

IBM System z Technology Summit



Administering and Optimizing Your DB2 9 & DB2 10 for z/OS Environment with Tools

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DB2 10 for z/OS: Out-of-the-Box Savings

Up to 20% CPU reductions for transactions, queries, and batch

- Out-of-the-box CPU reductions of 5-10% for traditional workloads
- Out-of-the box CPU reductions of up to 20% for new workloads
- Up to additional 10% CPU savings using new functions

Scales with less complexity and cost

- 5-10x more concurrent users – up to 20,000 per subsystem
- Significant scale-up capabilities in addition to existing scale-out support
- Consolidate to fewer LPARs and subsystems

Improved operational efficiencies and lower administration cost

- Automatic diagnostics, tuning, and compression

Even better performance

- Elapsed time improvement for small LOBS and Complex Queries



DB2 10 for z/OS: Savings and performance

- Up to 40% savings in processing costs
- Up to 6 times the number of SAP users on a single system
- Time Travel temporal capabilities built directly into the database
- Direct Row access accelerates high performance applications



"We have measured a 38% reduction in CPU for heavy insert workloads in a data sharing environment. That's a significant savings which provides immediate business benefit."

Peter Paetsch, BMW Group

We expect to reduce our data sharing requirements by 25%, which means less system, storage and resource expenses

Banco do Brasil



**Major
Insurance
Company**

The new temporal functionality in DB2 10 for z/OS will allow us to drastically simplify our data-related queries and reduce our processing cost by having DB2 handle data movement more efficiently than our custom code

"As much as 80% of our applications can use this, which will drastically save developer time and even more importantly make applications easier to understand to improve business efficiency and effectiveness"

bankdata

"In addition to the cost savings, DB2 10 for z/OS offers a far superior data server environment than Oracle"

Manuel Gomez Burrierl, CECA (Spanish Bank Federation)



As a multi-national corporation, we must adhere to strict local audit requirements. The security and administration capabilities in DB2 10 are a key driver for us to move to this version."

UniCredit Group

IBM DB2 Tools: Are you ready for DB2 10?

- Exploit DB2 10 performance savings out-of-the-box
- Optimize Performance Across Multi-Platform Applications
- Lower CPU costs while reducing batch windows
- Higher data availability through simplified recovery operations



All New with DB2 10!

DB2 Utilities Suite 10 drives down costs with *autonomics*, page sampling and further offloads processing to zIIPs and FlashCopy. Developed in conjunction with DB2 10 to provide maximum data integrity and exploit all new functions out of the box.

Tivoli OMEGAMON XE for DB2 Performance Expert 5.1 extends its insight into distributed workloads and offers a robust infrastructure to support DB2 10 subsystem consolidation, with lower monitoring overhead. The recommended performance monitor of DB2 10!

DB2 Administration Tool/Object Compare 10.1 extends the value of DB2 10 with new capabilities that allow DBAs to quickly exploit DB2 10 features like schema evolution. Reduces the overhead of many routine tasks.

QMF 10 delivers built-in visualizations and reports that dramatically extend the value to end users. A new metadata layer simplifies the process to understand and create reports.

DB2 Sort 1.1 lowers the cost of DB2 Utility sort processing by exploiting advanced features of System z and z/OS while optimizing overall system efficiency. Significantly reduces batch windows.

DB2 High Performance Unload 4.1 reduces the cost of extracting DB2 10 data with support for TCP/IP Pipes and the new internal format as well as a new native XML data unload capability.

Roadmap to Exploit DB2 10 for z/OS

Accelerate your ability to leverage compelling DB2 10 features

Administer DB2 Performance Savings

Optimize Dynamic Infrastructure Performance

Drive DB2 Efficiency and Productivity

Recover DB2 Advanced Technology

Accelerate Time to Value



Administer DB2 10 Performance Savings

DB2 Administration Tool 10.1 Exploitation

- **Drive immediate DB2 10 out-of-the-box Performance Savings**
- **Exploit DBA-managed Performance Improvements**
 - Include additional Columns in Indexes to Exploit Index Only Access
 - Convert LOBs to in-line to boost performance
- **Extend Administration Capabilities**
 - Manage new Security models
 - Reduce Schema change overhead
 - Recover from Access Path regressions
 - Manage Autonomic Statistics collection
- **Time Travel with Temporal Data – “as of”**
 - Record changes in history – System Time
 - Define, update and query events in past or future – Business Time
 - Browse Temporal Data “as of” a point in time with DB2 Table Editor 4.3

DB2 Admin Tool 10.1 Include Index non-key Column

```

ADB21XAA          DSNAlter Index - Add Columns          Row 1 to 12 of 12
Command ==> _          Scroll ==> CSR

Line commands:  A - Add as ascending      D - Add as descending
                R - Add as random         I - Add as include
ALTER INDEX "J148286"."ADB_PROP_#_3I4"
ADD COLUMN ( ... )

Sel Column Name      Col Type Length Null ColSeq Ord
*                   * * * * * * *
----->-----
LOG_ID               INTEGER          N          1 A
ID                   INTEGER          N          2
LOG_TIMESTAMP        TIMESTMP         N
LOG_ACTION           INTEGER          N
TIMESTAMP            TIMESTMP         N
DB2SYS               VARCHAR          N
TYPE                 VARCHAR          N
COLLECTION           VARCHAR          N
PROPERTY             VARCHAR          N
VALUE                VARCHAR          Y
CCC                  CLOB            Y
DB2_GENERATED_ROWID ROWID            N
***** END OF DB2 DATA *****

```

Easily include columns in primary indexes

Inline LOBs with DB2 Admin Tool 10.1

```

ADB21TAB ----- DSNA Alter Table ----- 10:22
Command ==>

ALTER TABLE
Table schema . . . J148286 >
Table name . . . TIMESTZ

ADD
Column name . . . NEWCOL1 > (? to look up)
Column type . . . CLOB (Built-in only)
Data length . . . 10000 (Built-in only)
Inline length . 1000 (0-32680 BLOB or CLOB, 0-16340 DBCLOB)
Precision . . . (used only w/FLOAT and DECIMAL)
Scale . . . . . (used only w/DECIMAL and TIMESTAMP)
Type schema . . . > (User-defined only)
Type name . . . > (User-defined only)
WITH TIME ZONE . (Yes/No - for TIMESTAMP only)

Allow nulls . . . (Yes or blank-nullable, No-NOT NULL)
FOR ? DATA . . . (B-Bit, S-SBCS, M-Mixed, blank-N/A)
WITH DEFAULT . . (Yes, No, L (SECLABEL) or enter value below)
Default value . . >
GENERATED . . . (A-ALWAYS, D-DEFAULT,

