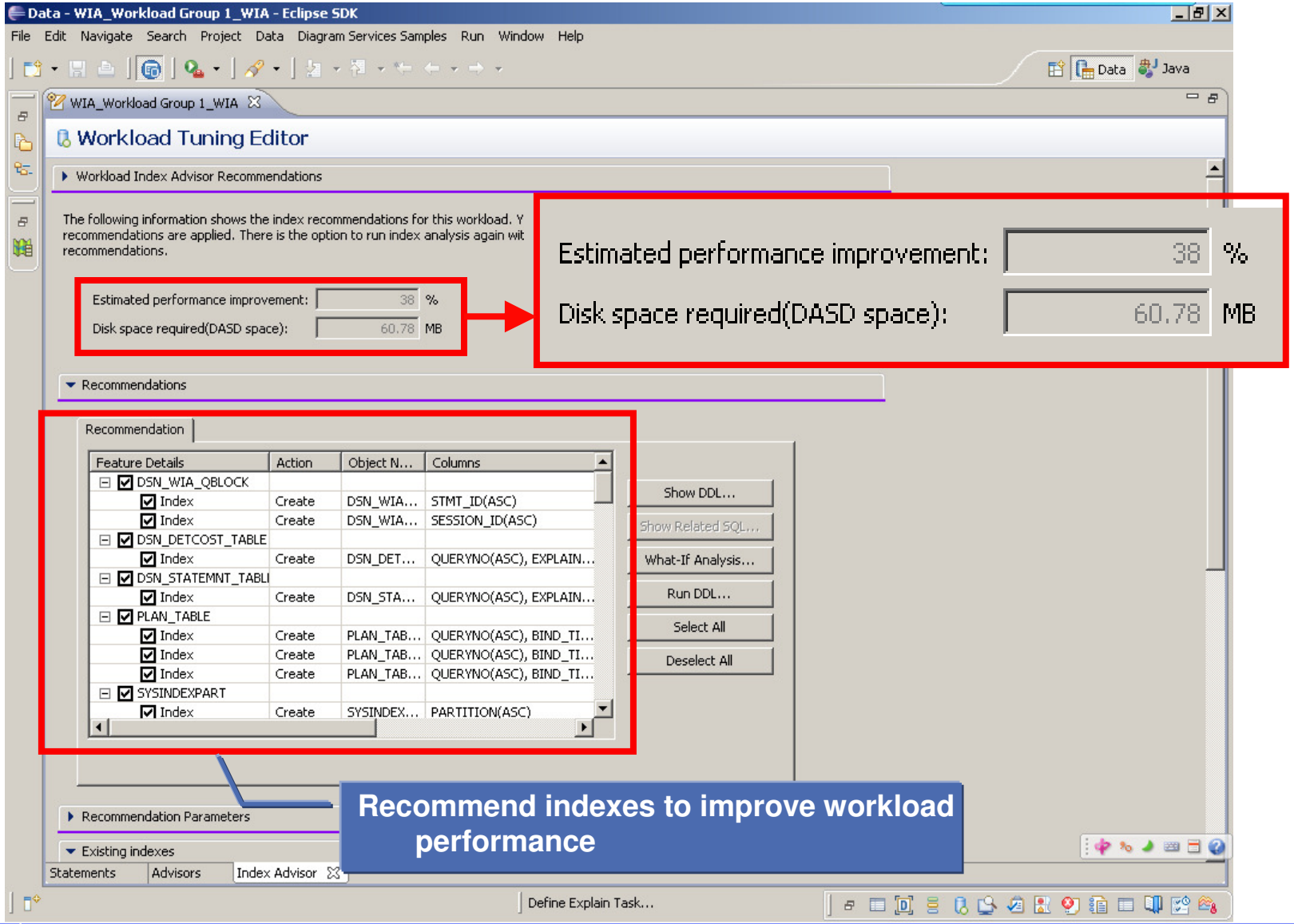


Workload Index Advisor (WIA)

