Increasing your ROI on DB2 Tools and Utilities

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Information Management on System Z

IBM ASEAN

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DB2 for z/OS

Beta Started: March 12, 2010

The most robust and cost effective data server

DB2	DB2 9	DB2 10
■ Deep synergy with System z ■ HW Compression ■ Consolidation	• 20%-30% Utility CPU savings • Compress indexes, save 50% disk • More CPU on specialty engines	• Save up to 20% DB2 Batch & OLTP CPU • On-the-fly data Compression • Temporal data support • Skip-level migration
■ Unmatched availability ■ Unparalleled security ■ Industry leading reliability	• Flexible context and role security • Expanded online schema changes • Volume level backup & recovery	• Ten times more concurrent users • More online schema changes • More granular access control
■ Near-linear scalability ■ Optimized for SOA ■ Flexible development ■ Warehousing capabilities	• Seamless integration of XML and relational data • Improved SQL • Partition by growth • OLAP expressions	• Enhanced query parallelism • More SQL compatibility • Improved pureXML and SQL PL

Efficiency

Resilience

Growth

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Agenda

- **Quick reminder of IBM's DB2 Tools offerings**

- **DB2 Tools to assist migration**

- **DB2 Tools to assist modern workloads**

- **And you thought DB2 utilities were old hat**
  - DB2 UET
  - DB2 Sort

DB2 for z/OS Tools Portfolio

Application Management

- **DB2 Administration Tool**
- **DB2 Path Checker**
- **DB2 Bind Manager**
- **DB2 Query Monitor**
- **DB2 SQL Performance Analyzer**
- **DB2 High Performance Unload**
- **DB2 Table Editor**
- **Data Studio**
- **Optim Development Studio**
- **Optim Data Growth**
- **Optim Query Tuner**
- **Optim Test Data Management**
- **InfoSphere Data Architect**

Utilities Management

- **DB2 Utilities Suite**
- **DB2 Automation Tool**
- **DB2 Automation Toolkit SAP Edition**
- **DB2 Utilities Enhancement Tool**
- **DB2 High Performance Unload**

Database Administration

- **DB2 Administration Tool**
- **DB2 Object Comparison Tool**
- **DB2 Administration Toolkit SAP Edition**
- **DB2 Storage Management Utility**

Performance Management

- **OMEGAMON XE DB2 Performance Expert**
- **OMEGAMON XE DB2 Performance Monitor**
- **DB2 Query Monitor**
- **DB2 SQL Performance Analyzer**
- **DB2 Buffer Pool Analyzer**
- **DB2 Performance Toolkit SAP Edition**
- **Optim Query Workload Tuner**
- **Optim Development Studio**
- **Optim pureQuery Runtime**

Backup and Recovery

- **DB2 Recovery Expert**
- **DB2 Log Analysis Tool**
- **DB2 Cloning Tool**
- **DB2 Change Accumulation Tool**
- **DB2 Object Restore Tool**
- **DB2 Archive Log Accelerator**
- **Application Recovery Tool for IMS and DB2 Databases**

Data Governance

- **Optim Data Growth**
- **Optim Data Privacy**
- **Optim Test Data Management**
- **DB2 Audit Management Expert**
- **Data Encryption for DB2 and IMS**
- **Guardium**

Business Intelligence

- **Cognos for Linux on System z**
- **DataQuant**
- **QMF**

Planning for the migration

- **Understanding how applications currently execute will help isolate the true new version introduced problems via access path regression analysis**

  ➢ Identify access path changes prior to mass rebind

  ➢ Analyze and tune any undesirable access path changes prior to rebinds

- **Establish a full complete performance baseline**

  ➢ Average and total resource consumption on system, thread and SQL level

  ➢ Workload profile

  ➢ Any performance problem, whether legitimately introduced by the new version, or from an existing application issue, could conceivably blame the DB2 migration.

  ➢ Without a historical perspective of DB2 performance, you might be forced to spend time researching problems not caused by your migration.

IBM

IBM DB2 Tools that help a successful migration to DB2 9 or 10

- Run DB2 Cloning Tool to create whole test subsystems or subsets quickly with low impact to production

- Run DB2 Bind Manager if the application (DBRM) is no longer available, the BLDDBRM function lets you build the DBRM from the catalog

- Run DB2 Path Checker in TEST mode to compare a "new" bind with the contents of the backup plan_table – and use this tool to allow for access path regression analysis

- Using DB2 SQL PA, pass it the statements with different access paths to get costing and more detailed explain information

- Use Optim Query Workload Tuner to monitor and tune workloads and queries to optimize application performance

- Use OMEGAMON XE DB2 Performance Expert to monitor existing V8 subsystem performance and provide performance baseline for post-migration analysis

- Use Optim Test Data Management Solution for z/OS to help create small testbeds of relationally intact data.

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Managing your plans/packages/DBRMlibs during migration
DB2 Bind Manager

- **"Catalog cleanup" feature that compares bound packages in a DB2 subsystem to one or more load libraries and generates FREE commands to remove obsolete or unreferenced packages from the catalog**

- **Maintains DB2 system integrity using the DBRM Checker feature**

- **Lets you (re)build DBRMs from the catalog**

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Do I really need to BIND ?
Ask DB2 Bind Manager ☺

Safely by-passes the DB2 bind process for code changes that do not alter existing SQL structures in an application