```

More: +

Specify length of inline portion of LOB

Time Travel “as of” with DB2 Table Editor 4.3

```
ETI$HIST V4R3 ----- History View ----- 2010/11/19 11:55:23
Option ==> ----- Scroll ==> CSR
-----
Creator ==> PDDAB >
Table ==> POLICY_INFO_STIME >
-----
Date Changed          Data
2010-08-11-10.40.22.4288759070  A457802
2010-08-11-10.40.15.5550727820  A456802
2010-07-05-11.38.59.7969314680  A456802
2010-07-05-11.38.48.9224441870  A45680
2010-06-19-13.07.43.5821303760  A456
***** Bottom of Data *****

Valid Commands: CANCEL, END/PF3
```

Historical view of data changes

Optimize Dynamic Infrastructure Performance

OMEGAMON XE for DB2 Performance Expert 5.1 Exploitation

Extended Insight

- Surface DB2 for z/OS end-to-end response time metrics
 - Visibility to **all** the components that make up end-user response time
 - Facilitates platform-agnostic identification of response time bottlenecks
 - Enables near-instantaneous response to and prevention of application slowdowns
- Leverages Tivoli Enterprise Portal GUI
- Support DB2 9 & 10

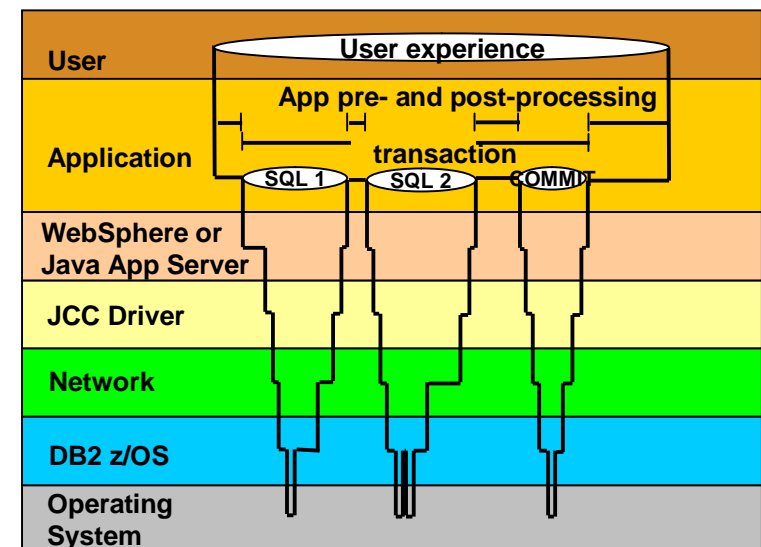
Summary SQL Reporting

Manage thousands of Threads

Support new DB2 10 Monitoring Data

Lower Monitoring Overhead

25% zIIP offload of Near Term History *



OMEGAMON DB2 PE 5.1 Extended Insight

Zoom into selected workload and see the TOP SQL list

Optim Performance Manager | TSCHAFFL | Log out | About | ?

Task Manager | Manage Database Connections | Welcome - My Optim Central

Welcome - My Optim Central | Manage Database Connections | Health Summary | Workload | System | Overview | **Extended Insight Dashboard**

Extended Insight Analysis Dashboard: OMP1D911

Back

Locate the source of performance problems, determine how those problems affect different parts of the workload, and analyze the impact of those problems on the system.

Response Time Details: 9.152.205.30

Graph | Grid

Selected layer: Average End-to-End Response Time | Show Maximum

Graph showing Average End-to-End Response Time (sec) over time (03/19 12:00:00 to 03/19 14:30:00).

SQL Statements | Clients

Show highest 10 by Average Data Server Time (sec)

| Statement Text | Statement Executions | Average Data Server Time (sec) |
|---------------------------------|----------------------|--------------------------------|
| SELECT 'PVT_40K' AS WKLID, '... | 1 | 0.504 |
| SELECT 'PVT_40K' AS WKLID, '... | 1 | 0.474 |
| SELECT 'PVT_40K' AS WKLID, '... | 1 | 0.518 |
| SELECT 'PVT_40K' AS WKLID, '... | 1 | 1.393 |
| N/P | 1 | 1.023 |

Display this list by the selected graph layer

Detail Area for Average End-to-End Response Time

End-to-End Response Time

| | |
|--|------------|
| Overall average response time per transaction: | 0.075 sec |
| Maximum response time: | 15.282 sec |
| Maximum Time of running transactions | 10.688 sec |
| Number of transactions: | 61,245 |
| Statements: | 65,344 |

Time Distribution (%)

| | |
|------------------|--------|
| Client time | 6.67% |
| Network time | 32.00% |
| Data server time | 61.33% |

Transaction Throughput

Transaction throughput graph showing /min over time (03/19 12:00:00 to 03/19 13:56:41).

Statement Throughput

Statement throughput graph showing /min over time (03/19 12:00:00 to 03/19 14:11:21).

Top SQL statements executed by Java or CLI applications like SAP, Cognos, DataStage or WebSphere

- Zoom in on a selected SQL

Detailed End-to-End Response Time

OMEGAMON DB2 PE 5.1 Extended Insight Select Static or Dynamic SQL and zoom into SQL details

Extended Insight Analysis Dashboard: OMP1D911

Back

Locate the source of performance problems, determine how those problems affect different parts of the workload, and analyze the performance of individual SQL statements, clients, and partitions.

Response Time Details: 9.152.205.30

Graph Grid

Selected layer: No layer selected Show Maximum

SQL Statements Clients

Show highest 10 by Average Data Server Time (sec)

| Statement Text | Statement Executions | Average Data Server Time (sec) |
|---------------------------|----------------------|--------------------------------|
| SELECT 'PVT_40K' AS WK... | 1 | 0.504 |
| ... | 1 | 0.474 |
| ... | 1 | 0.518 |
| ... | 1 | 1.393 |
| N/P | 1 | 1.023 |

SQL Statement Text

Statement information

```
SELECT 'PVT_40K' AS WKID, '100319#13:45:21:250' AS TIME, '1' AS STMTNR, '40000' AS LENGTH, '0' AS LB, '0' AS TB, 'false' AS TABNEWLINE, COUNT(*) AS COUNT FROM LGQ#0002 WHERE A=0001000 OR A=0001000 OR...
```

Statement Performance

Number of Executions: 1

Average end-to-end elapsed time: 0

Average client time: 0

Average driver time: 088 sec

Average data server time: 03 sec

Open Optim Query Tuner to analyze this SQL statement.

Tune SQL with Optim Query Workload Tuner

Statement Time Distribution (%)

97.33% Data server time, 2.67% Client time

Statement Outcome

Failure rate (with negative SQL code): 0 %

First SQL code: N/P

Package name: N/P

Section number: 0

Package name: N/P

Section number: 0

Package Consistency token: N/P

Package Version: N/P

Collection: N/P

| Java class | Java package | Method | Source line number | Build version | Source expression | Method Signature | Application Name | Metadata File |
|------------|--------------|--------|--------------------|---------------|-------------------|------------------|------------------|---------------|
| | | | | | | | | |

Java class, package and method shown if pureQuery Is installed.