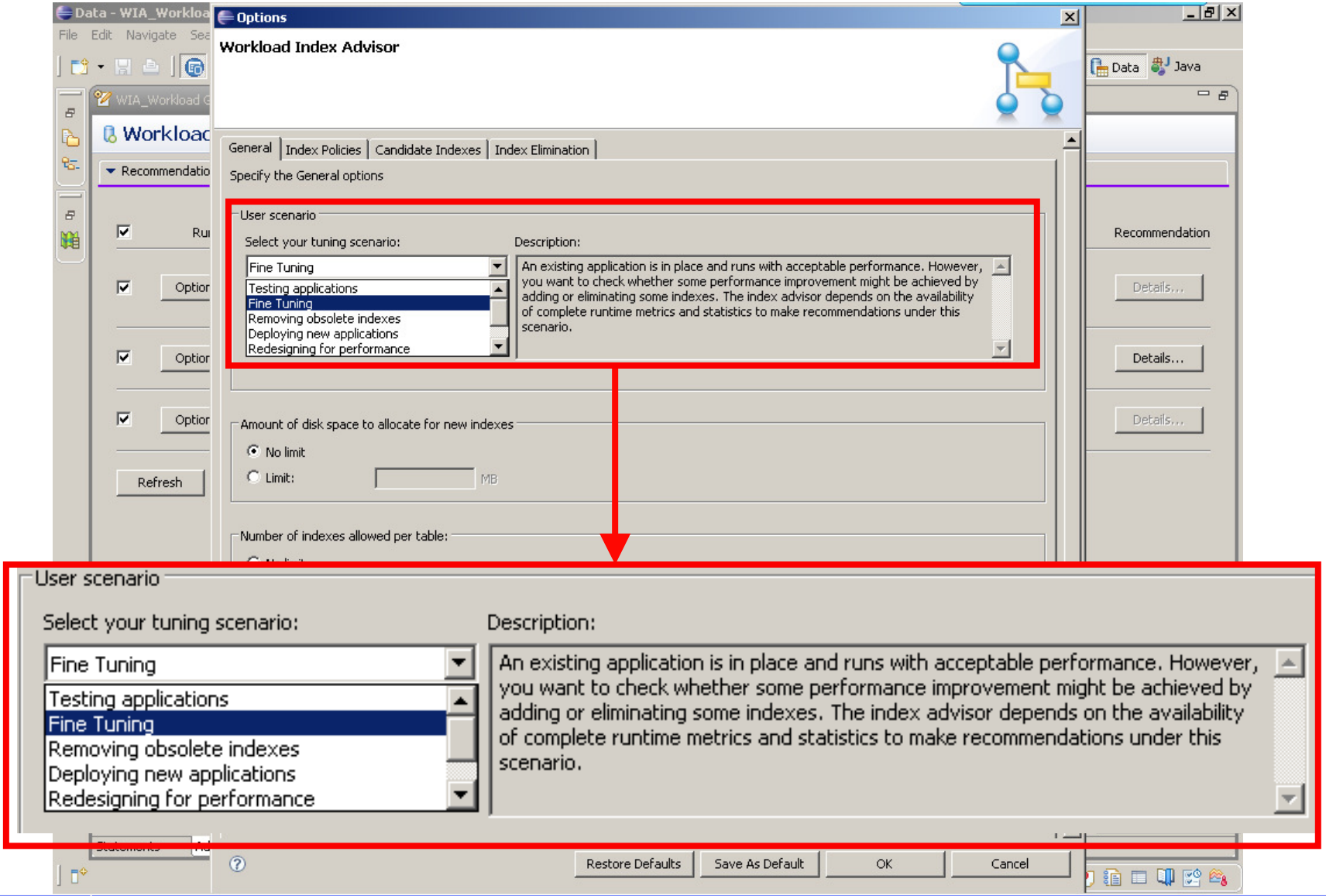
– SQL Tuning for workload indexes