- **Automatically eliminates unnecessary binds, processing only the necessary DB2 binds**
- **Helps determine whether a bind is required by comparing the consistency tokens for a plan in a DBRMLIB with the corresponding tokens in the DB2 catalog tables**
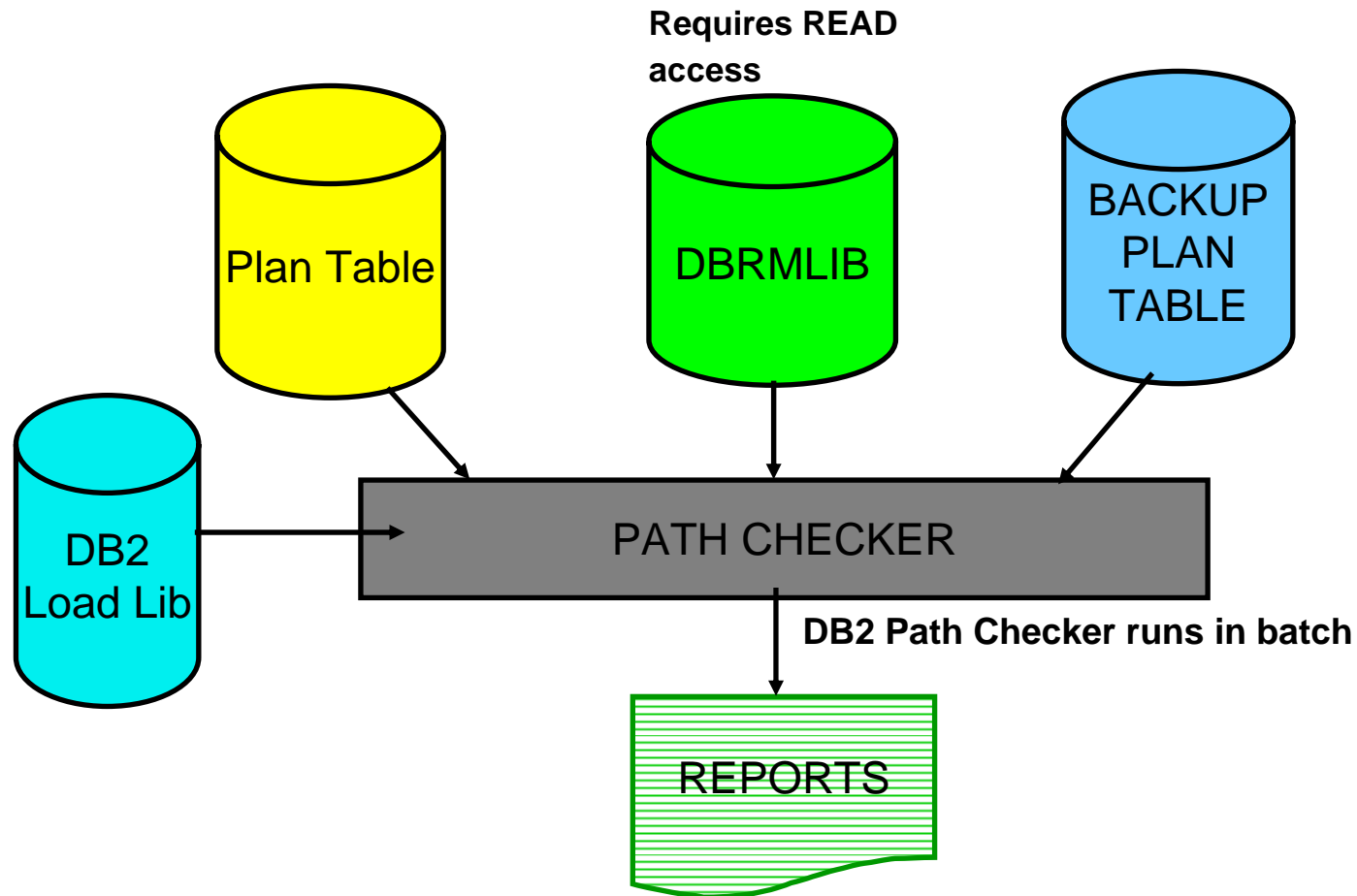
Helps save CPU – Every time programmers do a bind, there is a cost associated with it. If programmers can avoid doing binds, they can save CPU which equates to an overall lower total cost of ownership.

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Bad access paths can happen to good DBAs
Use PATH CHECKER

Helps determine access path changes so you can make adjustments before putting the application into production - thereby avoiding performance issues which could impact the bottom line

- **Use PATH CHECKER to analyze the access path data**

- **Use PATH CHECKER to create current access path data for old packages (Explain without BIND)**

- **Use PATH CHECKER to identify safe REBIND's (TEST BIND)**

- **Compare access paths before/after BIND**

- **Use SQL Performance Analyzer to get the access path details, cost and tuning advice**

- **Use PATH CHECKER to manage ongoing Bind/REBIND activity**

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DB2 PATH CHECKER

Requires READ access

Plan Table

DBRMLIB

BACKUP PLAN TABLE

DB2 Load Lib

PATH CHECKER

DB2 Path Checker runs in batch

REPORTS

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Path Checker- SYSPRINT -Results (Not Good)

```
IN   QRYNO M CREATOR  TNAME              TBNO AC MC  CREATOR  ACCESSNAME      IO
*     327 0 P390H     SYSCOLUMNS            1  I  2  P390H     DSNDCX01

CKP220I DATA CHANGE FOR COLUMN PREFETCH                WAS
CKP221I DATA CHANGE FOR COLUMN PREFETCH                IS NOW  L
CKP224I DSN_STATEMNT_TABLE ESTIMATED COST CHANGE - OLD EST SVC UNITS         1
CKP227I DSN_STATEMNT_TABLE ESTIMATED COST CHANGE - OLD EST CPU               1
CKP223I DSN_STATEMNT_TABLE ESTIMATED COST CHANGE - NEW EST SVC UNITS       146
CKP226I DSN_STATEMNT_TABLE ESTIMATED COST CHANGE - NEW EST CPU              76


CKP206I TEST COMPLETE FOR PROGRAM = TEST01   VERSION =  2005-04-11-18.34.53.754785
                                  PREVIOUS  VERSION =   2005-04-11-18.34.53.754785

CKP203I STATEMENTS WITH SAME ACCESS PATH 1   STATEMENTS WITH DIFFERENT ACCESS PATH 1
        FOR PROGRAM TEST01
CKP204I STATEMENTS WITH MATCHING EXPLAIN 2   STATEMENTS WITHOUT MATCHING EXPLAIN   0
        FOR PROGRAM TEST01
```

Path Checker- Sample SYSPRINT

```
IN   QRYNO M CREATOR   TNAME                 TBNO AC MC   CREATOR   ACCESSNAME          IO SORTUJOG LK
PF  FN QBNO  PLNO MXSQ  MJN PG JN OP
*     327 0 PUBLIC    SYSCOLUMNS            1 I     2 PUBLIC    DSNDCX01              N NNNNNNNN  IS
1   1      0

 CKP220I DATA CHANGE FOR COLUMN MATCHCOLS            WAS             0
CKP220I DATA CHANGE FOR COLUMN PREFETCH             WAS     S
CKP221I DATA CHANGE FOR COLUMN MATCHCOLS            IS NOW          2
CKP221I DATA CHANGE FOR COLUMN PREFETCH             IS NOW
CKP224I DSN_STATEMNT_TABLE ESTIMATED COST CHANGE - OLD EST SVC UNITS          38
CKP227I DSN_STATEMNT_TABLE ESTIMATED COST CHANGE - OLD EST CPU                20
CKP223I DSN_STATEMNT_TABLE ESTIMATED COST CHANGE - NEW EST SVC UNITS           1
CKP226I DSN_STATEMNT_TABLE ESTIMATED COST CHANGE - NEW EST CPU                 1


CKP206I TEST  COMPLETE  FOR  PROGRAM = TEST01   VERSION =    2006-04-24-22.45.29.330423
                                   PREVIOUS  VERSION =    2007-11-09-13.47.05.581274

CKP203I STATEMENTS WITH SAME ACCESS PATH      1        STATEMENTS WITH DIFFERENT ACCESS PATH
1      FOR PROGRAM TEST01
CKP204I STATEMENTS WITH MATCHING EXPLAIN      2        STATEMENTS WITHOUT MATCHING EXPLAIN
0      FOR PROGRAM TEST01
CKP219I STATEMENTS OVER CPUPCT   0
```