Transfer Volume

Average bytes transferred locally: 0 bytes

Average bytes transferred remotely: 41.369 KB

Average rows returned: 0

Average number of round trips: 1

Drive DB2 10 Efficiency & Productivity

DB2 Automation Tool 3.1 Exploitation

- Autonomic Statistics
 - Exploit real-time, sampling driven Statistics collection
 - Invoke RUNSTATS with new Profile option
 - Interface with existing Job Schedulers
- FlashCopy Image Copy
 - Reduce Batch-windows
 - Reduce CPU consumption with Storage-based Backups
 - Drive improved Recovery Time Objectives
- Avoid Unnecessary Reorgs
 - Set REORG thresholds based on DB2 10 Best Practices
 - Detect when Indexes are insensitive to Clustering
 - Avoid REORGs for poorly structured Indexes

Exploit Online Reorgs with DB2 Utilities Enhancement Tool 2.1

- New Utility Syntax Monitor to enforce enterprise Utility standards
- Define policy to cancel Threads immediately before Switch Phase
 - Exploit REORG Force option to eliminate Drain Failures
- No changes required to REORG Jobs

DB2 Automation Tool 3.1 Exceptions

CLUSTERSENS and HASHACCESS

```

AUTOTOOL V3R1      ---- Update Exceptions Profile Display --- 2010/09/28 09:20:31
Option ==>          Scroll ==> CSR
  Commands: END - Save and exit.
Line Commands: A - And  O - Or  S - Select  D - Deselect  R - Repeat
  CONditions: LT|<|LE|<=|EQ|=|GT|>|GE|>=|NE|^-|=|<> "*" indicates DAT stat
-----
Creator: CSJENN      Profile: TESTING                          Row 54 of 196  -+>
Share Option: U (U - Update, V - View, N - No)                User: CSJENNA
Description:
Use Stats From: R (R - Repository,                            Scroll Right for Column Help
                  C - Catalog,                                Update Runstats Options: N (Y - Yes,
                  U - Runstats,                               N - No)
                  S - Shadow,                                Save Triggers in Repository: N (Y - Yes,
                  H - History)                               N - No)
                  WTO number of triggered Objects: N (Y - Yes,
                                                         N - No)
Combine IX/TS Exceptions if evaluating IX triggering a TS: N (Y - Yes, N - No)
-----
S Statistics Type--- *Column----- Cond -----Exception Value-----
REALTIME REORG TS    DAYS_SINCE_HASH
                    DATAISMORETHANHASH
                    INS_UPD_DEL
                    INS_UPD_DEL_PCT
                    UNCLUST_INS
                    UNCLUST_INS_PCT
                    DISORGED_LOBS
                    DISORGED_LOBS_PCT
                    RELOCATED_ROWS
                    RELOCATED_ROWS_PCT
                    *HAA$DELETED
                    CLUSTERSENS
                    HASHACCESS
                    SCANACCESS
REALTIME REORG IX   REAL TIME STAT
                    DAYS_SINCE_LAST
                    INS_DEL
                    INS_DEL_PCT
                    APPENDED_INS
                    APPENDED_INS_PCT
                    PSEUDO_DEL
                    PSEUDO_DEL_PCT
                    LEAFFAR_SPLITS_PCT
                    NLEAF_SPLITS
*HAA$EPR
  
```

Avoid unnecessary REORGs to maintain high cluster ratio

**CLUSTERSENS
HASHACCESS
SCANACCESS**

DB2 Automation Tool 3.1

Cancel Readers Preventing Online Reorg Drains

```

AUTOTOOL V3R1 ----- online Reorg options ----- 2010/09/01 17:06:38
Option ==> 11 ==> CSR
Commands: END - Return to the previous utility profile
Creator: CSJENN      Name: TESTING      CSJENN

Enter the options to associate with this utility profile

sharelevel . . . . . ==> C (R - Reference, C - Change, N - None)
Drain wait . . . . . ==> 10 (blank, 0-1800 seconds)
Retry . . . . . ==> 0 (blank, 0-255)
Retry Delay . . . . . ==> 1 (blank, 1-1800 seconds)
Timeout . . . . . ==> I (A - Abend, I - Term, N - None)
Force . . . . . ==> - (A - All, R - Readers, N - None)
AUX . . . . . ==> R (Y - Yes, N - No)

Include Update
Deadline Options ==> N (Y - Yes, N - No) ==> N (Y - Yes, N - No)
shrlevel Change options ==> Y (Y - Yes, N - No) ==> N (Y - Yes, N - No)

*HAA$UOP -SDSF
  
```

Force Readers holding claims preventing REORG switch

Force

Drive DB2 9 & 10 Efficiency & Productivity

DB2 Sort 1.1

- Significant CPU and Elapsed Time reduction in Sort
 - LOAD, REORG, RUNSTATS, REBUILD INDEX, CHECK INDEX, CHECK DATA
 - Presort from DB2 Utilities Enhancement Tool for LOAD REPLACE
- Unique API to allow authorized utilities to invoke the sorting software
- Valuable for customers with large amount of data and aggressive SLA's

Internal Format for up to 4x Load Performance Improvements

- DB2 UNLOAD & LOAD Utilities
- DB2 High Performance Unload 4.1
- Exploit with DB2 Utilities Enhancement Tool 2.1 Constant & Valuelf Options

Unload and Load DB2 Data via USS Pipes & TCP/IP

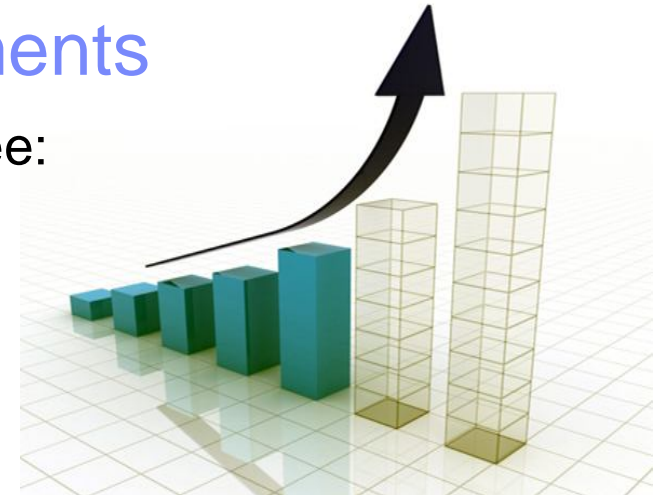
- DB2 UNLOAD & LOAD Utilities
- DB2 High Performance Unload 4.1

