



The future runs on System z

Essential Tools for Enterprise Data Warehousing and BI



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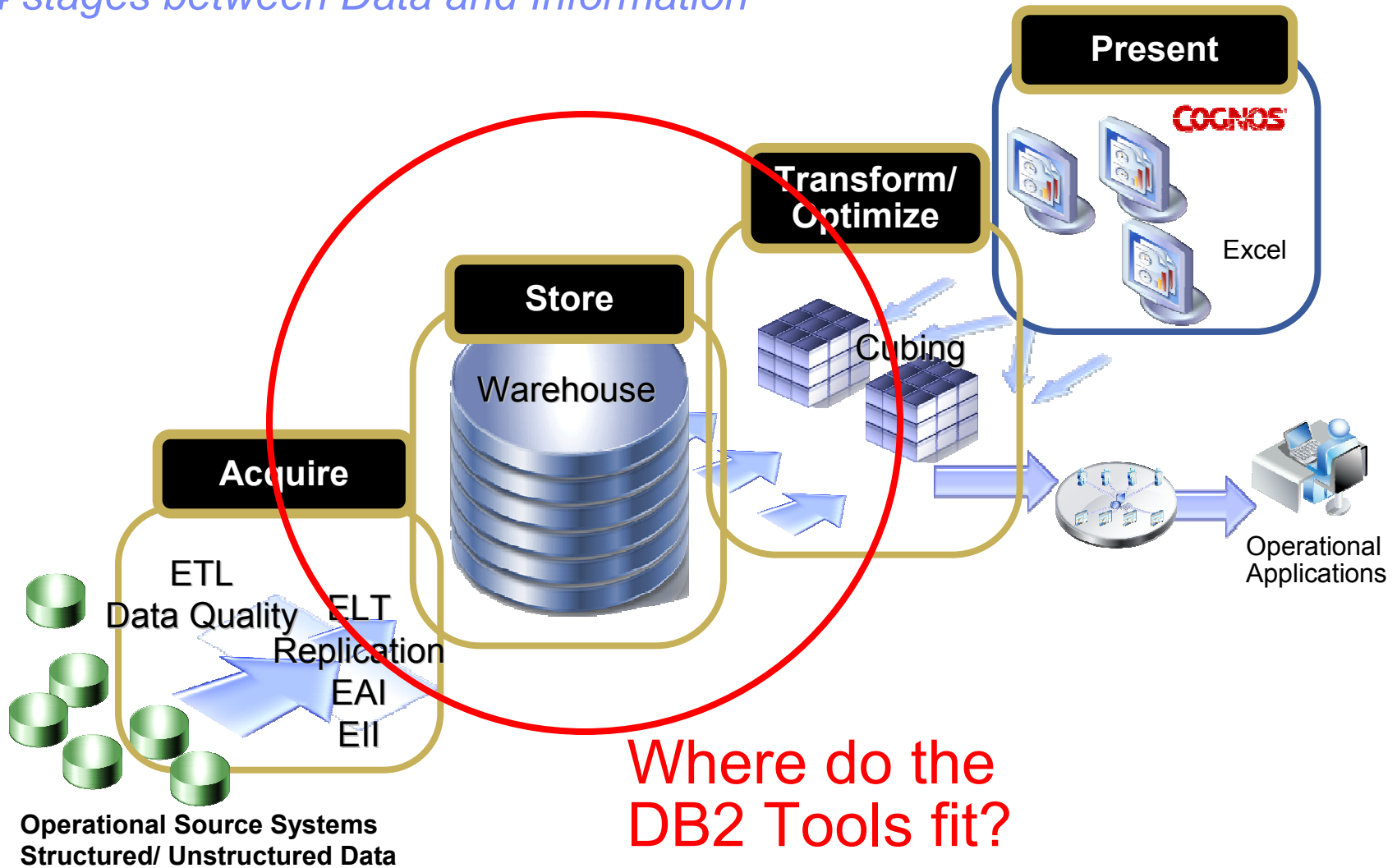
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Agenda

- **Intro and Background**
- **The IBM Solution – How our Tools for DB2 reduce your TCO and provide value to your warehousing environment**
 - Database Administration
 - Utilities Management
 - Performance Management
 - Backup and Recovery
 - Data Governance

Data Warehouse/BI Basics

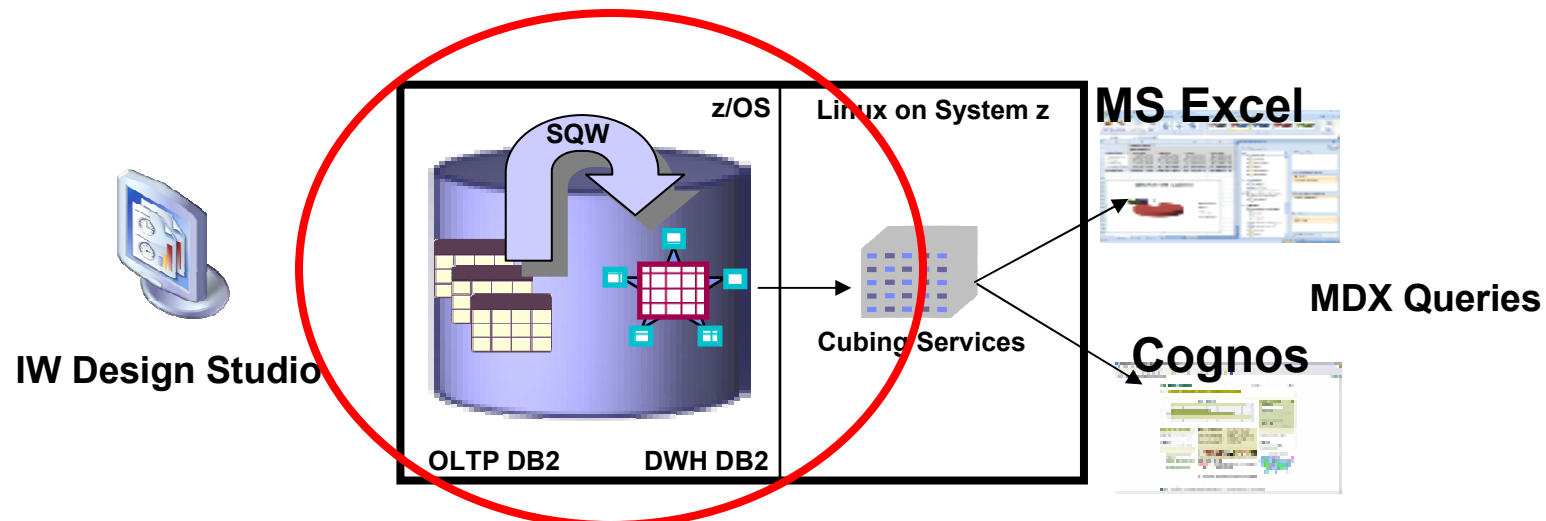
- 4 stages between Data and Information



InfoSphere Warehouse on System z

Adds core data warehouse and analytics capability to DB2 for z/OS:

- Advanced physical database **modeling and design**
- In-database data movement and manipulation capabilities of **SQL Warehouse Tool (SQW)**
- Optimize multidimensional reporting and analysis of data with **Cubing Services**