Predict cost and performance of SQL queries without executing them –
SQL Perfomance Analyzer

- ■ ***Emulates*** **and *Invokes* the DB2 Optimizer**
  - ‣ Uses internal path lengths and knowledge for costing (PRECISE NO)
  - ‣ Used the DB2 Optimizer's own CPU estimates (PRECISE YES)

- ■ ***Analyzes*** **the Access Plan chosen by DB2**

- ■ **Gives** <u>recommendations</u> **for tuning the SQL for maximum performance**

- ■ ***Estimates*** **the Execution Cost in the Real World**

- ■ ***Parameter*** **Driven**
  - ‣ User defined parameters
  - ‣ System defined parameters
  - ‣ Advisor Thresholds

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SQL PA

```
Session A - [32 x 80]                                                    _ |B| X|
File  Edit  View  Communication  Actions  Window  Help

[toolbar icons]

BROWSE -- BDREHER.ANLI.DET ---------------------- Line 00000205 Col 001 080
Command ===> _____ Scroll ===> CSR

Predicate =          _
                      4 Class 1  =      374.300965 Other O/H =       3.188400

The DB2 Optimizer has provided a processing estimate of      46639 Msec
equating to      524026 system Service Units. The "Cost Category" is: A

A join of  2 tables has been detected. This was the first table access.
It collects      167212 rows and      1 columns from       0 pages.

Queryno: 100000001   Qblockno:      1   Planno:      1   MixOpSeq:      0
Summary ->

The Total Cumulative Path Length for this query is      377.489365M Ins.
Resulting in a Total CPU Time of      0.83887 Seconds  consumed overall.
DB2 will put Class 1 CPU Time of      0.83178 Seconds  in SMF 101 record.
DB2 shows additional CPU Time of      0.00709 Seconds  in SMF 100 record.
Estimated Total  Logical I/O calls =      98 (excluding system) and
Estimated Total Physical I/O calls =      98 with Hit Ratio = 1.000.
Wait Time for Sync  Read I/O =      0.06916   Prefetch I/O =     5.24447
Wait Time on Async Write I/O =      0.00000   Total IWAIT  =     5.31363
Wait Time for VSAM Open/Close macros, Binding and Locking =     0.76812
*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*

------------------------------------------------------------------
Queryno: 100000001   Qblockno:      1   Planno:      2   MixOpSeq:      0
Process ->

  +-------------------------------------------------------------+
  |ANL6005I *** NOTE:                                           |

MA    a
Connected to remote server/host stplex4a.svl.ibm.com using lu/pool STM4TC85 and port 23
```

DB2 SQLPA – What If

- **Modify key table catalog statistics**
  - ‣ Number of rows (CARD)
  - ‣ Number of pages (NPAGES / NACTIVE)
  - ‣ % of the table space used by the table (PCTPAGES)
  - ‣ % of row compression (PCTROWCOMP)
- **Modify key index catalog statistics**
  - ‣ Number of rows indexed by 1st column (FIRSTKEYCARD)
  - ‣ Number of rows indexed by all columns (FULLKEYCARD)
  - ‣ Size of the index (NLEAF / NLEVELS)
  - ‣ Cluster ratio (CLUSTERRATIO)
- **Build or remove a temporary index**
  - ‣ Maximum of 5 columns
  - ‣ DEFER YES and DEFINE NO
  - ‣ Able to delete the index after evaluating it
- **Restore 'saved' catalog statistics**

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SQL PA – What if Analysis

```
SQL PA --------------------- What If? Analysis --------------------- 12:14
  OPTION  ===> 2


  Choose an option:

    1   Modify 'Table' Statistics      - modify key Table catalog statistics

    2   Modify 'Index' Statistics      - modify key Index catalog statistics

    3   Create or Delete an Index      - build or remove a temporary index

    4   Restore Table|Index Stats      - restore 'saved' catalog statistics


    X   EXIT

        >>> To return to main SQL PA processing panel, Press PF3 key <<<
```

OMEGAMON XE for DB2 PE and PM - Overview

- Superior overall DB2 management capabilities
- Comprehensive monitoring functionality to manage the efficiency and performance of DB2 on z/OS-based applications
  - ▸ Online and real time deep dive analysis capability plus "offline" via reports
- DB2 Performance Warehouse for expert analysis of DB2 application performance data.
- GUI integration with the IBM Tivoli Monitoring portfolio of systems management products
- Integration with DB2 Tools on z/OS (SQLPA, Query Monitor, OQT)

Value: Provides a comprehensive picture of the overall performance of your DB2 subsystem

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More Control of your System and Application Performance

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How do I dive deep into SQL runtime performance?

Optim Query Workload Tuner

Monitor and tune workloads and queries to optimize application performance

- **Provides multiple advisors to tune dynamic and static SQL for maximum performance**
- **Workload Statistics Advisor suggests additional statistics to improve query performance**
- **Workload Query Advisor provides advice on how to resolve access path issues**
- **Workload Index Advisor identifies new indexes that may improve performance**
- **Saves hours of time formatting, annotating, and analyzing queries**
- **Significantly reduces length and effort of migration process to rapidly move applications into production with new version**

Value: Improves the quality of SQL code which results in better performance which in turn allows a higher transaction rate and increased throughput, which results in better profitability.

Streamlined Analysis

Define or select workload

Execute advisors

Drill into advice

Validate improvement

Need a Clone of your DB2 Subsystems?
DB2 Cloning Tool

▸ Move READ only users to copy to reduce production performance impact

▸ Access data warehousing more than one day a week

▸ Quality assurance

▸ Online inquiry while batch runs

▸ Run reporting off the copy

▸ Test environment creation

▸ Application testing

▸ Data mining

▸ Training

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What value do the tools deliver?

DB2 Cloning Tool

Automates the cloning process to provide usable DB2 clones within minutes

- **Clones a DB2 subsystem by renaming and cataloging data sets, fixing the volume internals, and updating the DB2 internal control information**
- **Quickly copies DB2 data sets within a subsystem or to a different one**
- **Supports cloning multiple DB2 data sharing groups and non-data sharing subsystems**
- **Subsystem, table space, and index space clones can be used to system test an upgrade and applications before moving the production system to the new DB2 version**

Value: Quickly clones DB2 table and index spaces, or an entire DB2 subsystem (often reducing time to clone from days to minutes), creating the equivalent of a production environment that can be used to test new features and functions

# Test Data Management (Optim TDM/Data Privacy)

- **Build intact, smaller instances**
  - ▶ Development, Quality Assurance, Acceptance, Training
- **Multiple subsets created from one source**
- **Varied selection criteria**
- **Optimizes storage utilization**
- **Create and maintain test databases**