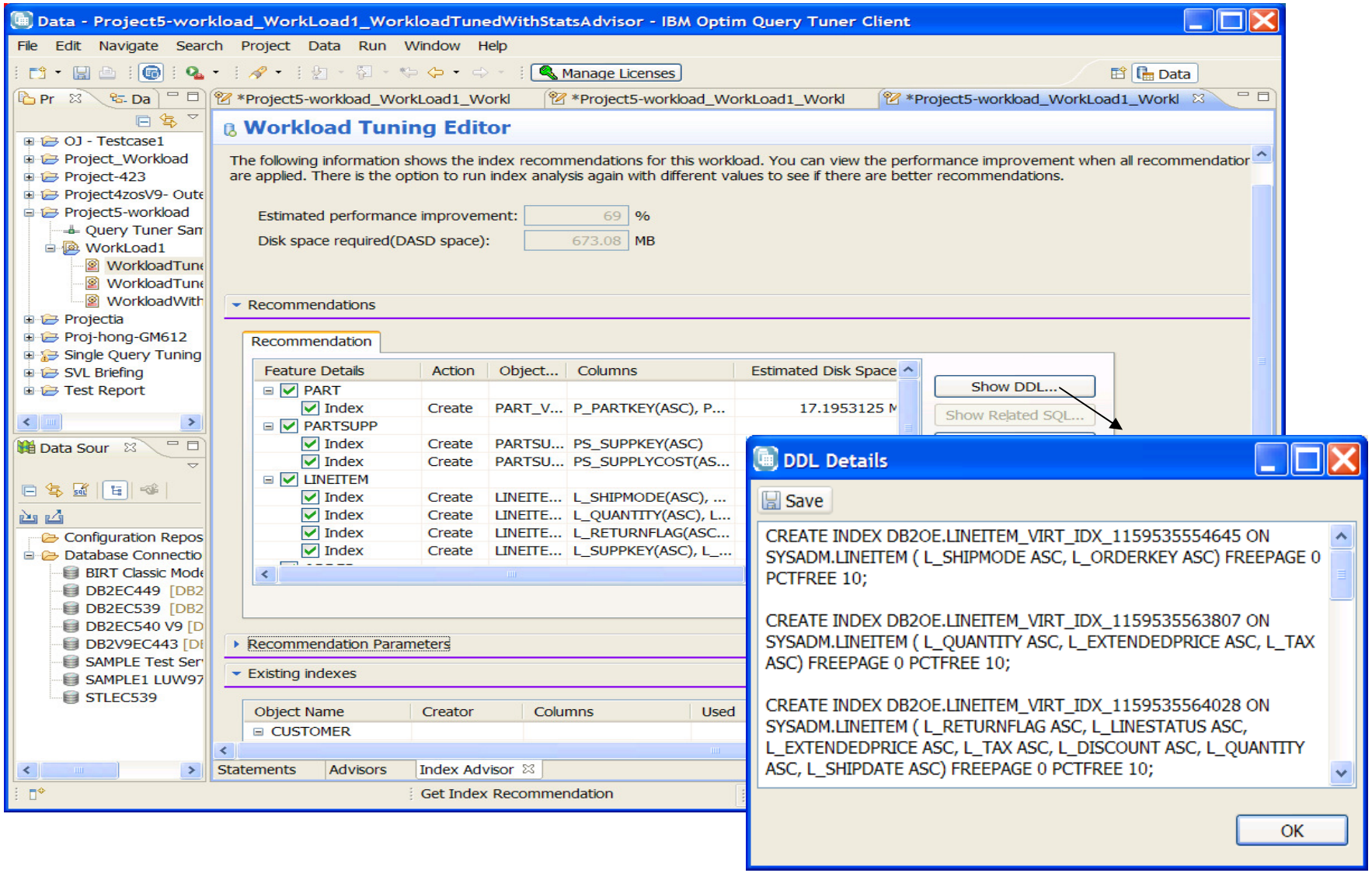
WIA with Index recommendations