Fast XML Data Unload

- DB2 High Performance Unload 4.1

DB2 Sort 1.1 Performance Improvements

- Customers using DB2 Sort 1.1 on a z196, may see:
 - Up to 15% in reduction of sort elapsed time *
 - Typically around 5-10% *
 - Up to 45% reduction of sort CPU *
 - Typically around 25-30% *
 - Up to 30% zIIP offload of remaining sort CPU *
- IBM DB2 Utilities where you'll see performance benefits
 - LOAD, REORG, RUNSTATS, REBUILD INDEX, CHECK INDEX, CHECK DATA
 - DB2 Utilities Enhancement Tool 2.1 LOAD Presort
 - Support DB2 V8, 9 & 10
- Workloads where there is more likely to be a benefit from utility sort processing and DB2 Sort 1.1
 - Highly-transactional workloads performing lots of insert, update, delete operations requiring RUNSTATS and REORG
 - Applications such as data warehousing applications that are performing frequent or large volumes of loading data requiring LOAD and REBUILD INDEX
 - Situations where data volume and/or inaccurate statistics have resulted in Sort Capacity Exceeded errors



Recover DB2 10 Advanced Technology

DB2 Recovery Expert 2.2

- Exploit FlashCopy Image Copy
 - Take Consistent Online Image Copies in seconds
 - Reduce CPU and Batch-windows
 - Improve Recovery Times
 - Automate Recovery Jobs
 - Native EMC Storage-based copies
 - **Supports DB2 V8, 9 and 10!**
- Exploit RECOVER BACKOUT for faster recoveries
- Undo and Redo Temporal Data

DB2 Log Analysis Tool 3.2

- Undo and Redo Temporal Data
- Support FlashCopy Image Copy
- Support all new DB2 10 Log changes

Further Exploit FlashCopy Image Copy

- DB2 Administration Tool 10.1
- DB2 Automation Tool 3.2
- DB2 Change Accumulation Tool 2.1
- DB2 High Performance Unload 4.1

DB2 Recovery Expert 2.2 FlashCopy and Snap Image Copies

```

ROCKBACK V2R2 ----- Image Copy Options ----- 2010/11/19 11:58:23
Option ==>  
-----
Creator: PDDUDEA      Name: PAYROLL APPLICATION      SSID: EA1A
Share Option: U      (Upd,View,No)      Description: EMC Snap
-----
Enter the Image Copy options to associate with this Object profile:

Global Image Copy Options
Fast Replication Method ==> D      (Snap/Dfmsmdss)
  Update Fast Rep Options ==> N      (Yes/No)
  Sharelevel              ==> C      (Reference/Change)
  Scope                   ==> A      (All/Pending)
  Number of Tasks         ==> 04     (01-99)
Traditional Image Copy options
All Parts in one Copy    ==> Y      (Yes/No)
Local Primary            ==> N      (Yes/No/Update)
Local Backup             ==> N      (Yes/No/Update)
Recovery Site Primary    ==> N      (Yes/No/Update)
Recovery Site Backup     ==> N      (Yes/No/Update)
VSAM Image Copy options
Register VSAM Copy       ==> Y      (Yes/No)
Number of VSAM Generations ==> 0001 (0000-9999 0 = Keep all gens)

```

RECOVER BACKOUT with DB2 Recovery Expert 2.2

Recovery Advisor

1. Location
2. Objects
3. Point in Time
4. Recovery Plan

Generate and execute a plan to recover the selected objects.
Click Generate to generate one or more recovery plans for the selected objects.
After generating, you can select a plan to review its details.
If it has been some time since you generated the recovery plans, you can click Validate to check whether the external resources required by the plans (such as image copy data sets) are still available.
Finally, select the plan you wish to use for recovery, and click Run to run it. To instead view

Recovery plans
Generate...

Plans

- Plan 1: Using RECOVER with BACKOUT (cost = 0.37)
 - Job 1
 - Check Status
 - START DATABASE
 - Check Status
 - RECOVER
 - Table space ICTEST.SEG4K
 - Index PDDUDE.IX4KS
 - CHECK INDEX
 - Check Status
 - START DATABASE
 - Check Status
 - Plan 2: Using RECOVER (cost = 0.57)
 - Plan 3: Using DSN1COPY and RECOVER LOGONLY (cost = 0.69)
 - Plan 4: Using undo SQL (cost = 50.75)
 - Plan 5: Using RECOVER to IC and redo SQL (cost = 52.76)
 - Plan 6: Using DSN1COPY of IC and redo SQL (cost = 52.85)
 - Recovered Objects

| Name | Value |
|--|----------------------------|
| Estimated number of cpu milliseconds | 37 |
| Estimated number of disk allocations | 1 |
| Estimated number of disk page copies | 13 |
| Estimated number of tape drive allocations | 0 |
| Estimated number of tape page copies | 0 |
| Estimated relative cost of the recovery p... | 0.37 |
| Log point | 0001198632F1 |
| Plan name | Using RECOVER with BACKOUT |

Validate Run View JCL...

Back Next Save... Close Help

Drive RECOVER BACKOUT based on relative cost

DB2 Log Analysis Tool 3.2 Redo Temporal Data

```

Menu Utilities Compilers Help
BROWSE PDJOH2.ALA.RUN.SQLOUTR 000 Col 001 080
Command ==> Scroll ==> CSR
***** Top of Data *****
--REDO SQL FOR SUBSYSTEM: DATA
--#00000001 *REDO INSERT* URID:0014F9FC7634 DATE/TIME:2010-11-19/13.07.16 ....
    INSERT INTO
    "PDJOH2"."POLICY_INFO"
    VALUES(
    'A123'
    ,+12000
    , '2010-01-01'
    , '2010-07-01'
    )
--#00000002 *REDO INSERT* URID:0014F9FC7634 DATE/TIME:2010-11-19/13.07.16 ....
    INSERT INTO
    "PDJOH2"."POLICY_INFO"
    VALUES(
    'A123'
    ,+12000
    , '2010-07-01'
    , '2010-12-01'
    );
--#00000003 *REDO UPDATE* URID:0014F9FC7634 DATE/TIME:2010-11-19/13.07.16 ....

```

Redo Business Time

Jump into DB2 10! The water's fine.