- **Subset corporate data for web access**

- **Populating decision support data bases**

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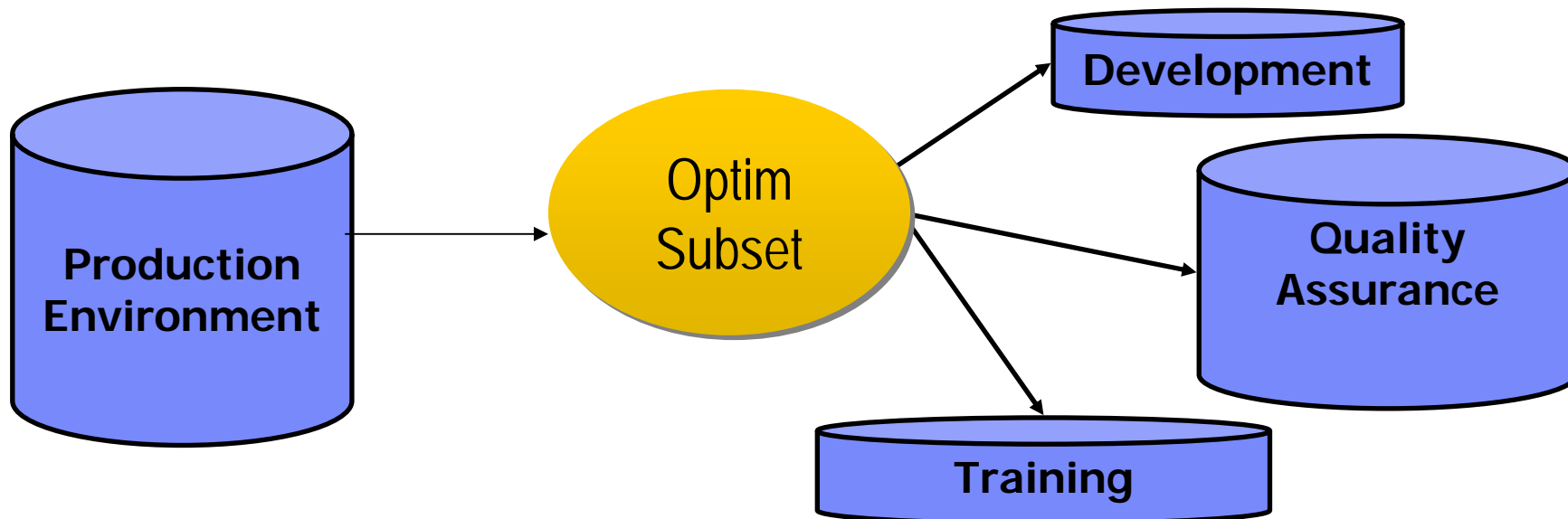
Leveraging the full tools migration solution

1. **Keep or generate EXPLAINS for PLANS/PACKAGES in current DB2 version**
2. **Use** OMEGAMON XE DB2 Performance Expert **to monitor existing V8 subsystem performance and provide performance baseline for post-migration analysis**
3. **After migration to new DB2 version, copy the plan_table data into a "backup" plan_table (say PLAN_TABLE_OLD)**
4. **Run** DB2 Path Checker **in TEST mode to compare a "new" bind with the contents of the backup plan table**
5. **With** DB2 SQL Performance Analyzer, **you can pass the statements with different access paths to get costing and more detailed explain information.**
6. **Run** DB2 Bind Manager **"Catalog Cleanup" to find packages without load libraries**
7. **Create size-optimized test environment with** Optim Test Data Management Solution **to facilitate functional testing with new DB2 version**
8. **Generate cloned production environment with** DB2 Cloning Tool **to facilitate final system testing with new DB2 version**