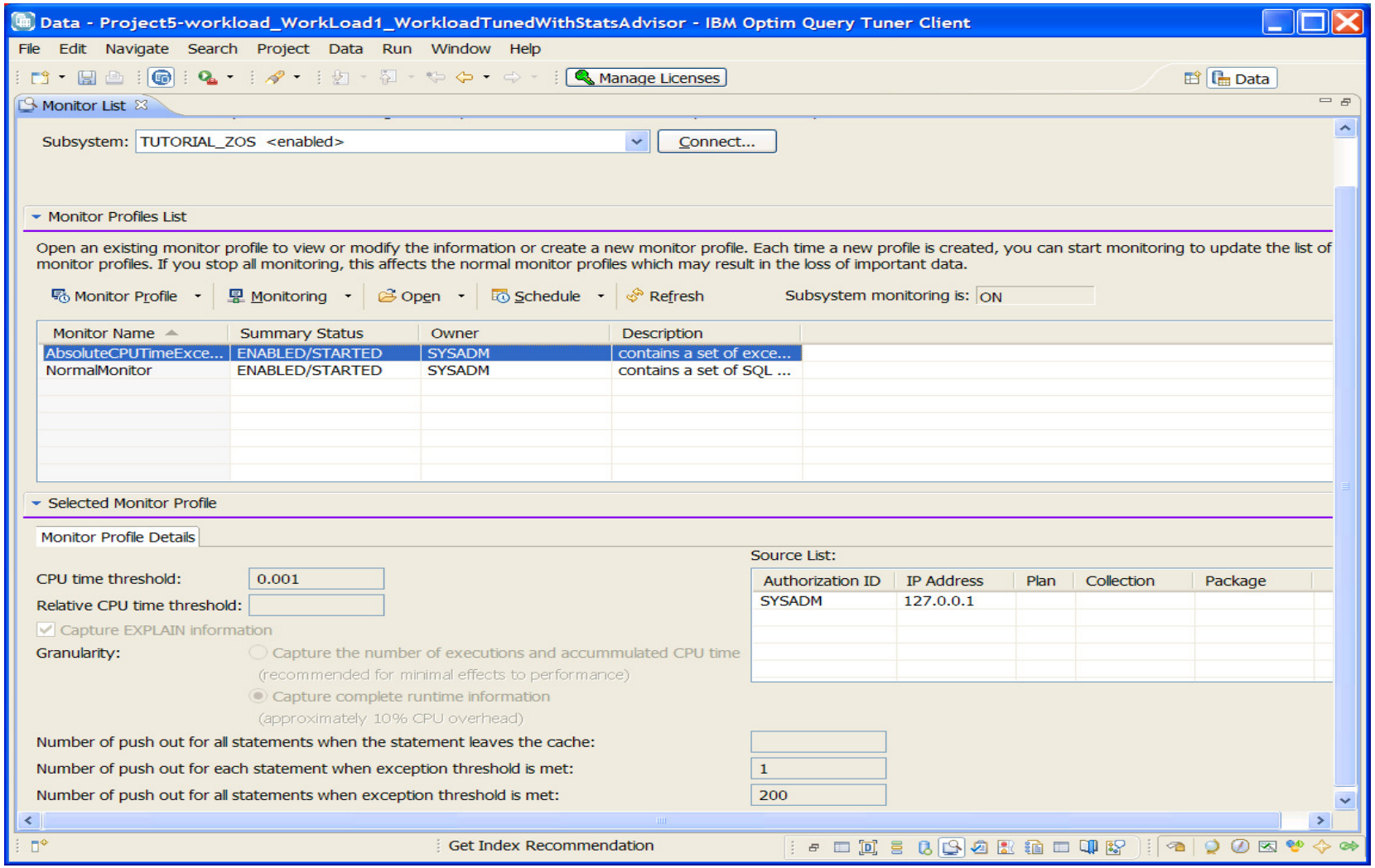
WIA – New User scenarios (New in V2.2)