- **DB2 Tools: Optimize the underlying DB2 systems**

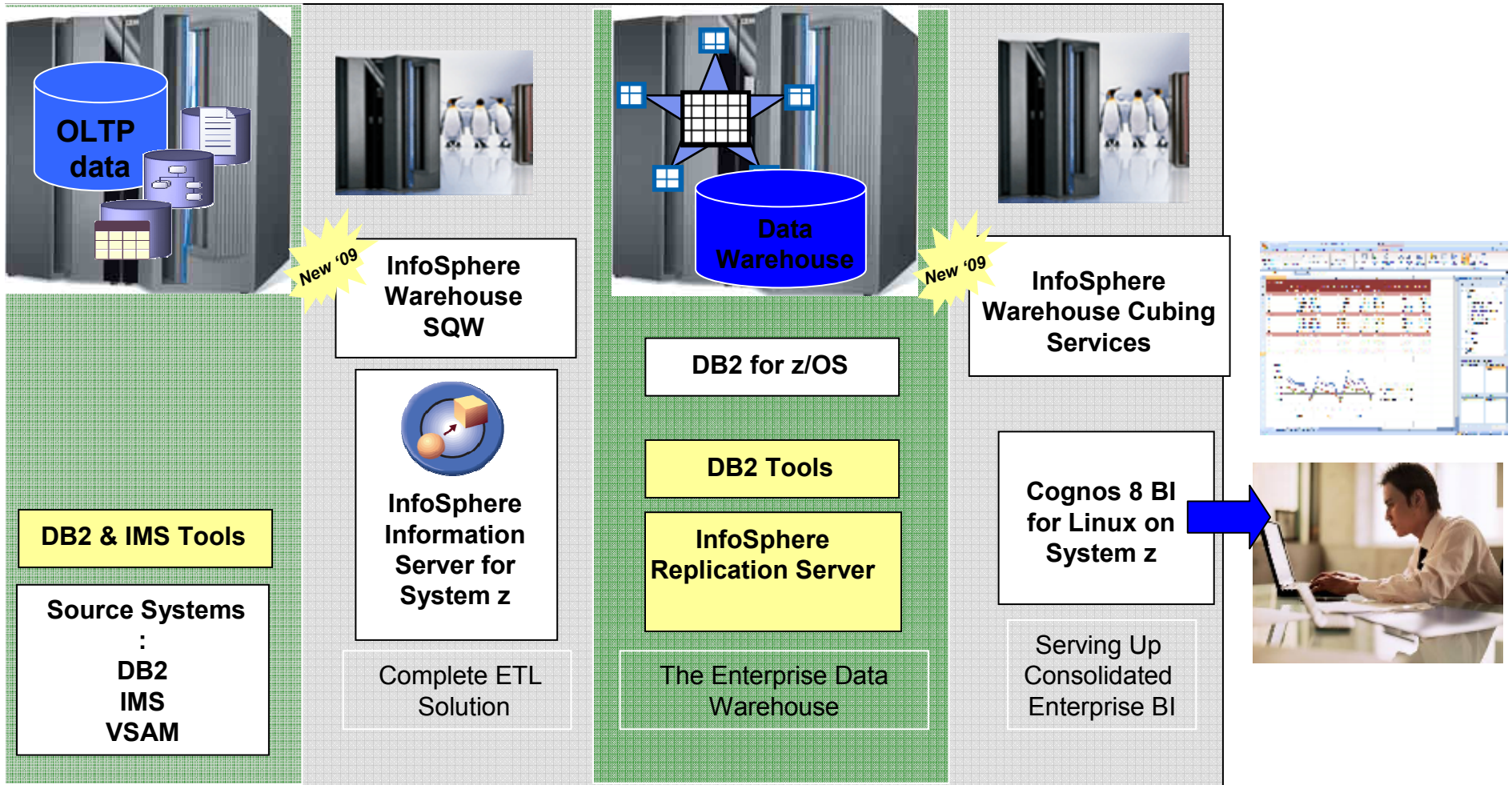
Industry Trends that Favor the System z Platform

- **Cost efficiencies of a consolidated, virtual environment**
 - Reduced: labor costs, energy consumption, data center footprint
 - Improved: ability to manage operations, upgrades, performance
 - **Reduced: labor costs, reduced CPU consumption, reduced I/O, reduced downtime, proactive performance management, improved productivity**

- **Mixed workload environments and operational business intelligence**
 - When warehouse and analytics become more operational, System z platform qualities of service become more critical:
 - Availability, Reliability, Security

- **Compliance pressures**
 - Centralized data can dramatically improve ease of data governance by reducing the number of servers and copies of data to be managed
 - Single version of the truth
 - **Efficient auditing, encryption, archiving, and data masking capabilities**

The Data Warehouse and BI Solution on System z



Combining the Reliability and Availability of DB2 for z/OS with Cost Effective Applications running on Linux for System z

Recap

- **Data Warehousing DB2 z/OS systems have the same maintenance and support requirements as transaction processing DB2 systems**
- **The requirements on warehousing systems are converging with OLTP systems**
 - 24 x 7 operations
 - Improved performance
 - Reduced cost
 - Live feed
 - Data security and compliance
- **Therefore, the same management solutions can be used to provide significant value to DW on z systems**

DB2 for z/OS and IMS Tools

Today: Reduce TCO & Increased Value on z

Best Practices for IMS and DB2

- ✓ Provide autonomic features to add capability and simplify operations
- ✓ Avoid tedious tasks and reduce errors
- ✓ Ensuring that business and regulatory needs are met
- ✓ Maximizing IT staff productivity and resource consumption

2000: Reduce TCO

2000-2004: Initial portfolio
 ■ DB2 V8, IMS V9 support

2005-2008: Portfolio Expansion
 ■ DB2 9, IMS V10 support

2008-2010: Portfolio Expansion & ROI Focus
 ■ DB2 X, IMS V11 Support



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

Success Story – A Major Healthcare Organization Increases Flexibility, Decreases Operating Costs by Moving to IBM DB2 Tools

Their Story

- Provides daily quality care to patients through clinical practice, education, and research.
- Maintains over 6 million customer files and employs more than 1500 physicians and scientists.
- Patient database and applications worked poorly together using multiple database tools from disparate vendors. Contract renewals were difficult and costly.
- Objective: Create a unified software environment, reduce operating costs, and run more efficiently.

*** They looked to IBM for a solid, more cost-effective tooling solution**

Solutions

- IBM DB2 Tools: DB2 Administration Tool, DB2 Automation Tool, DB2 Query Monitor, DB2 Utilities Suite, DB2 High Performance Unload, DB2 Object Comparison Tool, DB2 Log Analysis Tool, DB2 Bind Manager, DB2 Object Restore Tool, DB2 Path Checker, Tivoli OMEGAMON XE for DB2 PE

Benefits

- ✓ Reduced software licensing costs, under a single contract, simplifying future upgrades
- ✓ Improved database performance
- ✓ Simplified database maintenance
- ✓ DBAs are able to fully exploit the potential of the database tooling
- ✓ Completed each phase of the migration in a timely manner



Success Story – Large Energy Company Migrates to IBM DB2 Tools to Reduce Software Costs

Their Story

- Provides energy to over 5 million customers.
- Needed to streamline its operations so that it could better respond to and succeed within the volatile energy market.
- Goal: Restructure metering business in order to improve face-to-face customer service experience.
- Objective: Meet revenue growth objectives and bring down software costs, the largest component being ISV tooling and their costly contract renewals.