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Integration of Bind Manager, Path Checker & SQL PA
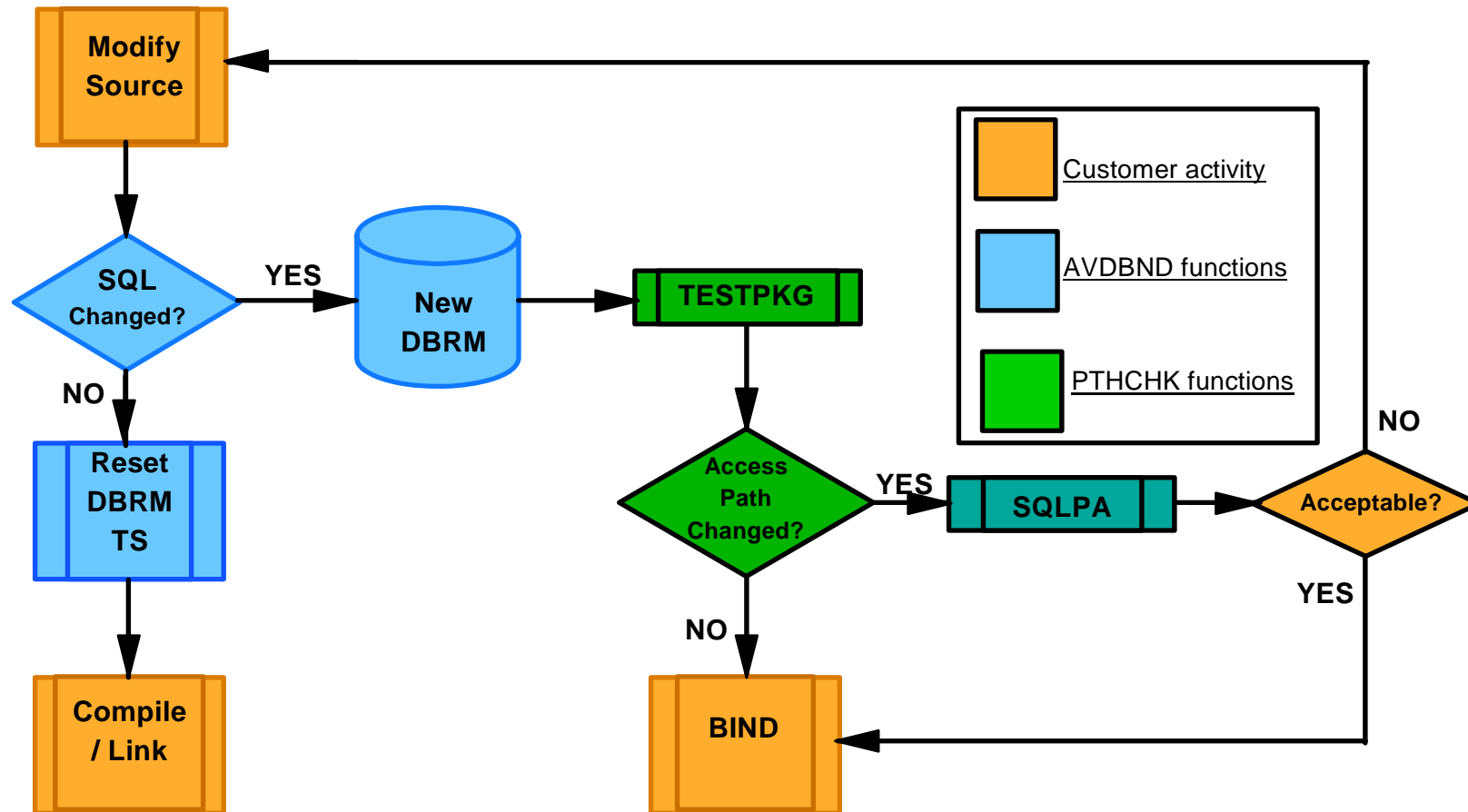
But hang on. What if we decide to DB2 10?
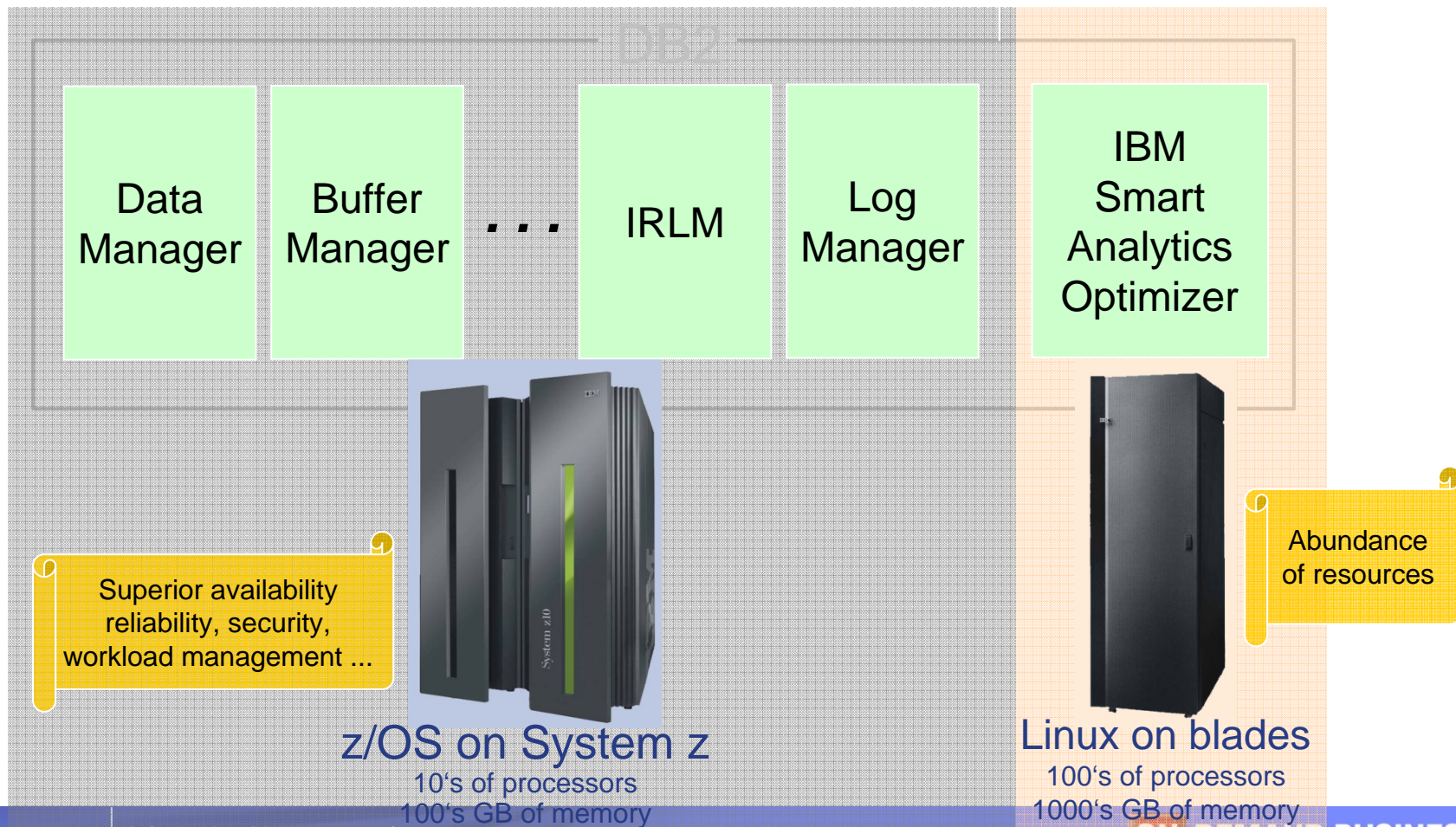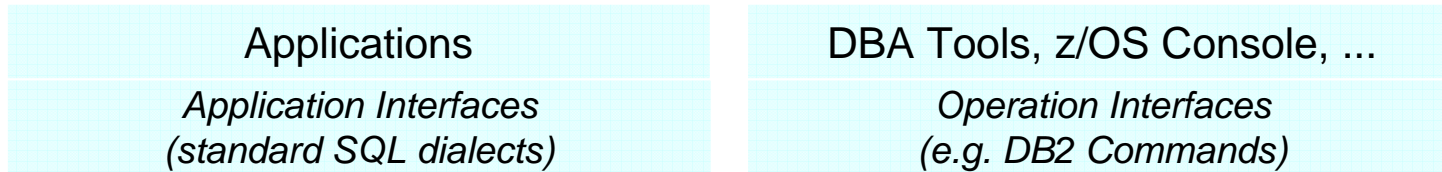
Will these and other tools work with DB2 10?