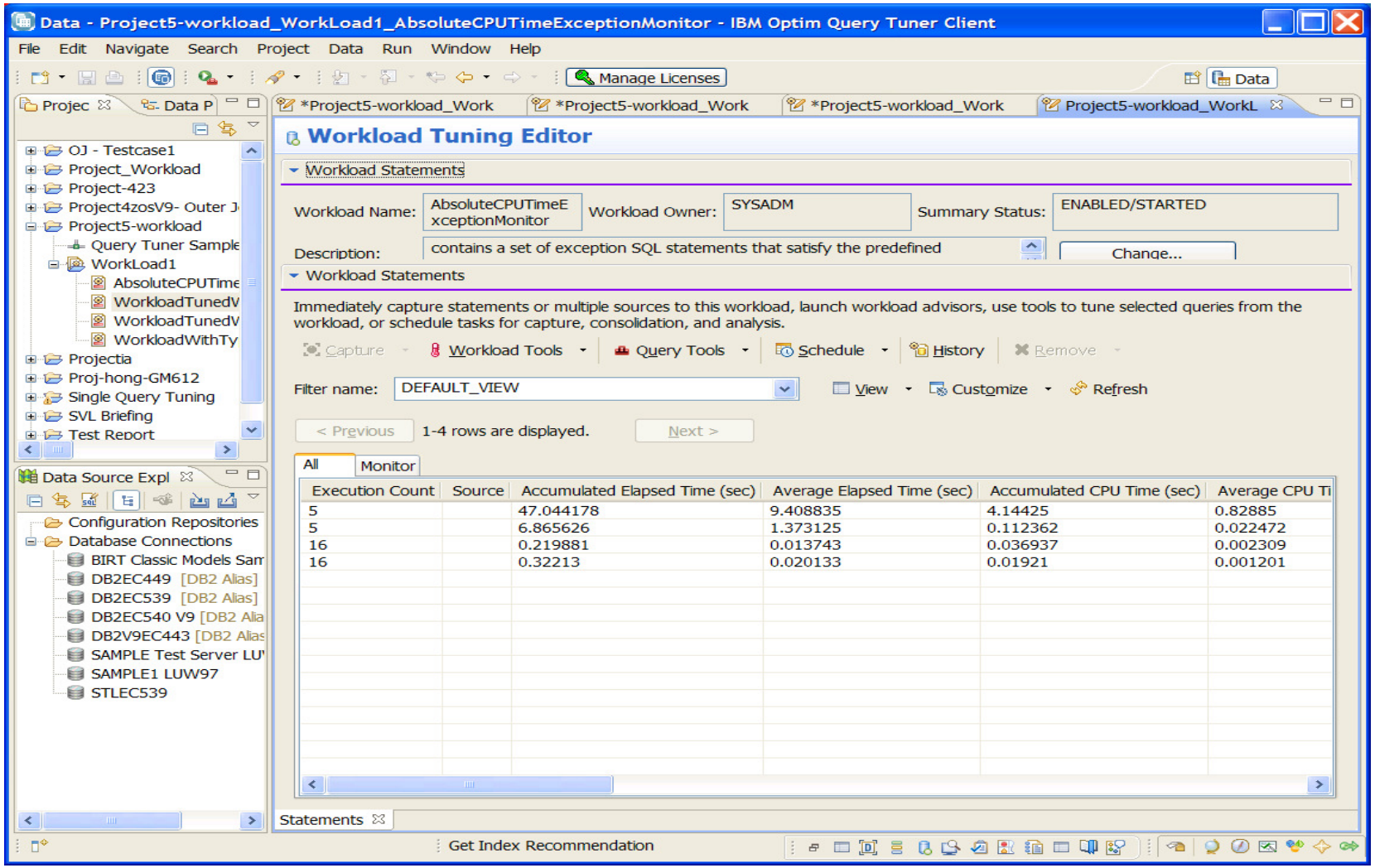
Workload index advisor recommendations



Monitor workload for CPU Time



Tuning a workload monitored into a project

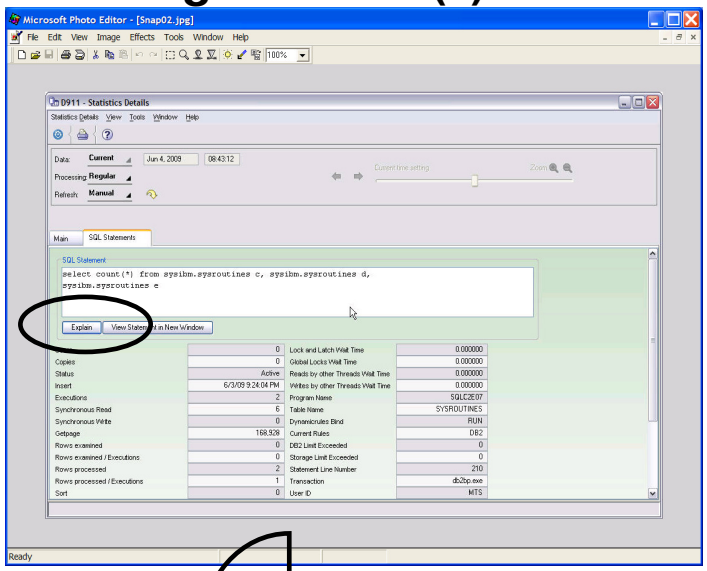


Acceleration of SQL Performance and better application development with OMPE and Optim Development Studio

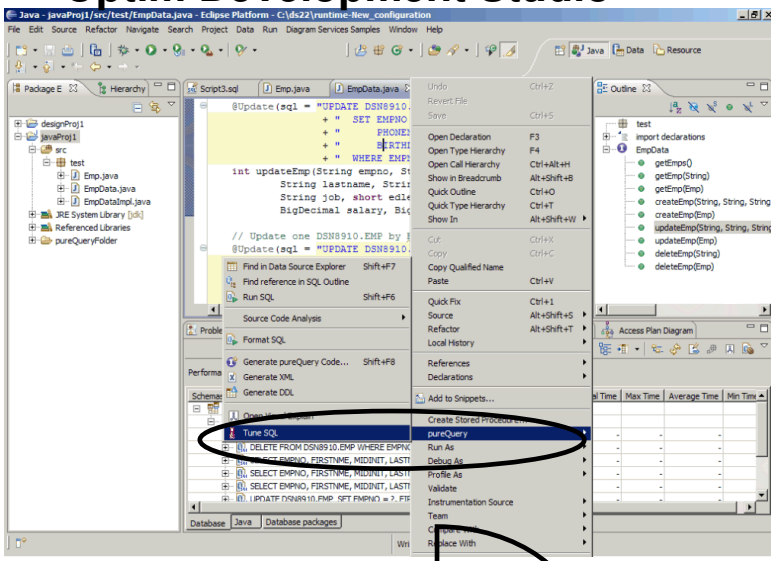
- *A peek at product integration support*