DB2 V8

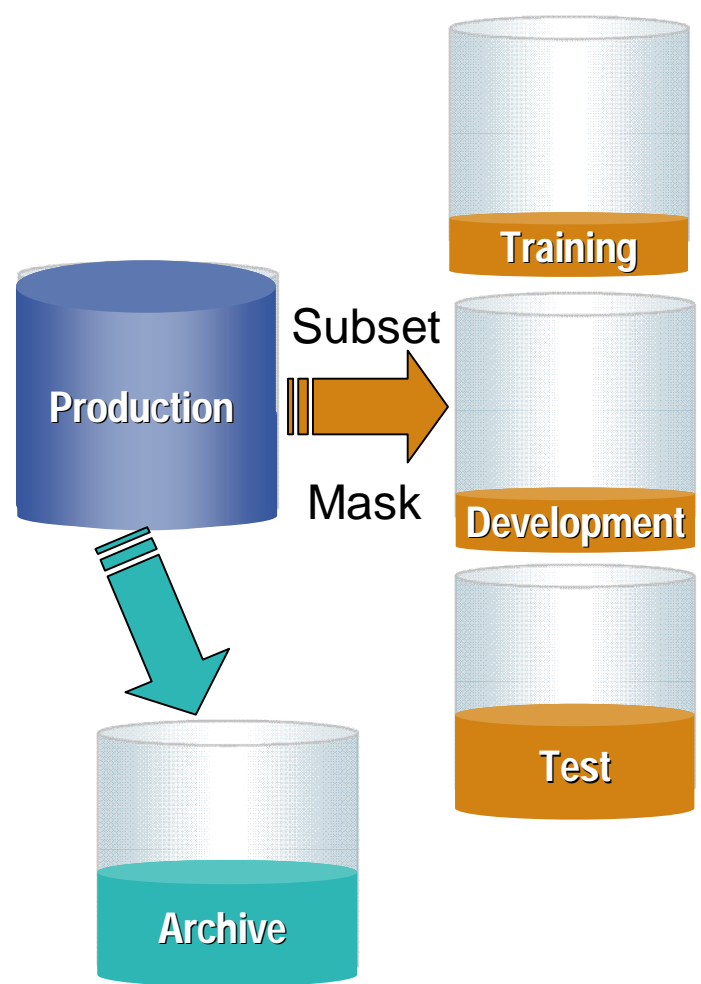
DB2 9

DB2 10

Key Questions are WHEN? and HOW?

IBM InfoSphere Optim solutions

Managing data throughout its lifecycle in heterogeneous environments



Data Growth Management

Benefits

- Reduce hardware, storage & maintenance costs
- Streamline application upgrades & improve application performance
- Safely retire legacy & redundant applications while retaining the data

Test Data Management

Benefits

- Easily refresh & maintain data in non-production environments
- Deploy new functionality more quickly and with improved quality
- Reduce storage and operational costs

Data Masking

Benefits

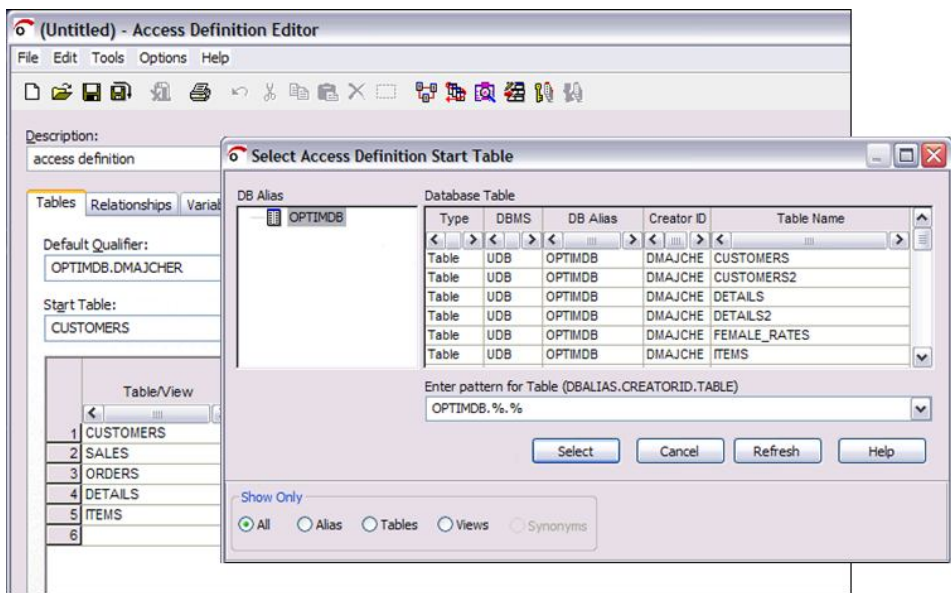
- Protect sensitive information from misuse & fraud
- Prevent data breaches and associated fines
- Achieve better data governance

IBM InfoSphere Optim Test Data Management Solution



Test Data Management

Create “right-size” production-like environments for application testing



Requirements

- Create referentially intact, “right-sized” test databases
- Automate test result comparisons to identify hidden errors
- Shorten iterative testing cycles and accelerate time to market

Benefits

- Deploy new functionality more quickly and with improved quality
- Easily refresh & maintain test environments
- Reduce storage and operational costs

IBM InfoSphere Optim Data Growth Solution



Data Growth

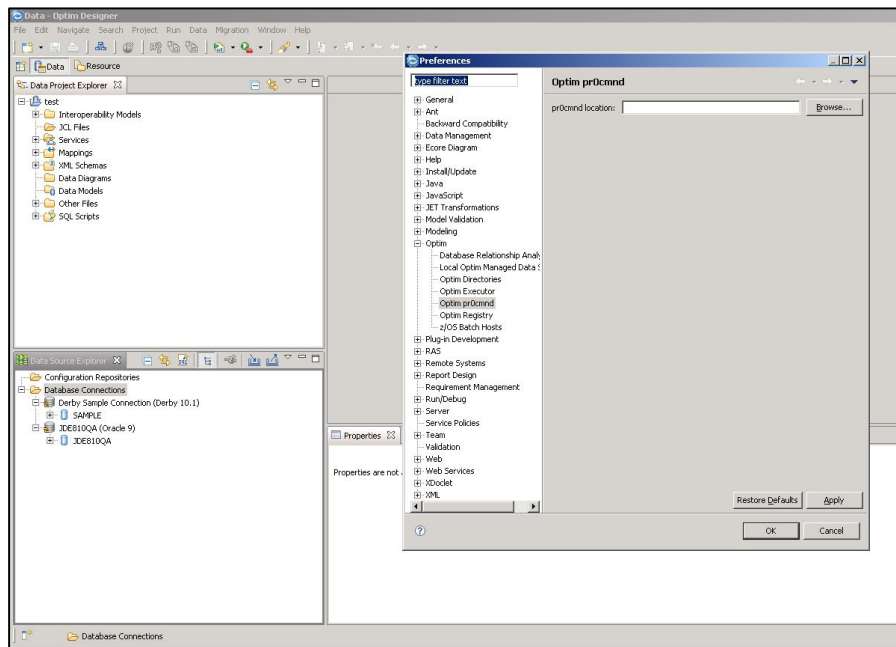
Manage data growth and improve performance by intelligently archiving historical data

Requirements

- Archive, manage and retain application data according to business policies
- Minimize downtime during application upgrades
- Consolidate application portfolio and retire legacy applications