But let's not forget why we are upgrading…
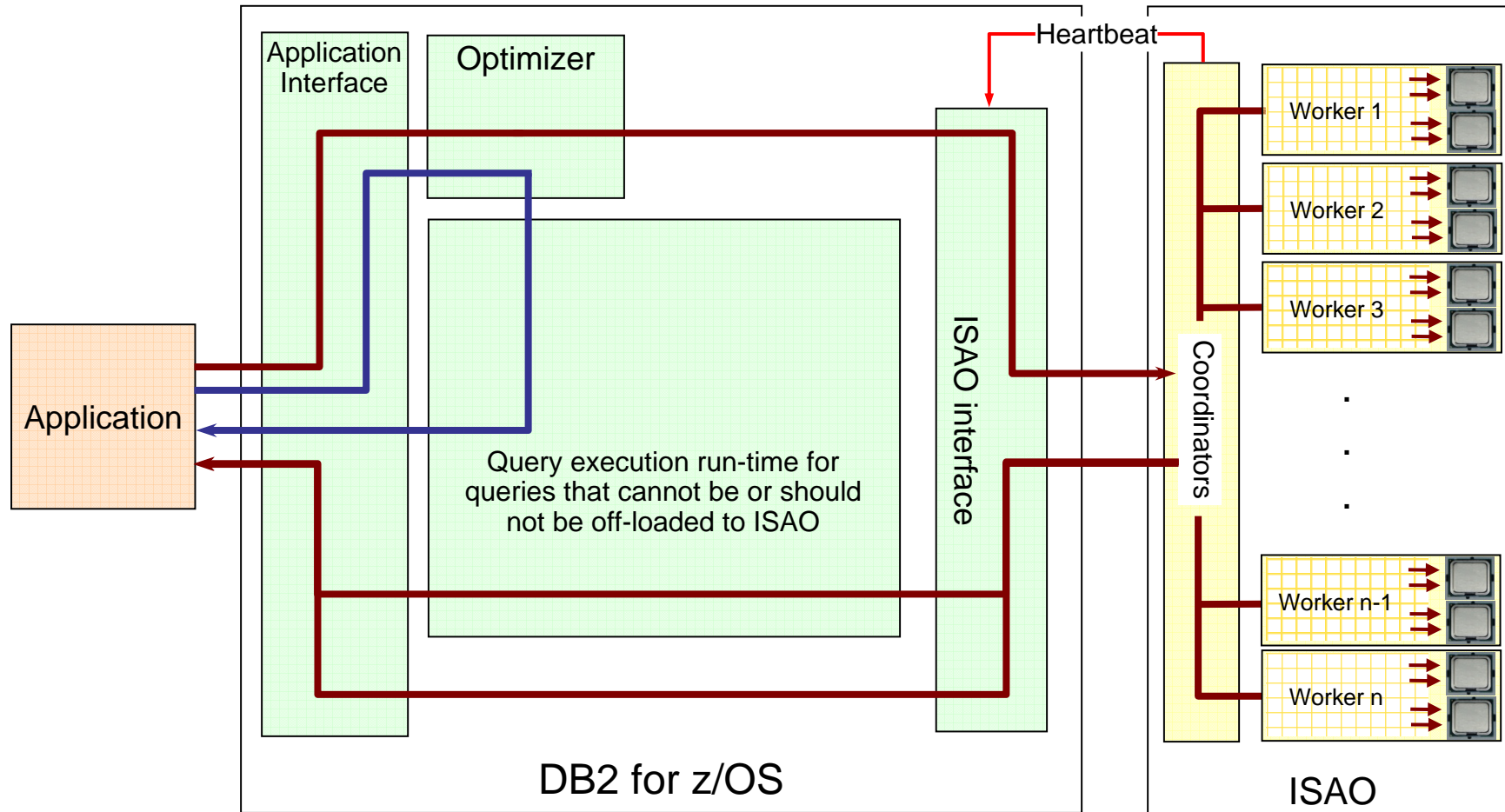
Modern Workloads

Deep DB2 Integration within zHybrid Architecture
IBM Smart Analytics Optimizer as a Virtual DB2 Component

Applications	DBA Tools, z/OS Console, ...
Application Interfaces *(standard SQL dialects)*	*Operation Interfaces* *(e.g. DB2 Commands)*

DB2

Data Manager	Buffer Manager	. . .	IRLM	Log Manager	IBM Smart Analytics Optimizer

Superior availability reliability, security, workload management ...

Abundance of resources

z/OS on System z
10's of processors
100's GB of memory

Linux on blades
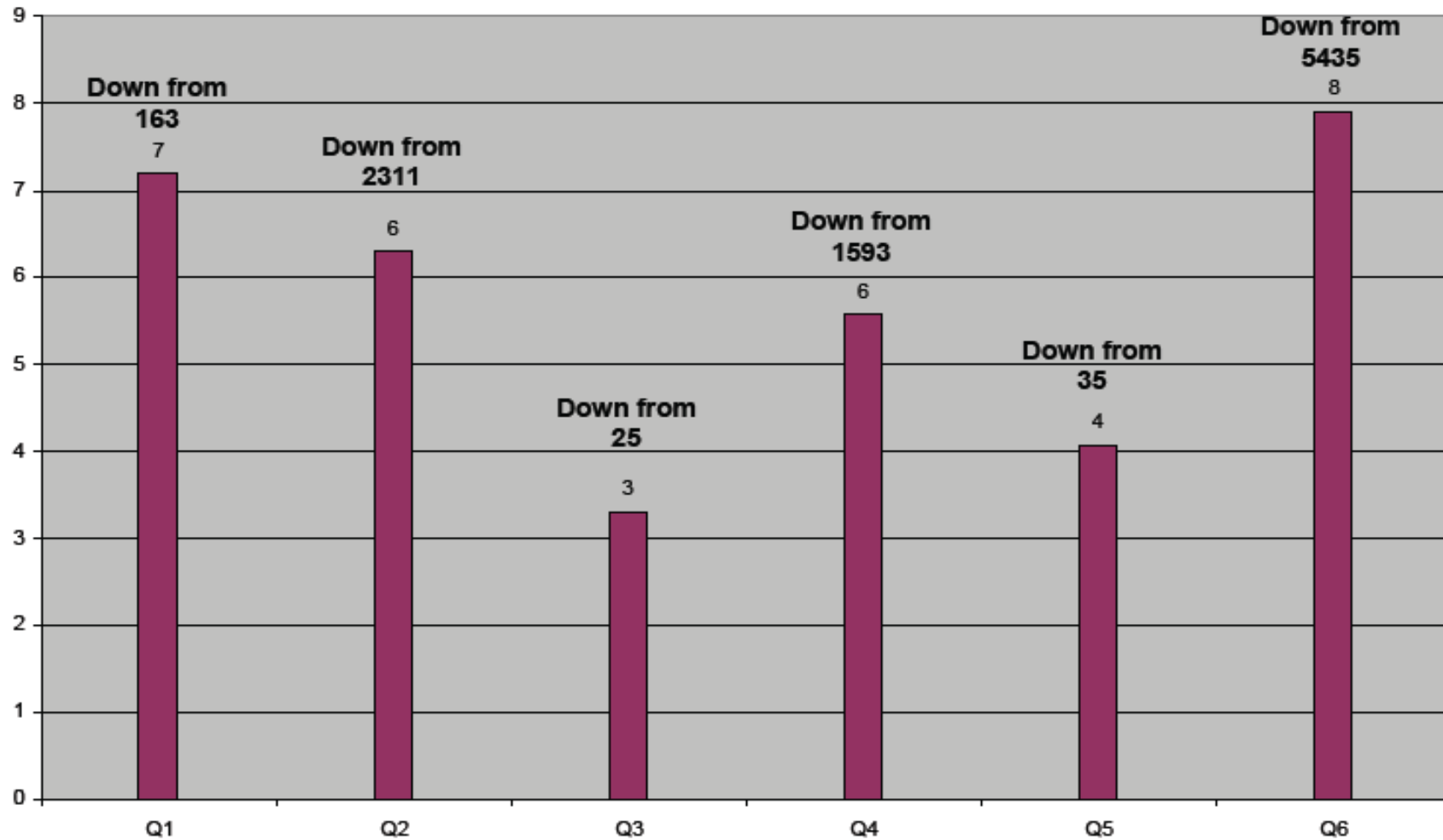100's of processors
1000's GB of memory

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Query Execution Process Flow

Heartbeat (ISAO availability and performance indicators)

