



DB2 for z/OS Tools

Making Your Business Resilient

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Agenda

- ***What is meant by “Resiliency”?***
- ***Is your Business Resilient? What are the Trouble Signs?***
- ***High Availability***
- ***Disaster Preparedness***
- ***DB2 Tools to Help You Ensure Resiliency***
- ***The Proof in the Customer Experience***

* What Does it Mean to be Resilient?



- *High Availability*
- *Reliability and Serviceability*
- *Efficient disaster recovery*
- *Proactive performance*
- *Security*
- *Advanced virtualization*

What is High Availability?

- ***GOAL: Minimize the affect of a resource that is temporarily unavailable***
- ***Short term in nature***
- ***Localized to a single site***
- ***Might be the result of a planned or unplanned outage***
- ***Achieved by utilizing redundant components***



What is Disaster Recovery?

- ***GOAL: Minimize the affect of a system wide or site wide resource unavailability***
- ***Longer term in nature***
- ***Affecting one or more critical resources***
- ***Always unplanned***



Trouble Signs

- ***Do you experience database failures?***
- ***Do hardware failures ever occur?***
- ***Has your business ever lost data or corrupted it's data?***
- ***Have you ever needed to restore data from a backup?***
- ***Ever experience application failures?***
- ***Are you missing your service-level agreements (SLAs)?***
- ***Are you seeing poor resource performance and consumption (such as CPU spikes)?***
- ***Is your process of viewing resources across the data center slow?***
- ***Would you like a virtualized view of your data with a single point-of-control?***

***If you answered “YES” to any of these,
your business has a need to become MORE RESILIENT***

Does this story happen to your business?

Real-World Scenario:

- *A large beverage company*
- *Spending 2-3 days to clone a single SAP instance*
- *Sometimes there can be over 90 instances*
- *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?*



Does this story happen to your business?

Real-World Scenario:

- ***A major US airline***
- ***Had a DELETE transaction that was running for 13 seconds***
- ***This transaction is at extremely high volume – 13 sec. is TOO LONG!***
- ***Need to improve production performance***
- ***Customer satisfaction is at stake!***

A resilient goal that seems impossible:

- ***Can IBM reduce this time to less than 1 second?***
- ***(By the way, we don't even know where to start the tuning)***



Does this story happen to your business?

Real-World Scenario:

- *A health care company*
- *An application designed to use dynamic SQL, and dynamic statement caching*
- *CPU consumption is becoming a concern*
- *Need to improve application performance*

A resilient goal that seems impossible:

- *Can IBM help us to reduce the CPU by 50%?*



Does this story happen to your business?

Real-World Scenario:

- ***Applications perform slowly***
 - SLAs are being missed
 - Customer satisfaction declining
- ***Backups seem to take forever***
- ***Batch jobs run into working hours***
- ***Increased infrastructure & storage costs***
 - “Every time I turn around, we are buying more storage”
- ***Data Retention Compliance***

A resilient goal that seems impossible:

- ***Can IBM help us to improve the application performance by 100%?***



Does this story happen to your business?

Real-World Scenario:

- ***Management notices that new application functionality is delayed three months***
- ***The business is unable to compete for customers because their software lacks “state-of-the-art” functionality***
- ***The CFO is complaining over how high the IT budget has become to fix application defects***
- ***Developers are sitting around waiting for their copy of the database to work with***
- ***3TB of total storage used for production, testing, training and other functions, require labor to support such large storage***

A resilient goal that seems impossible:

- ***Can IBM help us to reduce the storage usage by 50%?***



What is Test Data Management?