*** They turned to IBM to provide more cost-effective tooling to save \$\$\$**

Solutions

- IBM DB2 Tools: DB2 Administration Tool, DB2 Automation Tool, DB2 Query Monitor, DB2 SQL Performance Analyzer, DB2 High Performance Unload, DB2 Object Comparison Tool, DB2 Log Analysis Tool

Benefits

- ✓ Completed each phase of the migration in a timely manner
- ✓ Avoided costly contract renewals
- ✓ No impact to business during and after migration
- ✓ Significantly reduced its software costs, with minimal changes to its processes and procedures
- ✓ Received education from the IBM team on the new applications, thereby maximizing the solution's overall effectiveness after the rollout.



A look at some case studies and product updates...

Database Administration

Business Challenges

- **Create and manage objects and systems**
- **Manage changes to database objects and systems efficiently**
- **Understanding the database resources required to support a change**

- **Hold true in a DW or OLTP DB2**
- **Cloning data with high speed and minimal disruption**
- **Propagating changes to multiple database environments, including ODS and data marts**

DB2 Administration Tool: A Tool Designed For ...

■ DB2 Database Administrators

- Create and manage objects
- Manage authorizations to objects
- Display tablespace and index status
- Run utilities

■ DB2 System Administrators

- Display and manage Bufferpools
- Display and update Zparm values
- Display and manage threads, traces and logs

■ DB2 Application Developers

- Display object definition
- Manage plans and packages
- Prototype SQL
- Create test objects

```

DB2 Admin ----- DB2 Administration Menu 7.1.0 ----- 12:11
Option ==>

  1 - DB2 system catalog                      DB2 System: DSN7
  2 - Execute SQL statements                  DB2 SQL ID: J148286
  3 - DB2 performance queries                Userid   : J148286
  4 - Change current SQL ID                  DB2 Rel   : 710
  5 - Utility generation using LISTDEFS and TEMPLATES
  P - Change DB2 Admin parameters
  DD - Distributed DB2 systems
  E - Explain
  Z - DB2 system administration
  SM - Space management functions
  W - Manage work statement lists
  CC - DB2 catalog copy version maintenance
Interface to other DB2 products and offerings:
                                         More:   +
                                         DB2I

```

Reasons to Clone Data

Why Clone?

- Testing
 - DB2 version upgrades
 - Easily create application test beds
 - Test new functions and features of packaged apps (like SAP)
 - Test new maintenance
- Performance – move users to cloned system
- Availability – create read only copies of DB2
- Quickly clone data for warehousing purposes
- Replication – load initial replicate

The bottom line:

▶ Cloning costs you excessive amounts of people time and system resources – for OLTP or DW Systems



Cloning Challenges

- Extended downtime is the norm, as most data is shut down during cloning
- The requirement for a separate image
- How to clone different types of data?
- How to simplify cloning when using multiple replication products
- How to quickly access replicas

Does this story happen to your business?

Real-World Scenario:

- A large beverage company
- Spending 2-3 days to clone a single DB2 instance
- There can be over 90 instances
- Lots of DBA and storage personnel time

- Need to roll out to production FASTER
- Need to have a clone that's usable on the same LPAR
- Need to reduce labor cost from this long cloning operation

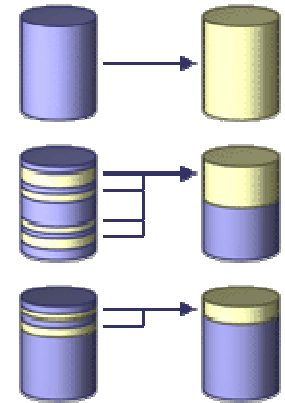
A resilient goal that seems impossible:

- **Can IBM reduce this time to less than an hour per DB2 subsystem clone?**



DB2 Cloning Tool

- Clones a DB2 subsystem AND at an object (Dataset level)
 - Renames and catalogs the data sets, fixes the volume internals, optionally updates all DB2 internal control information
 - No requirement for a clone in a separate LPAR
 - Supports DB2, PeopleSoft, and SAP
- Is extremely fast and cheap!
 - Disk vendor independent
 - Uses any snap, mirror or PIT copy, only volumes are eligible for cloning
 - Reduces production online downtime when cloning – takes just minutes
 - Dramatically reduces costs of traditional methods
 - Uses less personnel time
 - DB2 no longer needs to be shut down or conditioned the long traditional way
 - Provides virtually 24x7 access to the customer's data



DB2 Cloning Support



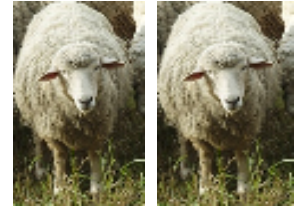
■ DB2 Subsystem Level Cloning Support

- DB2 offline
- DB2 online
- DB2 data sharing
- DB2 data sharing with many to less members
- DB2 data sharing to non-DB2 data sharing

■ DB2 Object Level Cloning Support

- Within the same DB2 system or to another DB2 system
- To the same database name or to another database
- To the same table space name, or to another table space name
- To the same Creator ID or to another Creator ID

A Customer Example - DB2 Cloning Tool



A large Insurance Company -- gaining usable DB2 clones instantly, thereby reducing errors and costs significantly

- The company needed to provide multiple DB2 environments to different departments for various testing purposes
- Previously, DB2 administrators had performed this task manually, with a lot of effort, resulting in errors and problems
- The DB2 Cloning Tool helped the company develop an effective testing environment for new applications, while reducing the errors and problems which were occurring when the DB2 cloning was done manually
- The company now has the software it needs to easily and quickly perform the complete DB2 subsystem cloning without interfering with its production environment
- The IBM DB2 Cloning Tool for z/OS automates the cloning process to provide usable DB2 clones within minutes, improving business performance and reducing total cost

What's New in DB2 Cloning Tool V2.2, GA in 2009

- **New ISPF Interface**

- Allow easy customization of JCL
- Users can create jobs using interactive panels



- **Tablespace data masking**

- STATIC RULE , FIELD = CONSTANT VALUE
- MASK RULE, FIELD = [a-z0-9]*10
- PATTERN RULE (Sir | Mr) Bill
- RANDOM RULE, FIELD = RAND(1, 100)
- USER EXIT RULE , FIELD = USER_EXIT()
- SEQUENCE RULE , SEQ(1, 1)
- SCRAMBLE RULE , SCRAMBLE(FIELD)
- CURRENT DATE, CURRENT TIME, CURRENT
TIMESTAMP RULES
- CURRENT USER RULE



Summary: DB2 Cloning Tool Cost Savings



- **Replaces labor-intensive home-grown tasks and techniques with cloning automation**
 - Reduces DBA and Storage Admin time it takes to clone DB2 subsystem or datasets
- **Productivity – what used to take days now takes just minutes**
 - The elapsed time, I/O, and CPU of cloning process is dramatically less than load/unload utility execution
 - Storage-based fast-replication facilities are under-utilized; Tend not to be used by DBAs
 - Allows customers to manage larger environments without staff changes
 - Reduces manual errors
- **DB2 systems require high availability as these systems and the web have evolved**
 - Need fast and non-intrusive cloning facilities to maintain high availability
- **What customers are saying:**
 - **Customer 1:** “It used to take 48 hours to clone a DB2 subsystem, now it takes 30 minutes”
 - **Customer 2:** “The end users used to have access to the warehouse data 1 day a week. Now, the users have unlimited access to the data.”
 - **Customer 3:** “It took 2 days, using 2 people to clone 6 DB2 systems for a total of 96 days per year. Now it takes 1 person 30 minutes for a savings of 84 person days per year”