Queries executed without ISAO

Queries executed with ISAO

Testing Results: Performance Improvement after Adding ISAO

seconds

Down from 163 — 7 (Q1)
Down from 2311 — 6 (Q2)
Down from 25 — 3 (Q3)
Down from 1593 — 6 (Q4)
Down from 35 — 4 (Q5)
Down from 5435 — 8 (Q6)

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*IBM Tools Ex*ploit DB2 for z/OS Warehouse Solutions

IBM Smart Analytics Optimizer Exploitation

- Manage with DB2 Administration Tool
  - ▶ Manage Accelerators
    - ➢ Display, Stop, Start
  - ▶ Manage Accelerated Query Tables
    - ➢ Create, Display, Migrate
    - ➢ Enable and Disable Query Routing
  - ▶ Navigate between Accelerators & Accelerated Query Tables

- Monitor with OMEGAMON for DB2 and DB2 Query Monitor
  - ▶ Monitor Accelerator usage, capacity & performance with OMEGAMON DB2
  - ▶ Display SQL routing to Accelerator with Query Monitor

- Tune with Optim Query Workload Tuner and DB2 Path Checker
  - ▶ Advice on new Accelerated Query Tables with Query Workload Tuner
  - ▶ Display access path changes due to Accelerator routing with Path Checker

- Load with DB2 High Performance Unload
  - ▶ Unload DB2 data and feed directly into ISAO via USS Pipes

Database Protection: 3 Key Business Drivers

1. ## Internal threats

   - Identify unauthorized changes (governance)
   - Prevent data leakage

2. ## External threats

   - Prevent theft

3. ## Compliance

   - Simplify processes
   - Reduce costs

Threats to the business

Internal Threats

External Threats

- **Malicious Employees**
- **Negligent Employees**
- **Broken Processes**

- **Ex-Employees**
- **Business Partners**
- **Contractors**

- **Competitors**
- **Hackers**
- **Espionage**

✓**System z data is usually the most critical in the enterprise**

✓**System z is well protected from external threats**

✓**Obviously, the largest concern is internal threats**

- **$197**
  - Cost to companies per compromised record
- **$6.3 Million**
  - Average cost per data breach "incident"
- **An example from the news:**
  - A U.S. bank loses a computer tape containing names, addresses, Social Security numbers, and checking account numbers
  - 90,000 customer records are lost
  - For 90,000 records the combined Direct and Indirect costs ($197 per record) = $17,730,000!
- **The indirect costs are incalculable**

Are we in Compliance? Are we Protected ?

- **RACF is the premier security product for z/OS and does an excellent job of protecting access to secured assets**

- **We all make extensive use of RACF in the environments that DB2 runs in**

- **So, if I have RACF controls in place for DB2, I must be ok, right ?**

- **"We control who is connected to the DB2 SYSADM group and we know what those people are authorized to do"**
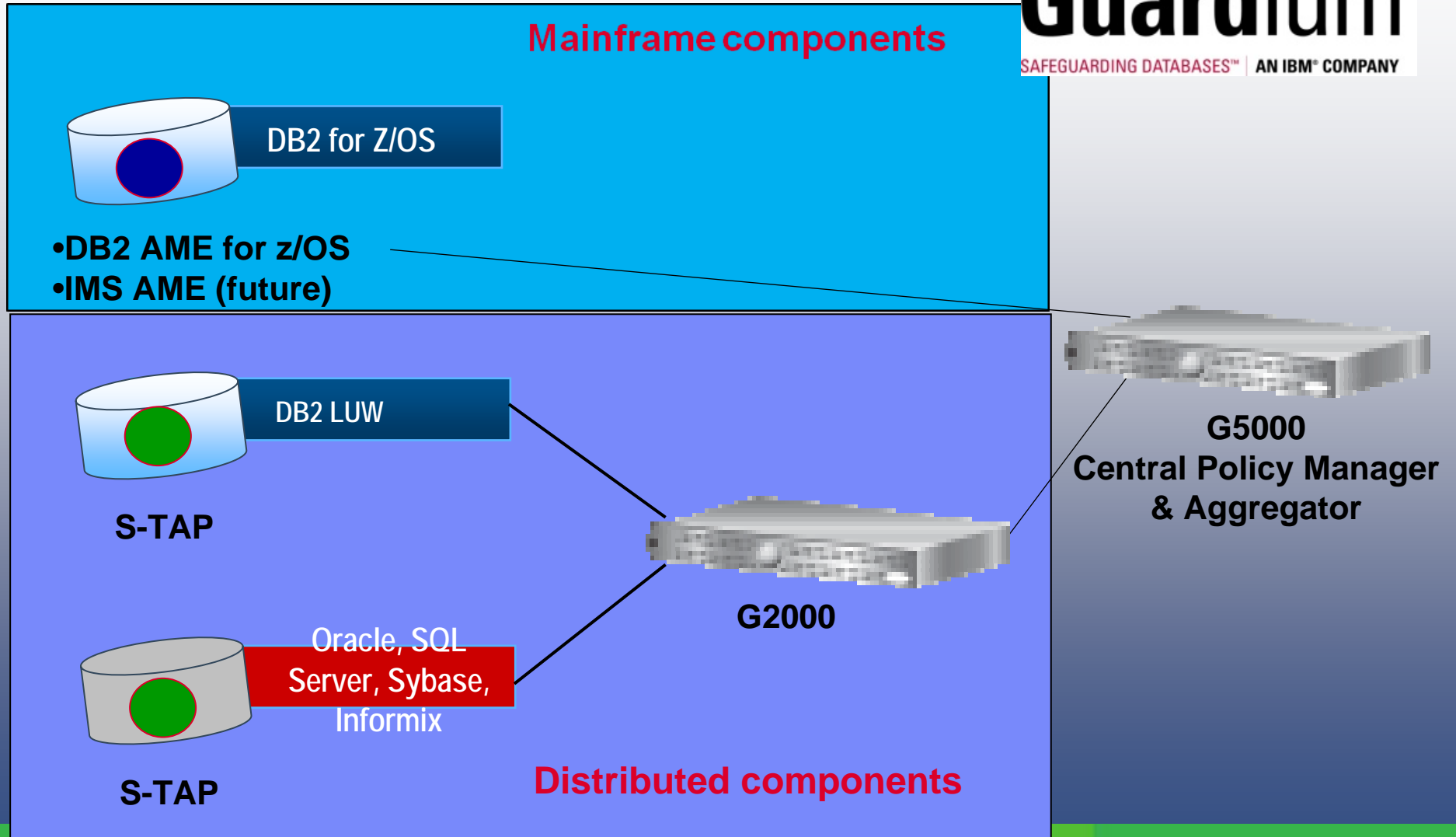
- **"We trust our Administrators"**
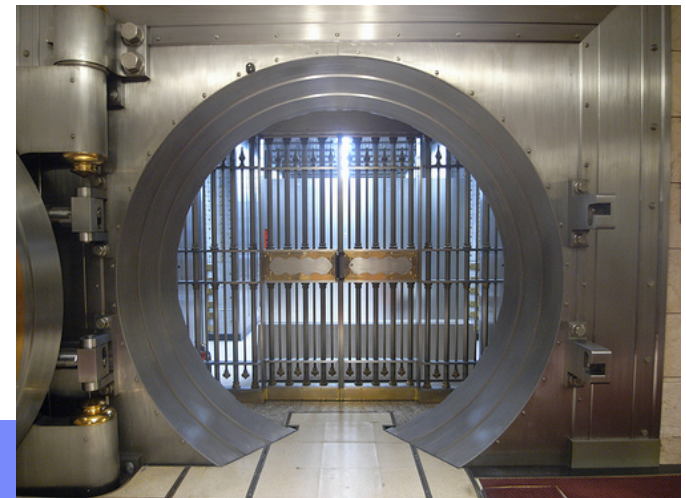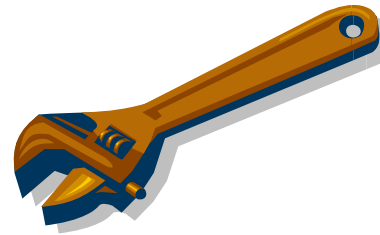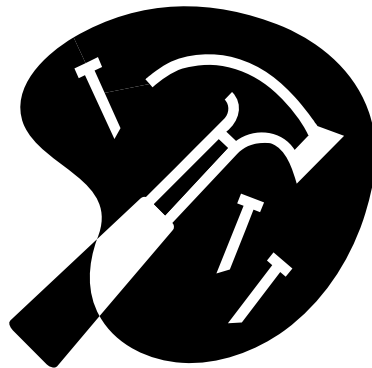
Auktiting DB2 z/OS activities