Benefits

- Reduce hardware, storage and maintenance costs
- Streamline application upgrades and improve application performance
- Safely retire legacy & redundant applications while retaining the data



IBM InfoSphere Guardium Data Redaction



Data Redaction

Protect sensitive unstructured data in documents and forms

Finresearch LLC
934 Fifth Ave
New York, NY 00124

September 19, 2008

James McDonald CEO
Financial National Bank
111 Massachusetts Ave
Boston MA 02140

Re: Preliminary Anti-Trust Pre-Acquisition Investigation

Finresearch LLC has conducted research of the market and legal situation in preparation for an acquisition of Northern Investments Inc. by Financial National Bank Inc., scheduled for Jan. 21, 2009. The assignment was to determine the risk of civil and/or criminal action from the Attorney General of the United States under Section 15 of the Lombard Act, 15 U.S.C. § 19 to enjoin the acquisition of Northern Investments. We were asked to assess if such an acquisition would substantially affect competition in the housing

Before

[Organization]
[Address]
[Address]
[Date]

[Phone] [Orga...]
[Organization]
[Address]
[Address]

Re: [Organization] Pre-Acquisition Investigation

[Organization] has conducted research of the market and legal situation in preparation for an acquisition of [Organization] by [Organization], scheduled for [Date]. The assignment was to determine the risk of civil and/or criminal action from the Attorney General of the [Location] under Section 15 of the Lombard Act, 15 U.S.C. § 19 to enjoin the acquisition of Northern Investments. We were asked to assess if such an acquisition would substantially affect competition in the housing

After

Requirements

- Protect unstructured data in textual, graphical and form based documents
- Control data views with user role policies
- Automate batch workflow process with optional human review

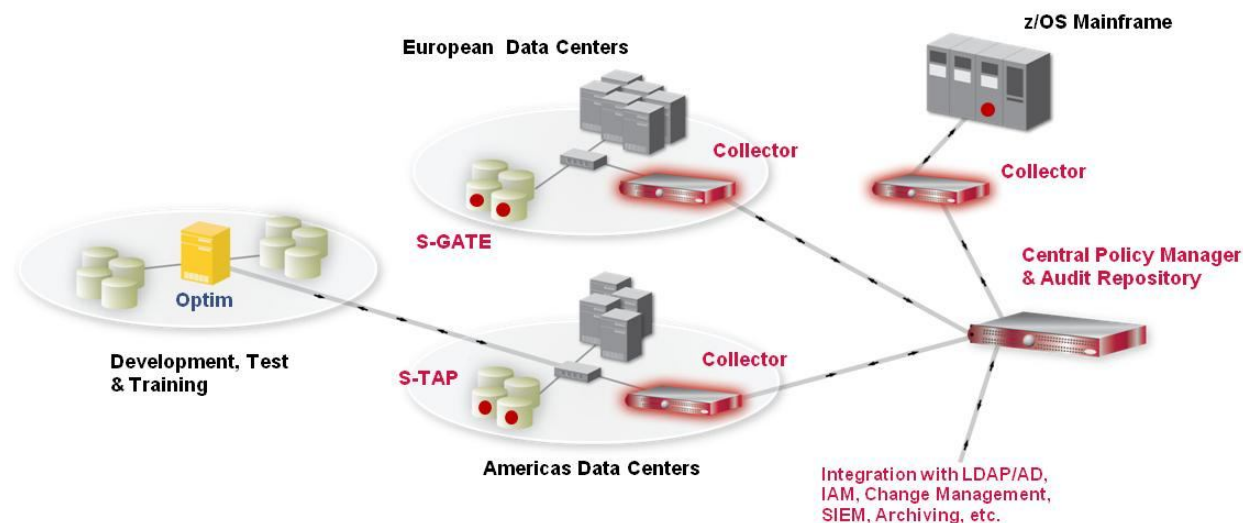
Benefits

- Prevent unintentional data disclosure
- Comply with regulatory and corporate compliance standards
- Increase efficiency and reduce risk via automation

IBM InfoSphere Guardium

Database Protection and Compliance Made Simple

16



Requirements

- **Maintain a trusted information supply chain by protecting sensitive data from unauthorized access or changes**
 - **In 2010 92% of compromised records came from DB servers**
- **Validate compliance with regulatory mandates**
- **Minimize operational costs**