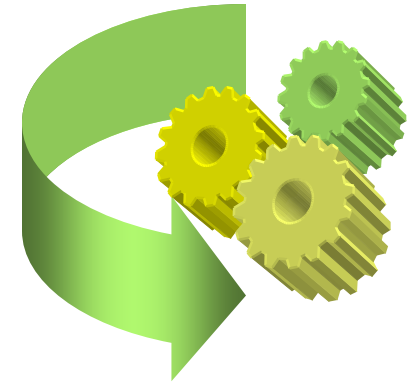
Utilities Management

Business Challenges

- Reducing system resources required for unloading, reloading, and reorganizing data
- Reducing people resources required for unloading, reloading, and reorganizing data
- Proactively preventing failures of utilities or applications
- Achieving higher availability and performance of database applications

- Increase ETL efficiency of loading from remote sources
- Data Warehouses tend to result in the need for more utility processing:
 - Ex. Reorganizations and Loads

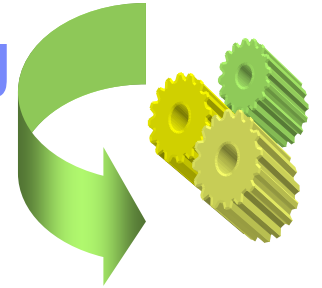
Determining the need to REORG ... with DB2 Automation Tool



- **DBA initiates a dialog with the tool**
 - Define an object profile with ALL the table spaces
 - Define a utility profile for REORG with the proper options
 - Define an exception profile with checks for the proper statistics
 - Tie the three profiles together in a job profile
 - Set up Automation Monitor in job scheduler to run at a desired frequency
- **That's it !**
 - The “monitor” runs the job profile, statistics for each table space in the utility profile are retrieved, and compared to the criteria in the exception profile.
 - Jobs are generated using the REORG utility profile for table spaces that meet the exception profile criteria

Set it.... And forget it !

DB2 Automation Tool and Data Warehousing



- **DW systems have to be backed up and loaded like any other system**
 - Frequent utility runs
- **With frequent LOAD activity in DW systems, many tables need to be reorg'd on a regular basis**
- **The DB2 Automation Tool can provide automation for these routine maintenance functions**
 - Freeing up staff
 - Reducing CPU and I/O

DB2 Utilities

**Reduce CPU
Consumption**



**Reduce DBA
Labor Costs**



**Eliminate
Application
Downtime**



Faster return on your investment

Reduce CPU Consumption

- DB2 Automation Tool provides an automated method to determine which objects need routine maintenance, eliminating CPU consumption from running maintenance on objects that don't need it.
- DB2 Automation Tool allows DBAs to focus their attention on more critical business needs by automatically generating utility jobs, keeping your DB2 objects available to other application jobs.

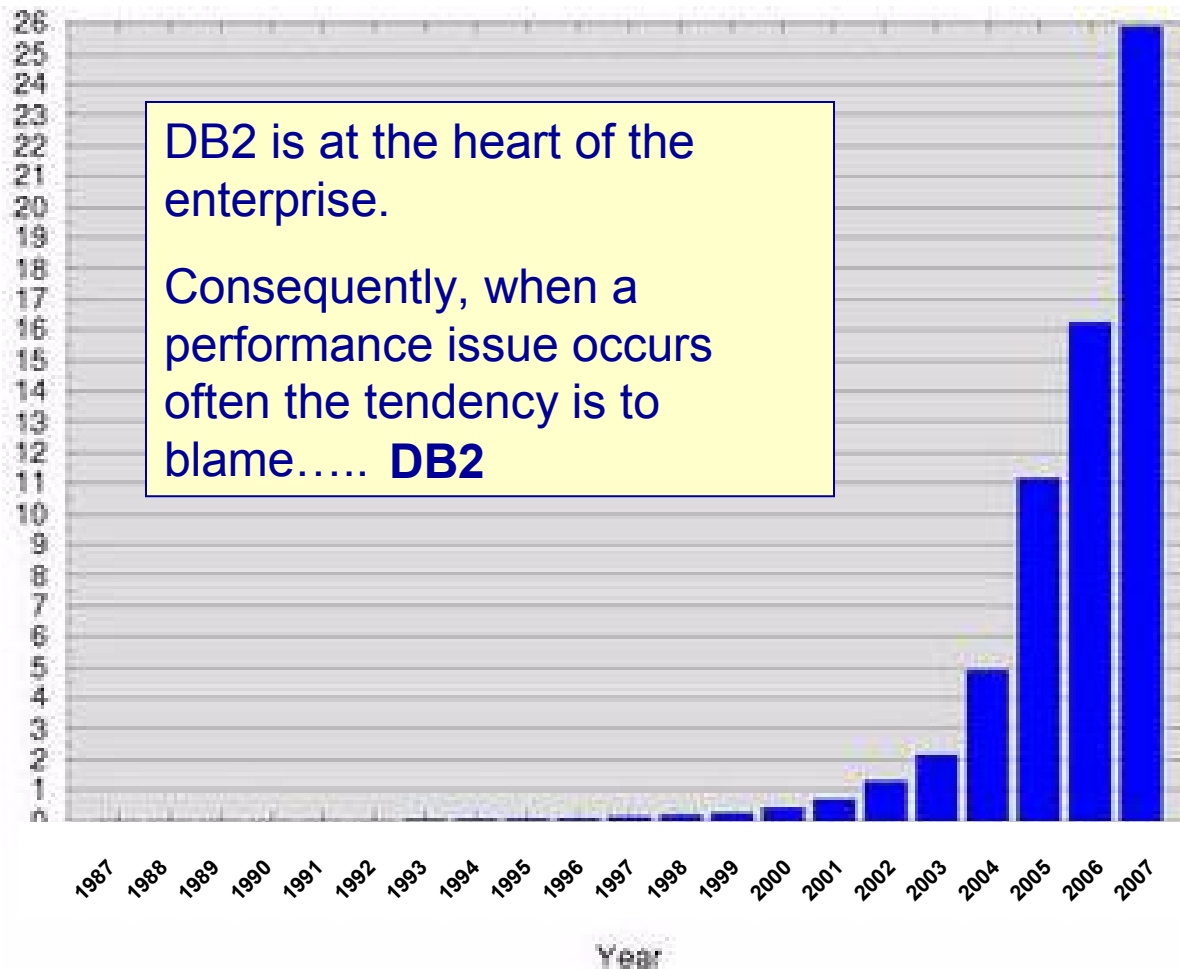
Performance Management

Business Challenges

- **Tuning SQL statements and database systems to improve performance**
- **Determining why on-line transactions are failing**
- **Setting alerts to know when performance thresholds are reached or exceeded**
- **End-to-end monitoring of your mission critical systems**

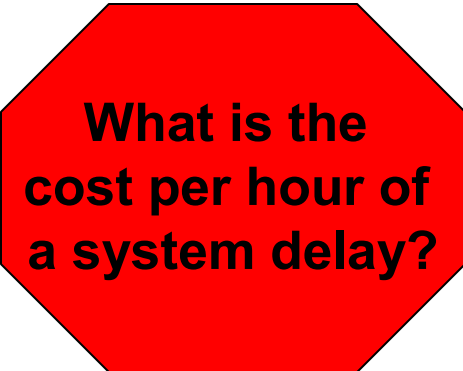
- **Managing response time on new warehousing workloads while ensuring OLTP workloads remain unchanged**
- **Tuning MQTs, star joins, and compressed indexes to improve DW performance**

The amount of data being stored in databases has grown exponentially



For DB2 ... Someone has just reported a performance problem. Where do you start?