Guardium®
SAFEGUARDING DATABASES™ | AN IBM® COMPANY

- **Auditors will be able to Access:**
  - SELECT, INSERT, UPDATE, and DELETE activity by user or by object
  - **SQL Text and Host Variable value for each statement**
    - **Row count that SQL statement affects**
  - CREATE, ALTER, and DROP operations against an audited object
  - Explicit GRANT and REVOKE operations
  - Utility access to an audited object
  - DB2 commands entered
  - Assignment or modification of an authorization ID
  - Authorization failures
- Provides auditors with flexible options for examining the data in the audit repository

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IBM

Single set of security policies & compliance views for both mainframe & distributed environments

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Mainframe components

DB2 for Z/OS

•**DB2 AME for z/OS**
•**IMS AME (future)**

DB2 LUW

S-TAP

G5000
Central Policy Manager
& Aggregator

Oracle, SQL Server, Sybase, Informix

G2000

S-TAP

Distributed components

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A few words about DB2 Utilities….

Managing nagging DB2 Threads
DB2 Utilities Enhancement Tool

- **Have you ever had a production batch job delayed because some thread in DB2 was holding resources needed by the production job?**

- **Have you ever had a production job fail because a DB2 thread was holding resources?**

- **Have you ever spent too much time determining what that thread was and how to cancel it?**

- **Do your distributed applications hold connections to DB2 after your users go home at night?**

- **Do you ever find you need to terminate threads that are connected to a specific tablespace?**

- **Have you tried to terminate threads from specific authorization ids or generic/mechanical authorization ids?**

- **Have you ever had an errant or long-running application that is tying up objects needed by other applications?**

DB2 Utilities Enhancement Tool (DUET) 2.1 - Overview

- **DB2 Utilities Enhancement Tool for z/OS provides additional features and functions not found in the DB2 Utilities Suite that address the most demanding needs of DB2 Utility environments**
- **Provides more user control over DB2 utilities and resources**
  - ‣ Increases productivity of DBAs by reducing time-consuming maintenance tasks

- **Cancel or block threads on DB2 objects to allow utility processing (Previously called DB2 Thread Expert)**
  - Prevents users from accessing an object when a utility must be performed
  - Runs the utility
  - Changes status of object so users can access object again

- **ISPF User Interface**
  - Display and Cancel threads

- **Batch Processing**
  - Cancel threads
  - Block threads

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DB2 Sort for z/OS v1.1 – Announced August 10th, 2010

- **DB2 Sort provides high speed utility sort processing for data stored in DB2 for z/OS. It improves sort performance while optimizing overall system efficiency by exploiting the advanced facilities of the z/OS operating system and System z.**
- **DB2 Sort leverages the strengths of the System z platform, DB2 for z/OS and the DB2 Utilities Suite to drive:**

  ▸ Significant savings in elapsed time and CPU during utility sort processing, especially LOAD, REORG and RUNSTATS, CHECK INDEX, CHECK DATA

  ▸ Relief from application constraints of large volumes of data in highly-transactional workloads performing numerous insert, update and delete operations

  ▸ Continued commitment from IBM to deliver DB2 solutions to provide the highest level of ROI

Performance

- **Customers using DB2 Sort V1.1* may see:**
  - ▶ Up to 30% in reduction of elapsed time
  - ▶ Up to 50% reduction of CPU
- **IBM DB2 Utilities where you'll see performance benefits**
  - ▶ LOAD, REORG, RUNSTATS, REBUILD INDEX, CHECK INDEX and CHECK DATA
- **Workloads where there is more likely to be a benefit from utility sort processing and DB2 Sort V1.0, such as:**
  - ▶ 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

*Customer results may vary. Results based on analysis done at SVL lab

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DB2 Sort Requirements

- **DB2 Sort v1.1 requires:**
  - ▶ DB2 Version 8 or DB2 9 or DB2 Value Unit Edition V8 or 9 with the following
    - For DB2 V8 – APAR PM 12819 with PTF UK59100
    - For DB2 9 – APAR PM12819 with PTV UK59101
  - ▶ z/OS 1.9 or higher
  - ▶ DB2 Utilities Suite Version 8 or 9 (depending on DB2 for z/OS level)

Don't forget…..those tools DB2 Tools that help a successful migration to DB2 9 or 10 once more

- Run DB2 Cloning Tool to create whole test subsystems or subsets quickly with low impact to production

- Run DB2 Bind Manager if the application (DBRM) is no longer available, the BLDDBRM function lets you build the DBRM from the catalog

- Run DB2 Path Checker in TEST mode to compare a "new" bind with the contents of the backup plan_table – and use this tool to allow for access path regression analysis

- Using DB2 SQL PA, pass it the statements with different access paths to get costing and more detailed explain information

- Use Optim Query Workload Tuner to monitor and tune workloads and queries to optimize application performance

- Use OMEGAMON XE DB2 Performance Expert to monitor existing V8 subsystem performance and provide performance baseline for post-migration analysis

- Use Optim Test Data Management Solution for z/OS to help create small testbeds of relationally intact data.

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The last Word

Upgrading DB2 is not a trivial exercise………

But with the right planning….

With the right tools…….

You'll be successful!

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