Accelerate SQL Performance with OPME and Optim Development Studio

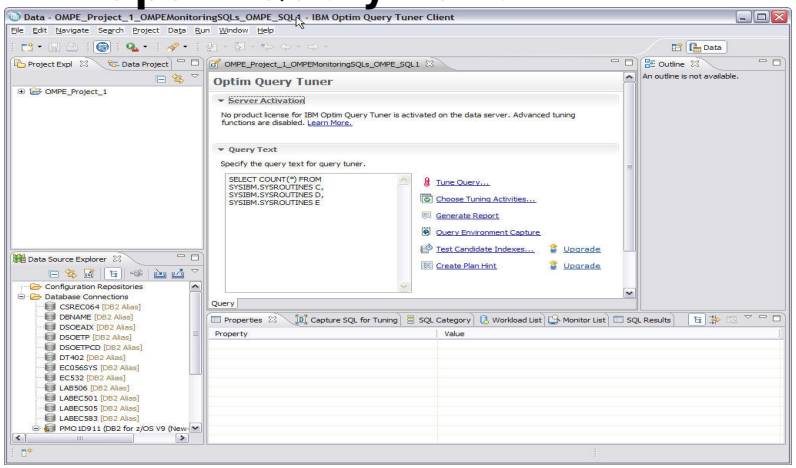
- **Omegamon XE (z)**



- **Optim Development Studio**



- **Optim Query Tuner**

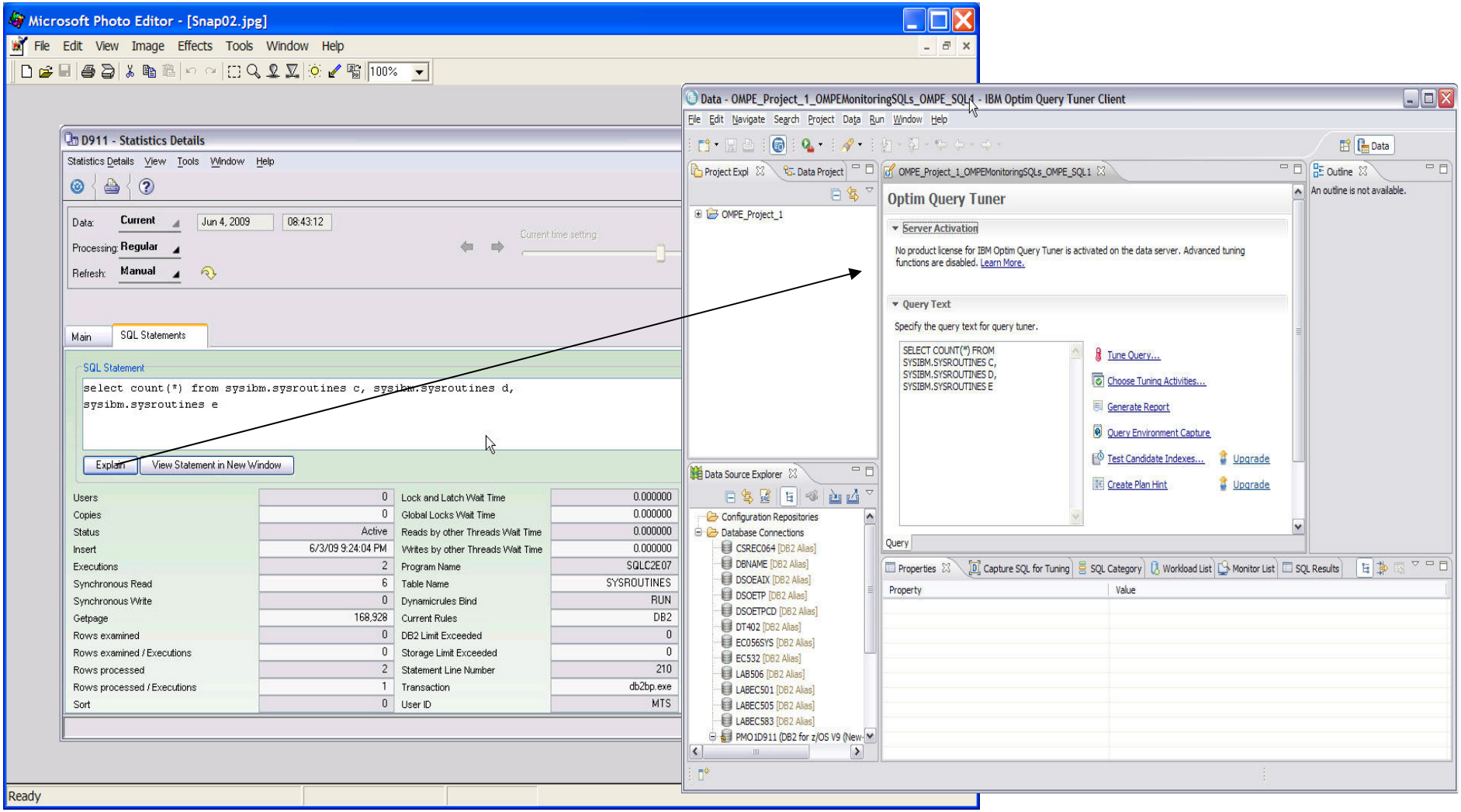


- OPME launch
- OQT to tune
- SQL performance

- ODS Launch OQT