- Could the problem be in DB2 itself?
 - Did you run out of system resources?
- Is the problem related to poorly coded SQL?
 - Is the SQL static or dynamic?
 - What is the access path?
- How about the network?
- When did this occur?
- Is this a one time occurrence, or has it happened before?
- Is the information stored in a history file somewhere?



**What is the
cost per hour of
a system delay?**

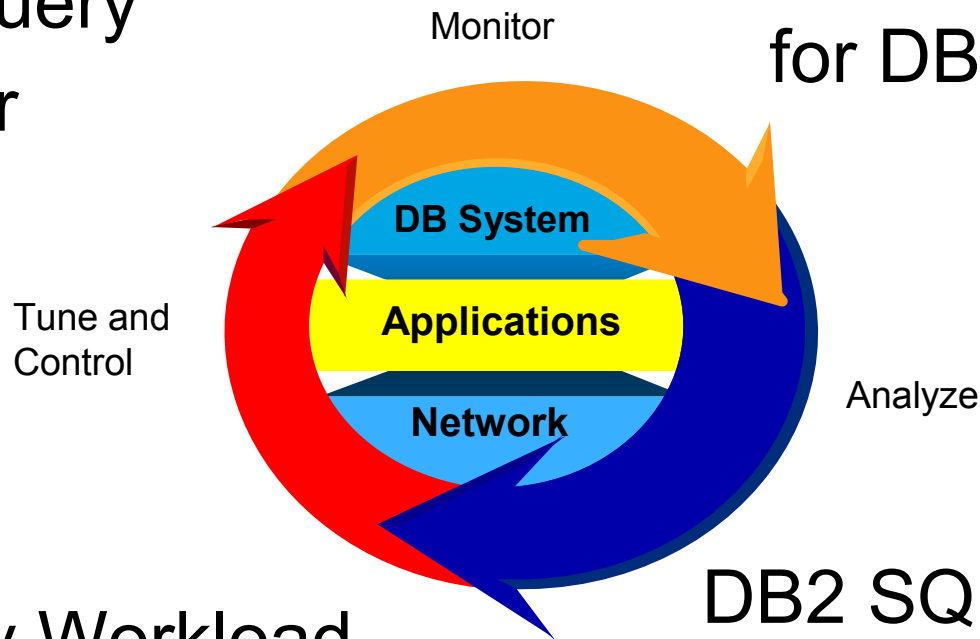
DB2 Performance Management Tools

Provide tools to monitor and tune DB2 systems and applications to obtain optimal performance and lowest cost

DB2 Query
Monitor

OMEGAMON XE
for DB2 PE

DB2 Buffer
Pool Analyzer



Optim Query Workload
Tuner

DB2 SQL
Performance
Analyzer

IBM Tivoli OMEGAMON® XE for DB2 PE / PM

Product at a Glance

- Tremendous reporting infrastructure
- Sysplex and Data Sharing wide monitoring and bottleneck analysis of specific workload elements and objects
- Early detection of out-of-line situation with the automated capability to take actions
- Easy to use monitoring and tracing functions for application and system environment
- Full V9 exploitation; VNEXT underway

Benefits

- Highly flexible reporting and Performance Warehouse
- Rule-of-Thumb and expert analysis with dedicated recommendations
- Fully integrated Real-time monitoring
- DB2 Connect monitoring correlated with host DBAT thread information
- Expert buffer pool analysis with What-if simulation capability

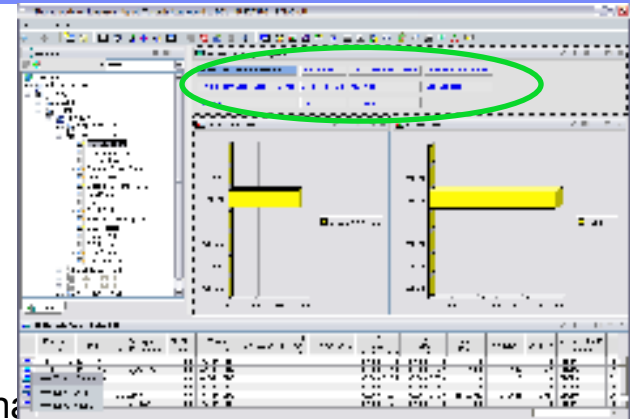
News

- Improved SAP Monitoring 6.40
- Monitoring of DB2 Connect
- Improved Accounting (DB2 V8 ACCUMAC)
- Granular IFCID 225 Information (Virtual Storage Monitoring)
- Improved distributed application support
- Seamless navigation between DB2, IMS, zOS, and CICS

Includes Buffer Pool Analyzer

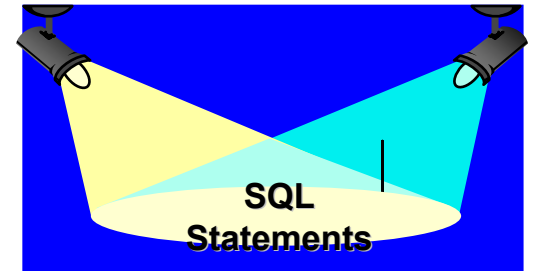
- BPAs goal is, to save you memory and CPU resources by optimizing DB2s Buffer Pools
- Two major functions to achieve this:
 - **Change size of BPs to make most out of available real memory**
 - **Group objects in BPs according to characteristic (called Object Placement) and define BP thresholds accordingly**
- Allows you to test changes before you apply them to system (simulation)

OM PE 4.2 -- What's New



- **Provides a flexible mechanism for DB2 subsystem configuration**
 - Reduces effort for installing and maintaining the product
 - Initial setup, changing an existing configuration. applying maintenance
- **Profile created for DB2 subsystem**
 - Specifies the monitoring function to be enabled for the subsystem
 - Reusable for several DB2 subsystems
- **Batch Accounting Improvements**
 - “OPTIMIZE” option that enables optimization on CPU consumption or ACWORK size
 - “CALCULATE” option to determine the disk space required to process a given input
- **ITM infrastructure upgrade to ITM v6.2.1**
 - High-Availability HUB capability that fulfills customer failover requirements for a z/OS-based monitoring server
- **Usability Improvement – Navigator buttons**

DB2 Query Monitor



- **Low overhead SQL statement monitor**
- **Identifies SQL requests which are consuming excessive resources and may be preventing critical requests from completing on schedule**
- **Proactively manage DB2 resources**
 - React quickly and effectively to DB2 problems like inefficient SQL or inadequate object structures
 - Determine which tables and indexes are actually being used by your queries
- **Collects information about exceptional SQL-related events**
 - Performs analysis of exceptional events
 - Undertakes notification and curative actions when exceptional events occur

DATA collected and available to view

- SQL metrics
- DB2 object access
- SQL text and host variables
- DB2 commands
- Negative SQLCODES
- Expanded and grouped Information about exceptions
- Buffer Pool Statistics
- Delays

Historical Information

- Interval-based VSAM Datasets for data storage
- Intervals of data viewable online
- User controlled number of intervals retained Interval length

DB2 Query Monitor in a Warehouse

- Detects and helps tune poorly running queries against data warehouses
- Often people running warehousing queries are not SQL experts
- The table structures of many warehouse systems make it easy to code poorly performing queries

A product like DB2 Query Monitor is particularly valuable in a DW environment

Backup and Recovery

Business Challenges

- Identifying resources that must be in place to ensure a proper recovery
- Determining which objects have been impacted by a failure
- Time spent to create and maintain disaster recovery scenarios

- Robust and fast Recovery and DR are now important prerequisites for enterprise data warehouses

Does this story happen to your business?