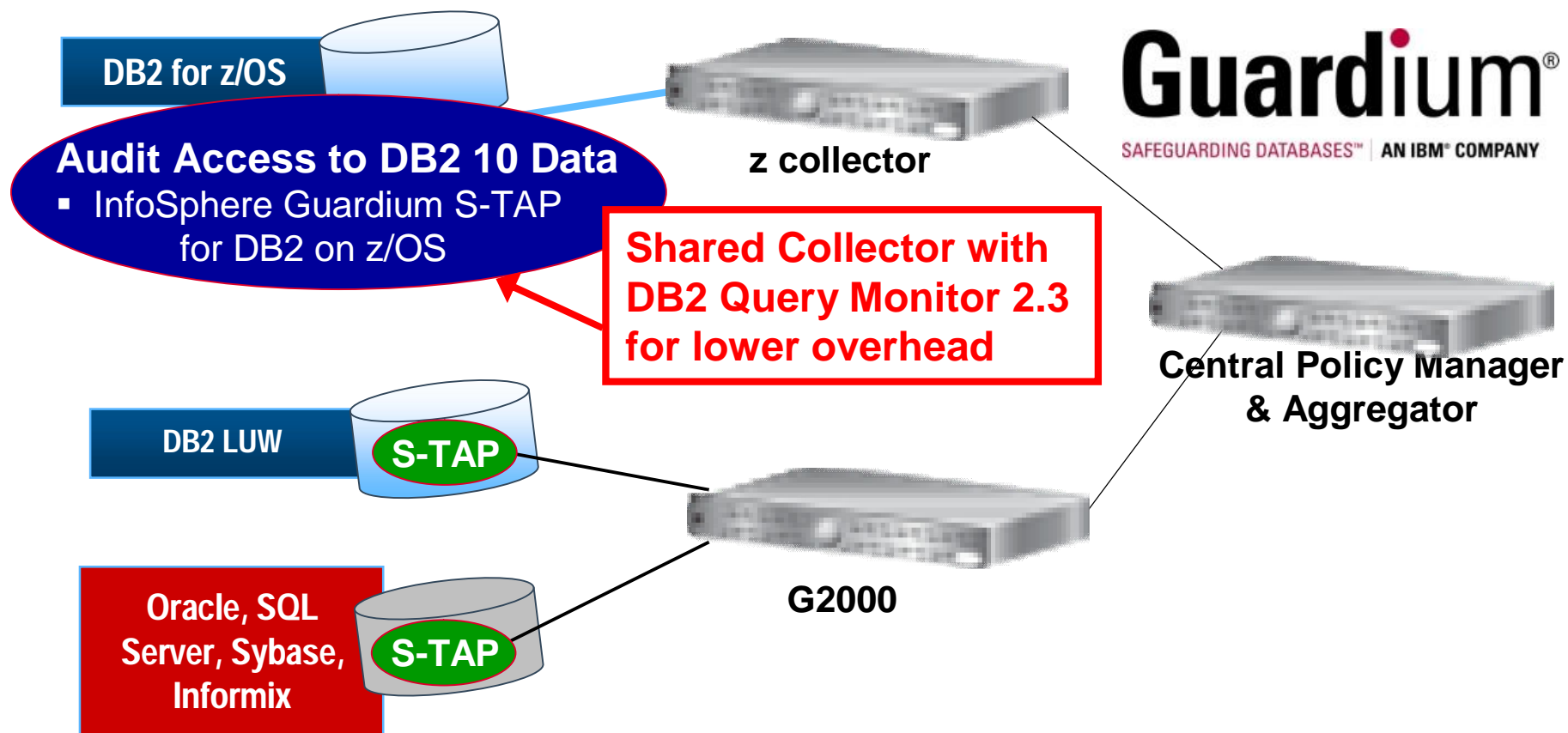
Benefits

- **Secures high-value databases by continuous monitoring and protecting against threats from legitimate users and potential hackers**
- **Streamlines compliance processes with automated and centralized controls; slashing compliance costs**

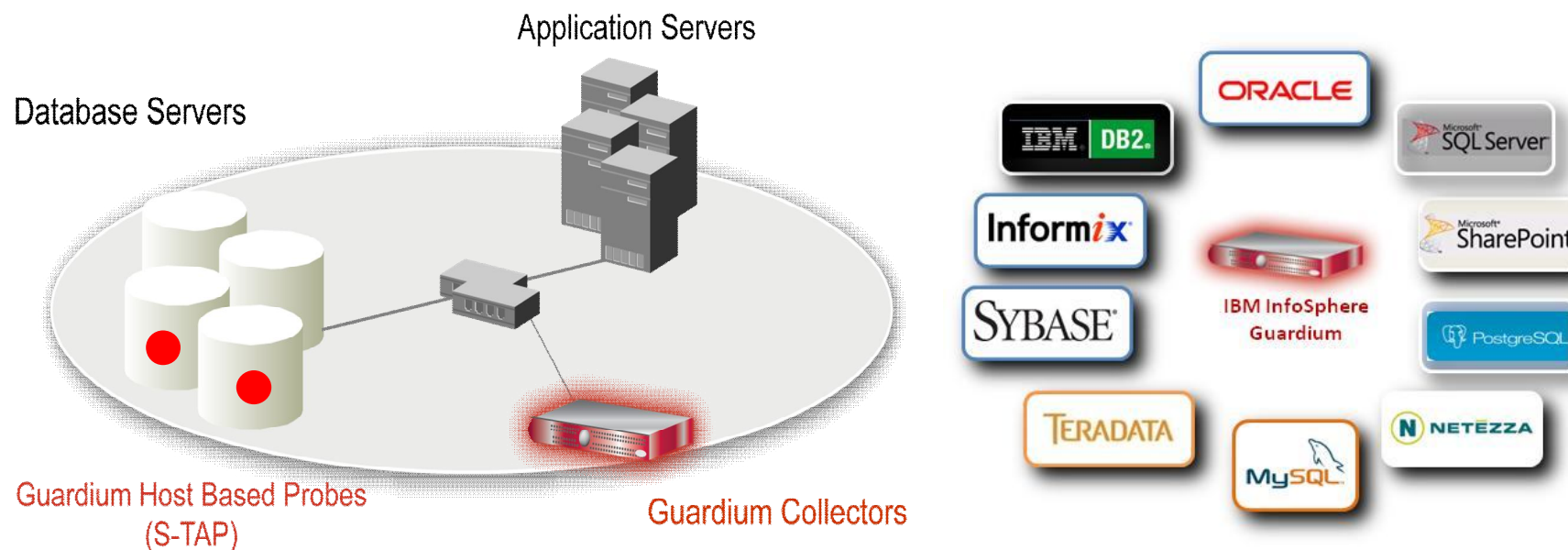
Safeguard DB2 10 Data

Encrypt DB2 10 Data

- Data Encryption Tool for DB2



Guardium Database Activity Monitoring



- Non-invasive architecture
 - Outside database
 - Minimal performance impact
 - No DBMS or application changes
- Cross-DBMS solution
- 100% visibility including local DBA access
- Enforces separation of duties
- Does not rely on DBMS-resident logs that can easily be erased by attackers, rogue insiders
- Granular, real-time policies & auditing
 - *Who, what, when, how*
- Automated compliance reporting, sign-offs & escalations (SOX, PCI, NIST, etc.)

Accelerate DB2 10 Time to Value

DB2 Cloning Tool 2.2

- Exploit Storage-based copies to drastically reduce CPU and outages
- Create Subsystem and Object Clones to test DB2 10 with minimal effort
 - Automatically reduce number of Data Sharing Members
 - Convert Data Sharing to non-Data Sharing
 - Create Subsystem Clone from System Level Backup
 - Mask sensitive production data
- Supports native IBM, EMC and Hitachi Storage-based copies

DB2 Query Monitor 2.3

- Track SQL Performance before and after Migration

DB2 Path Checker 4.1

- Identify potential Access Path regressions
- Export SQL to Optim Query Workload Tuner or Data Studio for tuning
- Selectively save packages in DB2 9 & 10 (CM8,CM9,NFM) with Plan Mgmt

DB2 Bind Manager 2.4

- Identify and Free unused Packages
- Reduce Bind impacts

Accelerate DB2 10 Time to Value

Optim Query Workload Tuner 2.2.1

- Tune applications/queries created against DB2 V8, 9 & 10
- Support of new workload explain format in DB2 10
- Identify Indexes not being used as candidates for elimination
- Provide advice on modifying existing indexes to reduce CPU
- New DataMart Advisor (Accelerated Query Table)
- Identify potential Access Path regressions after Migration based on cost
- Support all of the new access types introduced in DB2 10
 - hash access(H), range list access (NR), and in memory access(IN)

SQL Performance Analyzer 4.1

- Support for DB2 10 Explain format
- Support new DB2 10 access types
- New Tabular Report
- Improved ISPF interface
- Initial release of Tools Customizer for z/OS (TCz)

Optim Query Workload Tuner Streamlined Analysis

Define or select a workload

Execute Advisors



Drill Down into advice

Recommendations - 11

| Advisor | Number | Priority | Description |
|---------------------|--------|----------|---|
| Recommendations | | | |
| Statistics Advisor | 1 | HIGH | Repair statistics problems for this query. Gather missing statistics. Recollect conflicting st... |
| Query Advisor | 2 | MEDIUM | Provide a join predicate based on the referential constraint between tables DSN8910.EM... |
| Query Advisor | 3 | MEDIUM | Provide a predicate on column WORKDEPT. |
| Access Path Advisor | 4 | LOW | Avoid reading all index keys on an index scan (QBLOCKNO = 1, PLANNO = 1). |
| Index Advisor | 5 | LOW | Index recommendations found. |