- For application tuning

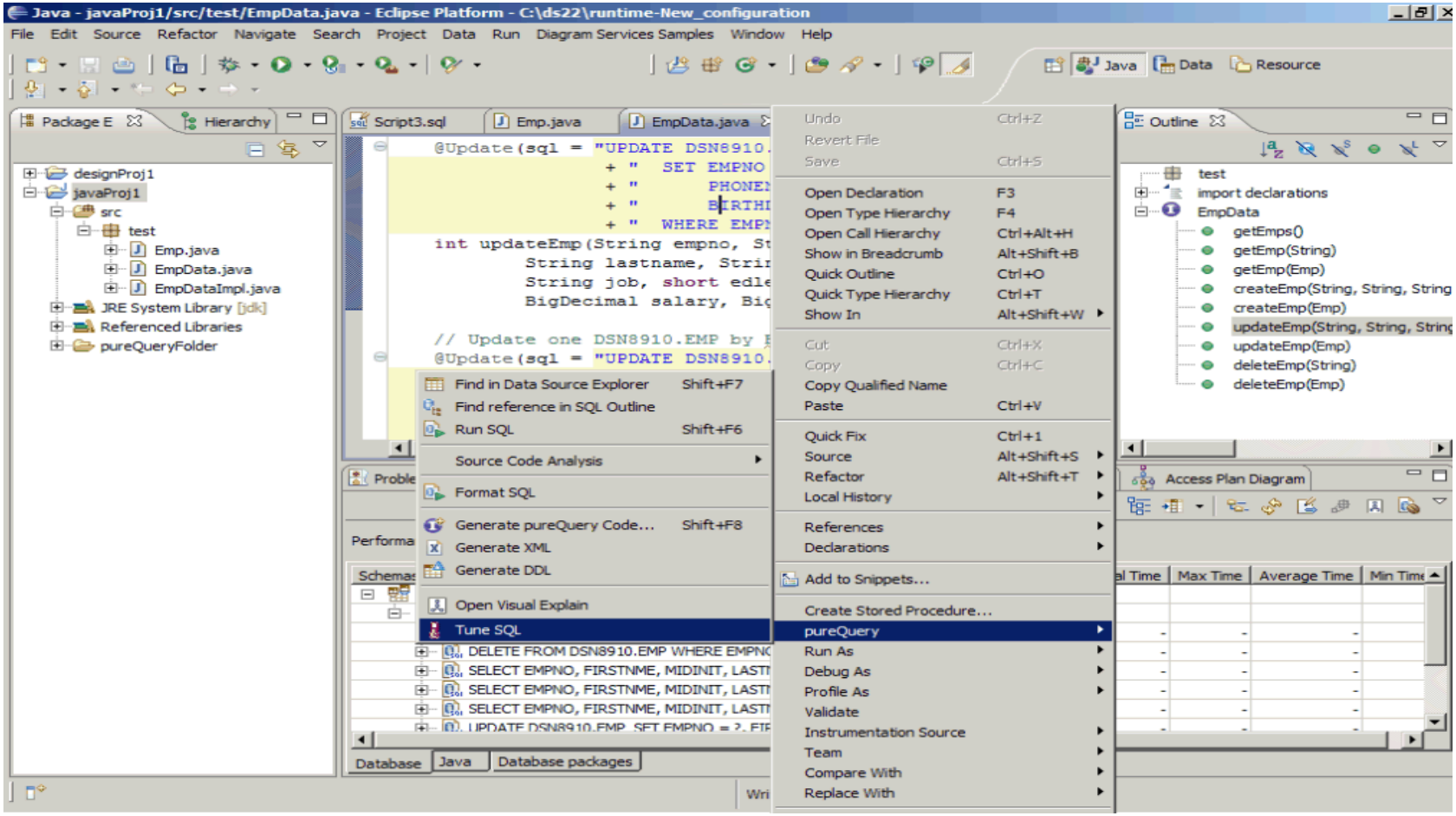
Product Integration Support:

- *OMPE Launch Query Tuner for SQL Performance tuning*



Product Integration ODS (with pureQuery) -> QT

ODS launch Query Tuner for (PQ) Tuning



Optim Query Tuner V2.2 – What's new?