Real-World Scenario:

- A large, world-wide financial services company
- Has strict SLAs in place for local application data availability
- Can't really meet them for much of their data with current backup/recovery process in place
- Spend excessive resources in backup activities
 - CPU, I/O
 - Multiple copies taken by multiple applications teams; keep multiple full iterations
- Large environment

- Need highly efficient, centralized, backup strategy
- Need the recovery solution to be flexible, dependable, and fast
- Need to reduce labor costs and complexity from backup/recovery operations management

A resilient goal that seems impossible:

- **Can IBM reduce daily costs while improving application availability??**



Backup and Recovery Costs, Part 1

- Safeguarding DB2 applications and data is **critical**
- Many backup strategies incur a significant ongoing cost to guarantee a certain level of recoverability

- Actual recovery is **rare**
- Recovery is one of the most complex tasks undertaken by DBAs
- In many shops, recovery scenarios are not practiced
- When the crisis comes, DBAs are presented with
 - A short timeframe for recovery of critical production data assets
 - A potentially unpracticed recovery scenario
 - Utilities and tools with many options and features to help them, but with which they are often not completely familiar
 - A lot of stress!



Backup and Recovery Costs, Part 2



- Safeguarding DB2 applications and data is **critical**
- We are dedicating a lot of CPU, I/O, DASD, tape, and personnel resources to regular backup activities that create recovery resources that are seldom used
- A **costly insurance premium ...**
- **Consider a new model**
 - Reduce the CPU, I/O, and management costs associated with creating daily recovery assets, yet retain the same level of recoverability you have today

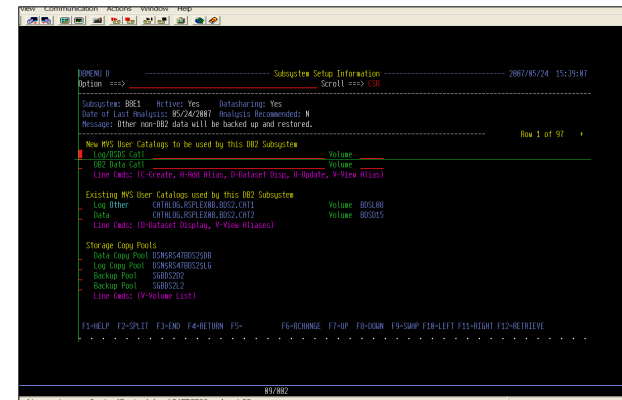
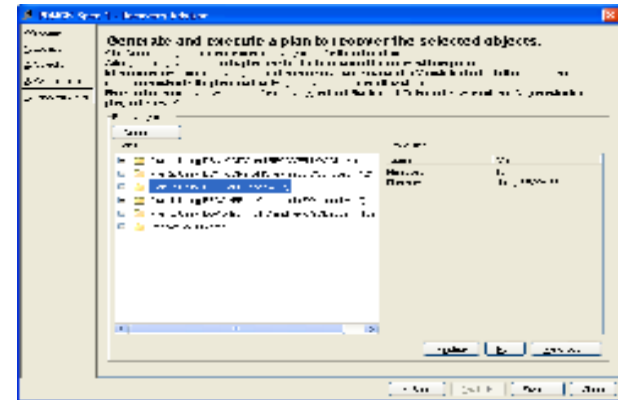
Image Copy backups An Expensive Insurance Policy

Backing up with image copies (aka. traditional backups)

- Reliable but time consuming
- Either tables/DBs are read-only or the backup is fuzzy
- Can't afford batch/backup window
- Infrequent backups make for lengthy restores
- CPU cost can be an issue
- Thousands of files must be managed; mistakes are made

DB2 Recovery Expert for z/OS

- **Recovery Expert** provides:
 - Automated system backup management
 - Object level Recovery
 - Reporting
 - Tape Offload support
 - Validity Checking
 - Disaster Recovery
 - Several Backup Options
 - Integration with DB2 Recovery Expert z/OS V2.1 GUI interface



A simple, self-managing recovery solution that enables database recovery operations with minimal disruption

Data Governance/Data Security/Compliance

Business Challenges

- **Ensuring sensitive data is protected throughout the application lifecycle**
- **Validating that company processes comply with existing regulations**
- **Data Warehousing data is often characterized by more frequent access by ad hoc or non-traditional users**
- **Securing a Warehouse is critical**

What's driving Data Governance, Security and Compliance?

Sound Business Practices

- Brand trust
- Partner responsibilities
- IP Protection
- Revenue protection

Regulatory Compliance

- PCI Data Security
- Data Breach Notification laws
- SOX
- Other Government Laws and Regulations

Security

- Protect Sensitive Data
- Separation of duties
- Insider threat
- External threat

Could this story happen to your business?

Real-World Scenario:

- In 78% of data breach incidents, the insiders were authorized users with active computer accounts at the time of the incident
- In 43% of the cases, the insider used his or her own username and password.
- Most incidents required little technical sophistication and typically involved exploitation of business rules or organizational processes
- In 87% of the cases simple, legitimate user commands and processes were used.
- Standard Non-Disclosure Agreements will not deter a disgruntled employee

A resilient goal that seems impossible:

- **Can IBM help us to stay compliant with our valuable z systems ... therefore stay in business?**



Threats to the business

Internal Threats

- Malicious Employees
- Negligent Employees
- Broken Processes

External Threats

- Ex-Employees
- Business Partners
- Contractors
- Competitors
- Hackers
- Espionage

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

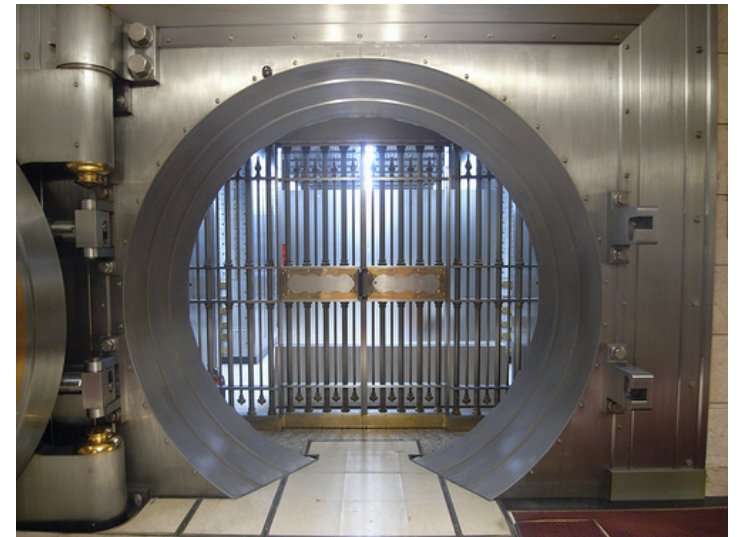
✓ System z is well protected from external threats

✓ 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 and IMS run in
- So, if I have RACF controls in place for DB2 and IMS, I must be ok, right ?