Validate improvement

| Name | Summary Status | Owner | Execution Time |
|---------------------------------|-----------------|---------|----------------------------|
| WorkloadWithTypicalStats | ANALYZING | B3OSC12 | CPU time: 97.32 (second... |
| WorkloadTunedWithStatsAdvisor | ANALYZING | B3OSC12 | CPU time: 53.19 (second... |
| WorkloadTunedWithIndexAdvisor | ANALYZING | B3OSC07 | CPU time: 40.67 (second... |
| AbsoluteCPUTimeExceptionMonitor | ENABLED/STARTED | SYSADM | N/A |
| NormalMonitor | ENABLED/STARTED | SYSADM | N/A |

Optim Query Workload Tuner Improved Statistics Quality

Statements | Recommendation Summary | **Workload Statistics Advisor** | Workload Query Advisor

Existing statistics status - 5 tables need repair out of the 7 tables that were checked

Repair Complete

This version of the RUNSTATS command repairs the problems that the Workload Statistics Advisor identifies.

RUNSTATS Control Statements

```
RUNSTATS TABLESPACE DB4LINE1.TSLINE1
TABLE(SYSADM.LINEITEM) SAMPLE 5
COLGROUP(L_QUANTITY) FREQVAL COUNT 10
COLGROUP(L_DISCOUNT) FREQVAL COUNT 10
COLGROUP(L_DISCOUNT) HISTOGRAM NUMQUANTILES 20
COLGROUP(L_SUPPKEY) HISTOGRAM NUMQUANTILES 20
COLGROUP(L_SHIPDATE) FREQVAL COUNT 10
COLGROUP(L_SHIPDATE) HISTOGRAM NUMQUANTILES 20
COLGROUP(L_RECEIPTDATE) FREQVAL COUNT 10
COLGROUP(L_RETURNFLAG) FREQVAL COUNT 10
COLGROUP(L_TAX) FREQVAL COUNT 10
COLGROUP(L_RECEIPTDATE,L_RETURNFLAG,L_SHIPDATE,L_SHIPMODE)
COLGROUP(L_SHIPMODE) FREQVAL COUNT 10
COLGROUP(L_ORDERKEY,L_QUANTITY)
```

Generates
RUNSTATS
control statements

- Provides advice on
 - Missing statistics
 - Conflicting statistics
 - Out-of-date statistics



▪ Results

- Accurate estimated costs
- Better query performance
- Less CPU consumption
- Improved maintenance window throughput

Statistics Advisor report

Interesting columns:

S_SUPPKEY

Cardinality: 10000.0
 Uniform statistics collection time: 2008-09-29 16:06:48.376482
 Uniform statistics status: OK
 Frequency statistics collection time: 2008-09-29 16:06:48.376482
 Frequency statistics status: OK
Histogram statistics collection time: null
 Histogram statistics status: missing
 Possibly point skewed: No
 Possibly range skewed: No

S_NATIONKEY

Cardinality: 25.0
 Uniform statistics collection time: 2008-09-29 16:06:48.376482
 Uniform statistics status: OK
Frequency statistics collection time: null
 Frequency statistics status: missing
 Histogram statistics collection time: null

Indicates
conflicting
and missing
statistics

“Half of access path PMRs could be resolved by statistics advisor before calling IBM support.” – IBM Support

Conflicts detail

One of the frequency records (-1.0) of the L_ORDERKEY column group is out of range [0, 1]

The maximum frequency of the column group or column (L_ORDERKEY), (0,0), is less than the average unless only least-frequently occurring values are being collected.
Tolerance: 0.0010

Conflicting
statistics
explanation

Optim Query Workload Tuner Indexing Advice

- Improve query efficiency
 - Indexing foreign keys in queries that do not have indexes defined
 - Identifying index filtering and screening
 - Support for index only access
 - Indexing to avoid sorts
- Simplify use
 - Consolidate indexes and provide a single recommendation
 - Enables what-if analysis
 - Provides DDL to create indexes
 - Run immediately or save
- Test before deployment
 - Utilize virtual index capabilities built into the DB2 engine

The screenshot displays the Optim Query Workload Tuner interface. At the top, a table shows index columns with columns for 'New Index Columns', 'Old Index Columns', and 'Estimated'. A yellow starburst labeled 'New!' points to the 'New Index Columns' column. Below this, a 'DDL for Selected Indexes' window shows SQL code for creating and altering indexes. A red box highlights the 'ALTER INDEX' statement: `ALTER INDEX "SYSADM"."MI5" ADD COLUMN ("PS_AVAILQTY" ASC);`. A red arrow points from the text 'Modify existing indexes' to this statement. At the bottom, the 'Index elimination' dialog is shown, with a red box highlighting the 'Index elimination priority' section, which has 'Estimated performance cost' selected. Another red box labeled 'Index elimination' points to the 'Index elimination settings' section, which includes fields for 'Amount of disk space to recover' (set to 200 MB) and 'Limit for performance cost increase' (set to 0 %).

Exploit DB2 10 for z/OS with IBM DB2 Tools

Accelerate your ability to leverage compelling DB2 10 features with comprehensive Tools support

Data Encryption Tool for IMS and DB2 Databases
DB2 Administration Tool / DB2 Object Compare for z/OS
DB2 Audit Management Expert for z/OS
DB2 Automation Tool for z/OS
DB2 Bind Manager for z/OS
DB2 Change Accumulation Tool for z/OS
DB2 Cloning Tool for z/OS
DB2 High Performance Unload for z/OS
DB2 Log Analysis Tool for z/OS
DB2 Object Restore for z/OS
DB2 Path Checker for z/OS
DB2 Query Management Facility for z/OS
DB2 Query Monitor for z/OS
DB2 Recovery Expert for z/OS
DB2 SQL Performance Analyzer for z/OS
DB2 Table Editor for z/OS
DB2 Utilities Enhancement Tool for z/OS
DB2 Utilities Suite for z/OS
InfoSphere Change Data Capture
InfoSphere Data Event Publisher
InfoSphere Replication Server
Optim Data Growth Solution for z/OS
Optim Development Studio
Optim pureQuery Runtime
Optim Query Workload Tuner
Optim Test Data Management Solution for z/OS
Tivoli OMEGAMON XE for DB2 Performance Expert on z/OS



IBM DB2 Tools and DB2 10 for z/OS

Exploit out-of-the-box Savings

Extend Productivity

Accelerate Time to Value



Are your Tools ready for DB2 10?



Thank You!