- **Optim Query Tuner V2.2**
  - *Made available in June/July, 2009*
    - *IBM Optim Query Tuner for DB2 for z/OS*
      - *Single Query based*
    - *IBM Optim Workload Tuner for DB2 for z/OS*
      - *Single query and workload SQL tuning*
    - *IBM Optim Query Tuner for DB2 LUW*
      - *Support Single Query SQL Tuning tools and advisors*

IBM Optim Query Tuner V2.2 New Feature Highlights

- ***Usability and workflow enhancements***
  - *Integrated look and feel when evaluating advisor recommendations*
  - *Expanded project management*
    - *provides the ability to group statements*
    - *maintain versions of statements and analysis results*
  - *Common DB connection and management*
  - *Ability to capture and analyze SQL from*
    - *Code editors*
    - *Routine editor*
    - *Integrated Query Editor (IQE)*
    - *pureQuery Outline*
    - *Data Source Explorer*
      - *Packages, UDFs ,Stored Procedures, Triggers and Views*

IBM Optim Query Tuner V2.2 New Feature Highlights…

- ***SQL tuning Tools and Advisors enhancements***
  - *Index Advisors*
    - *Ability to maintain user-defined virtual indexes without invoking the Index Advisor*
    - *New predefined scenarios for Workload Index Advisor Recommendations*
    - *New and enhanced rules for Index Advisor recommendations*
  - *Statistics Advisor*
    - *New and enhanced rules for Statistics advisor recommendations*
    - *New Statistics profile function*
      - *ability to save implemented RUNSTATS recommendations to a user-created profile table for later recall*
  - *Access Plan Graph to present the use of virtual indexes and its statistics*
  - *Access plan graph comparison*
    - *Ability to compare APG between two statements or tuning analysis results before and after*
  - *Integrated advisor recommendations into APG*

IBM Optim Query Tuner V2.2 New Feature Highlights…

- **Provide performance enhancement for**
  - Workload SQL capturing
  - Workload Advisors
- **Support product integration with**
  - *IBM Optim Development Studio (ODS)*
  - *OMEGAMON XE(z) for DB2 PM/PE (APAR **PK88290**)*
  - With ability to launch Query Tuner during application development (with pureQuery) by ODS and SQL performance monitoring for further performance analysis by OMPE.

Optim Query Tuner – The Step Beyond

- *More usability enhancements*
- *More performance enhancements*
- *More enhancements on advisor recommendations*
  - *provide more best-practice rule for better application development*
  - *for both novice and experienced DBAs and developers*
- *More workload SQL tuning features/functions*
- *More product integration support*

Summary

- *IBM Optim Query Tuner*
  - *Made substantial enhancements in V2.2 for DB2 z*
  - *Provide Single Query Tuning tools and advisors for DB2 LUW (V2.2 new)*
- *Provides Key Business Value to*
  - Increase quality of service by proactively solving problems before they occur
    - Accelerate problem analysis/resolution by providing expert guidance and decreasing reliance on special skills
    - Aggregate performance data in a query warehouse to readily see and track the affect of changes over time
    - Query Workload Tuner can:
      - Define and analyze workloads to proactively optimize physical database design on indexes
      - Provide SQL workload and query tuning advice to maximize application performances and reduce the total cost of ownership
      - Eliminating the needs for costly manual analysis of large applications with huge number of SQL in a large workload

Optim Query Tuner – Feature offering

Backup charts

IBM Optim Query Tuner key functions

Functions	Query Tuner for DB2 for z/OS and LUW (single Query)	Query Workload Tuner for DB2 for z/OS
Query Formatter	Yes	Yes
Query Annotation	Yes	Yes
Access Plan Graph	Yes	Yes
Visual Plan Hint**	Yes	Yes
Query Advisor	Yes	Yes
Access Path Advisor	Yes	Yes
Statistics Advisor	Yes	Yes
Index Advisor	Yes	Yes
Query Reports	Yes	Yes
Query Environment Capture**	Yes	Yes
Workload Query Advisor		Yes
Workload Statistics Advisor		Yes
Workload Index Advisor		Yes
Workload Query Reports		Yes
Workload Environment Capture		Yes
Profile Based Monitor *		Yes

- *DB2 for z/OS V9.1 NFM
- ** functions for DB2 for z/OS

IBM Optim Solutions

- **Optim Solutions Page:**
  - http://www.ibm.com/software/data/optim/
- **IBM Integrated Data Management (Optim and Data Studio):**
  - http://www.ibm.com/developerworks/spaces/optim
    - Tutorials
    - Downloads
    - Forums / Blogs
    - Join the community!

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