We Are Protected



- “We don’t need to audit, we have RACF controls surrounding who can access data”
- “We control who is connected to the DB2 SYSADM group and we know what those people are authorized to do”
- “We trust our DBAs”

Counter Arguments To “We Are Protected”

- **RACF does two things:**

- Prevents people from accessing a resource that is not essential or appropriate for their jobs
- Allows people access to the necessary data to do their jobs

- **But RACF does NOT:**

- Prevent a malicious update if the user has authority to the data
- Prevent an authorized user from accessing sensitive data that is **NOT** within the scope of their job
- Provide meaningful information about access to protected DB2 resources (authorized or not)
 - Did someone grant their other userid or someone else DB2 SYSADM (system administration) authority?
 - Is someone reading data during off hours? Why?
 - Authorized access to data does not ensure the data is accessed in accordance with “proper use” criteria.

When there is a will, there is a way. Calculate your risk!

Yes protect sensitive data – but a comprehensive auditing of access not only makes sense...
it is mandated by every governance/compliance regulation

An Example



- A privileged user does not have authority to execute CICS transactions but has DBADM authority to administer the tables involved
 - In many cases this includes SELECT authority
- The user runs an unload utility extracting all of the data contained in the table
 - A normal event
- Could transfer this data through any number of mechanisms to an outside entity
 - Ex. Flash disk
- Since the user has privileges on the table there would be NO SECURITY VIOLATION reported by RACF

Auditing Overview

- **Privileged users must be trusted with sensitive data in order to do their jobs. For example, DBAs**
 - Their responsibilities include maintaining, copying, loading, reorganizing, and recovering sensitive data.

In the absence of auditing, it is impossible to trace when or if these special privileges have been abused

- **Auditing must implemented in a way to prevent privileged users from interfering with its collection or reporting (called Separation of Roles)**
 - Centralized and independent of the users you are auditing!
- **DBAs should do their job duties, and auditors should be able to run audit reports independently of them.**
 - Separation of Roles
 - More accurate audits
 - Reduced cost of gathering audit data

Enterprise Data Governance

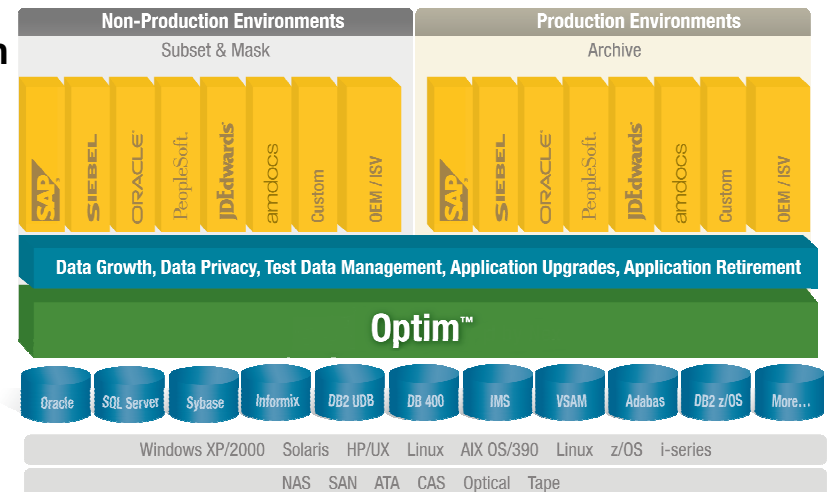
DB2 and IMS Audit Management Expert

- Provides centralized auditing of DB2 and IMS bringing together information from many different sources into a correlated, coherent view
- Enables auditors to collect, view, analyze and report on data and save it into an audit repository
- Allows auditors to automatically generate their own reports and export the data into other applications such as Excel spreadsheets
- Separation of roles
- Low cost audit data gathering



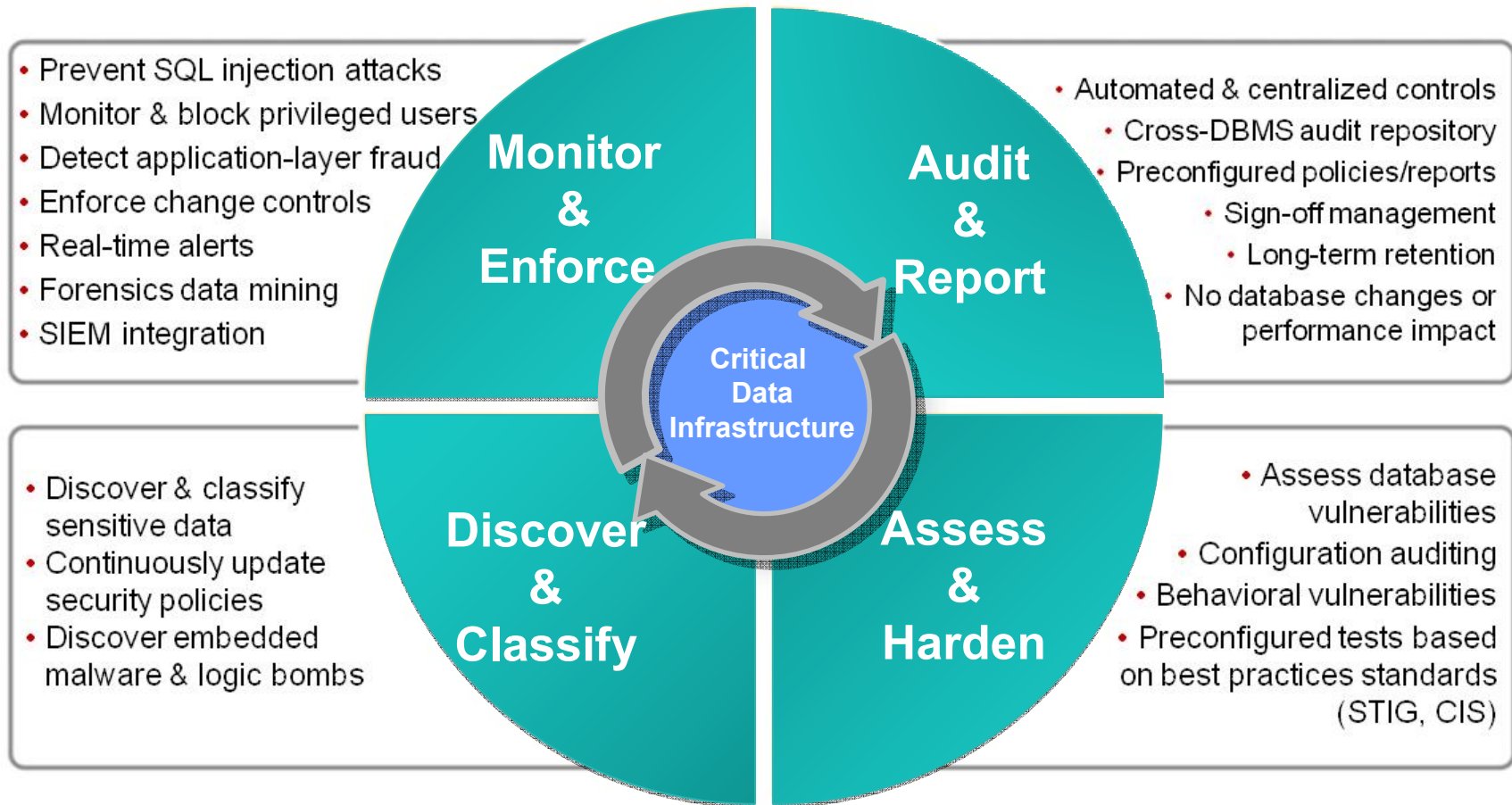
Encryption for IMS and DB2 Databases

- Low overhead encryption using cryptographic services on z platform
- No application changes required
- Supports all DB2 and IMS versions

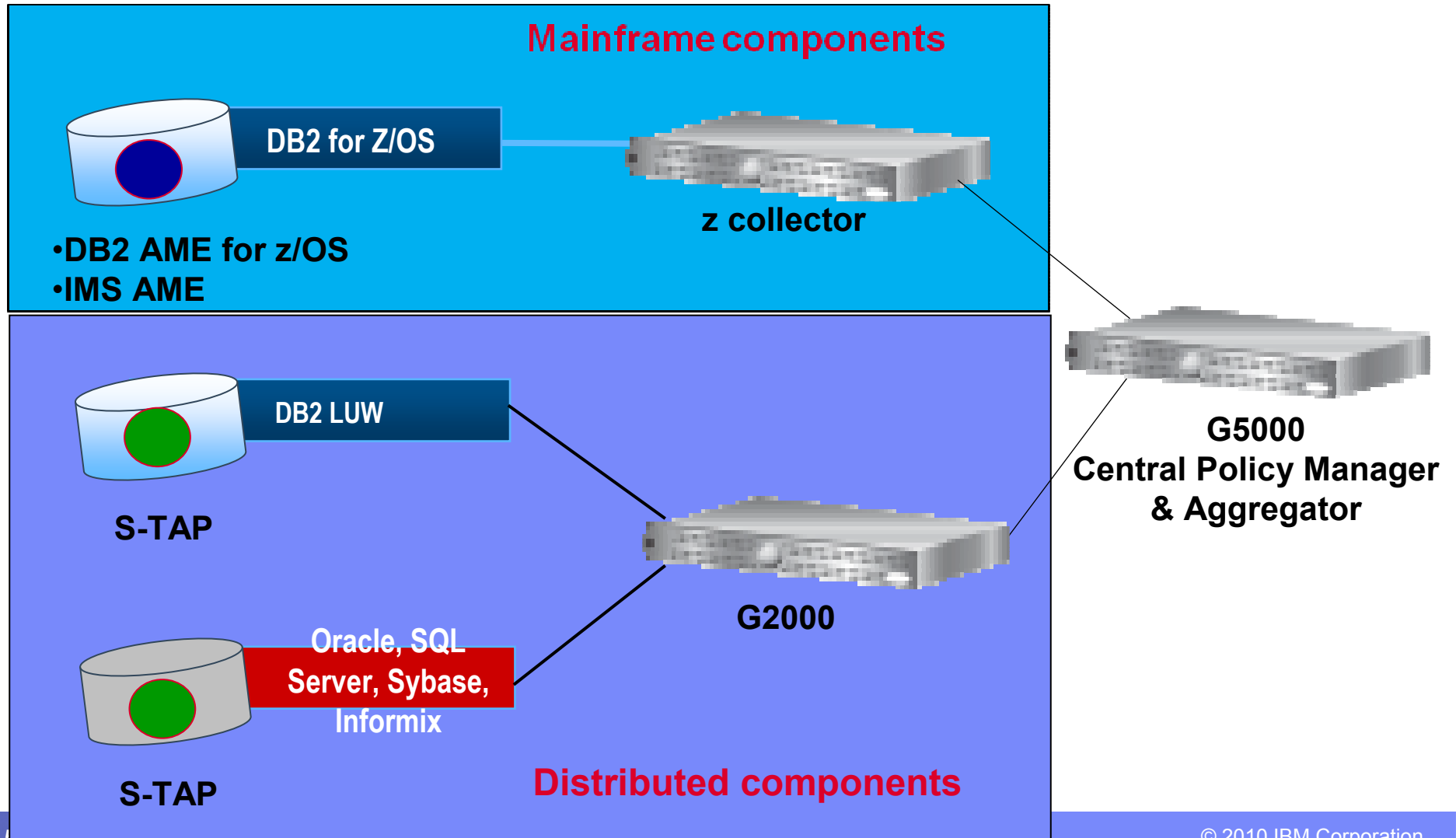


Single, scalable, interoperable EDM solution provides a central point to deploy policies to extract, store, port, and protect application data records from creation to deletion

Guardium addresses all aspects of Data Protection



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



Wrap Up

Summary: How DB2 Tools help with Data Warehousing

■ **DB2 Administration Tool for z/OS**

- DB2 Administration Tool for z/OS is a critical tool for managing the day-to-day operations of a DB2 system, including a Data Warehousing environment

■ **DB2 Automation Tool for z/OS**

- Data Warehouses need reorging frequently as they are often insert heavy, creating disorganization. Therefore, maintenance aids such as Auto Tool are a big help.

■ **DB2 Recovery Expert for z/OS**

- Data availability is critical to many Data Warehousing customers. Recovery Expert can help with achieving maximum speed in recovery situations with the lowest possible overhead.

■ **Tivoli OMEGAMON XE for DB2 Performance Expert for z/OS**

- A single, comprehensive assessment tool to optimize performance of DB2

■ **DB2 Query Monitor for z/OS**

- Complex SQL queries that have a significant impact on performance can be easily identified and managed by Query Monitor

■ **Optim Query Workload Tuner**

- When problem queries are identified, OQWT can help customers tune these queries for maximum performance.

■ **Optim Data Growth Solution for z/OS**

- Optim Data Growth allows administrators to effectively manage large volumes of active and archive Warehouse data to reduce costs and limit legal exposures

DB2 Tools with Data Warehousing - Cont.

- **DB2 Cloning Tool for z/OS**
 - Easily populate staging areas where production data is rapidly extracted for the data warehouse. Also use to create application test beds with minimal overhead
- **DB2 High Performance Unload for z/OS**
 - DB2 High Performance Unload is another alternative for populating and refreshing Warehouse data when file based post-processing is required
- **DB2 Buffer Pool Analyzer**
 - Buffer Pool Analyzer allows Warehouse administrators to be able to effectively manage their system resources
- **Optim Data Privacy Solution**
 - Some Data Warehouse applications (i.e. medical research) need to protect sensitive information while maintaining data relationships
- **Data Encryption for IMS and DB2 Databases**
 - Some Data Warehouse applications (i.e. medical research) need to protect sensitive information when it is at rest



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