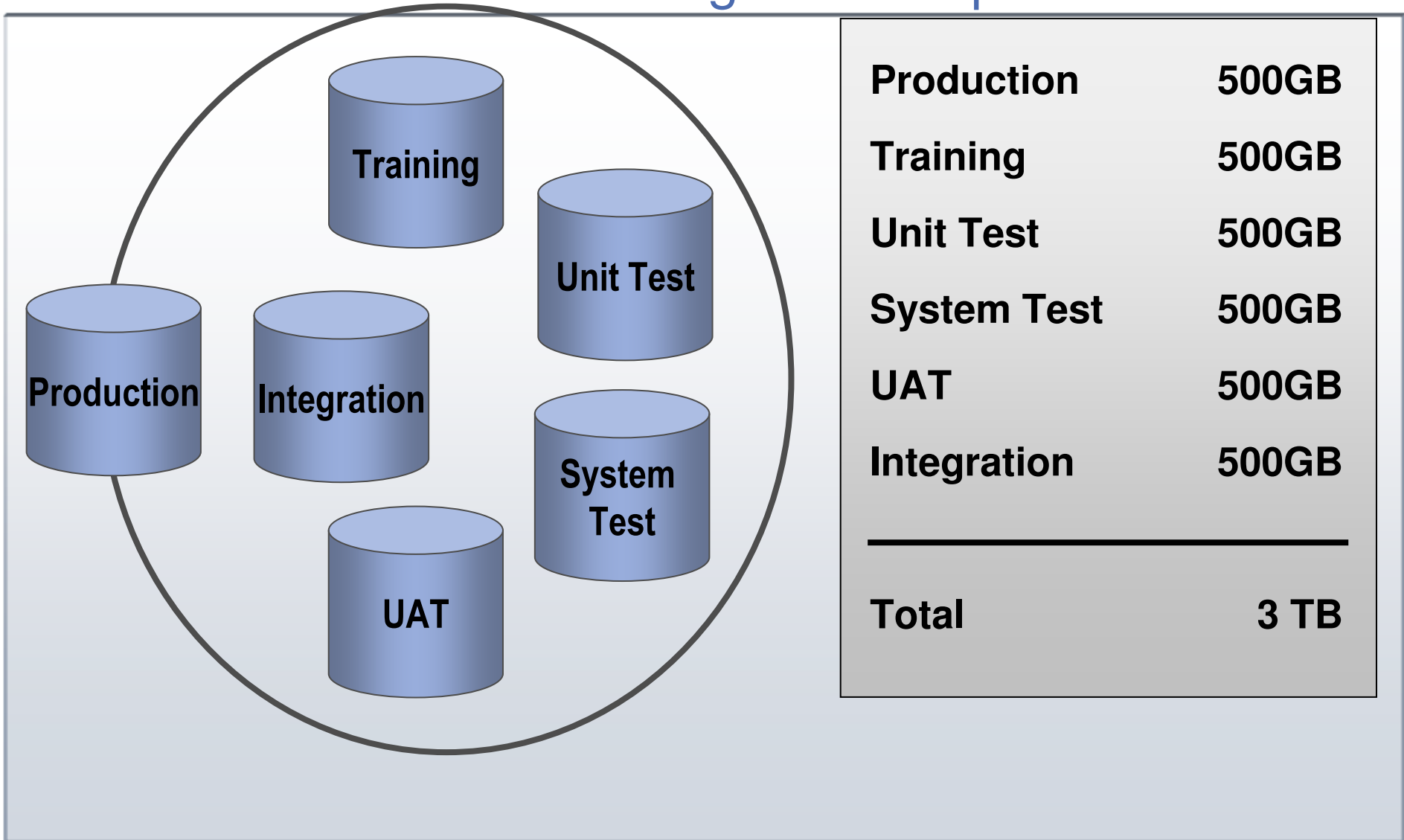


Create targeted, right-sized test environments instead of cloning entire production environments

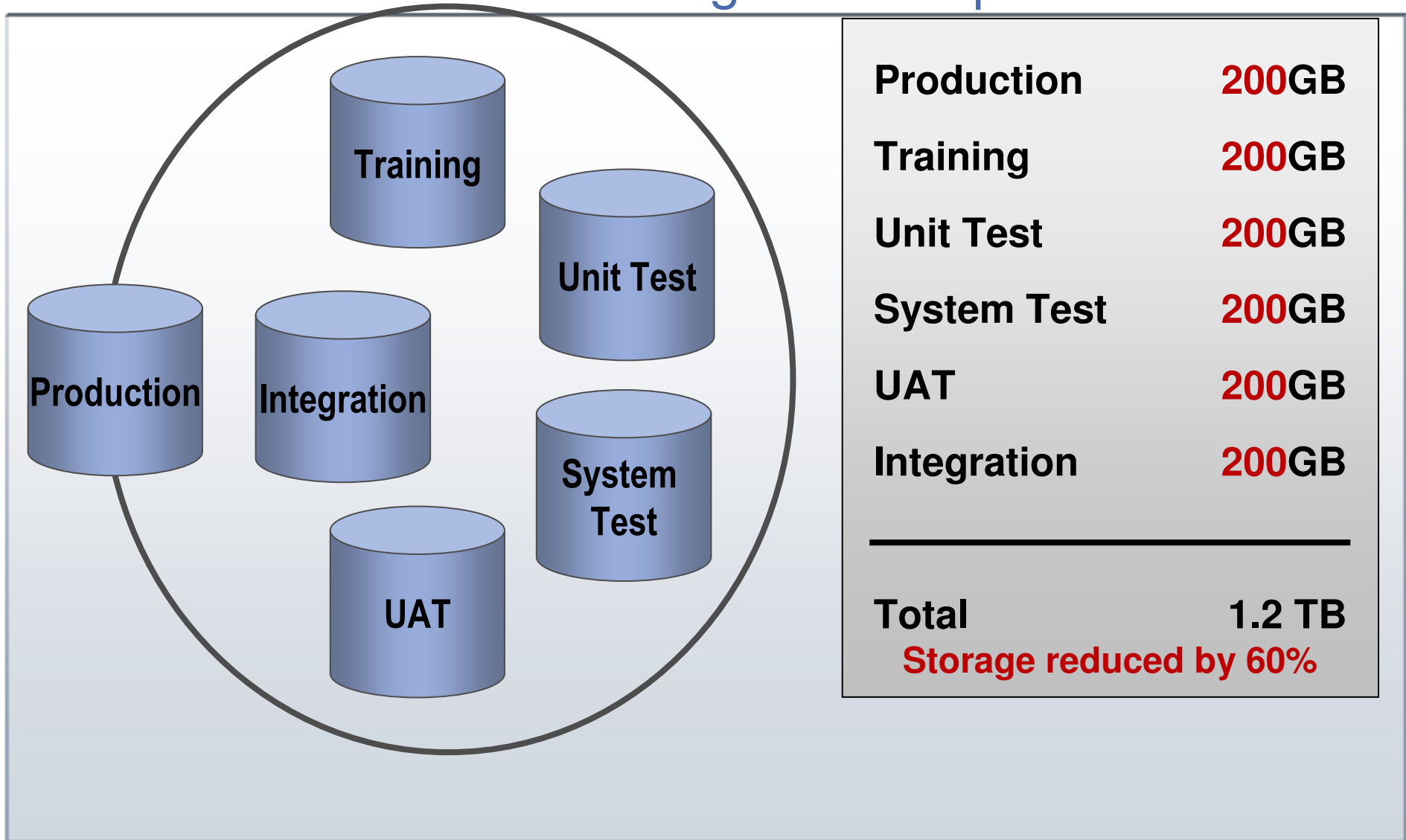
Development environments are then more manageable, speeding the testing process!



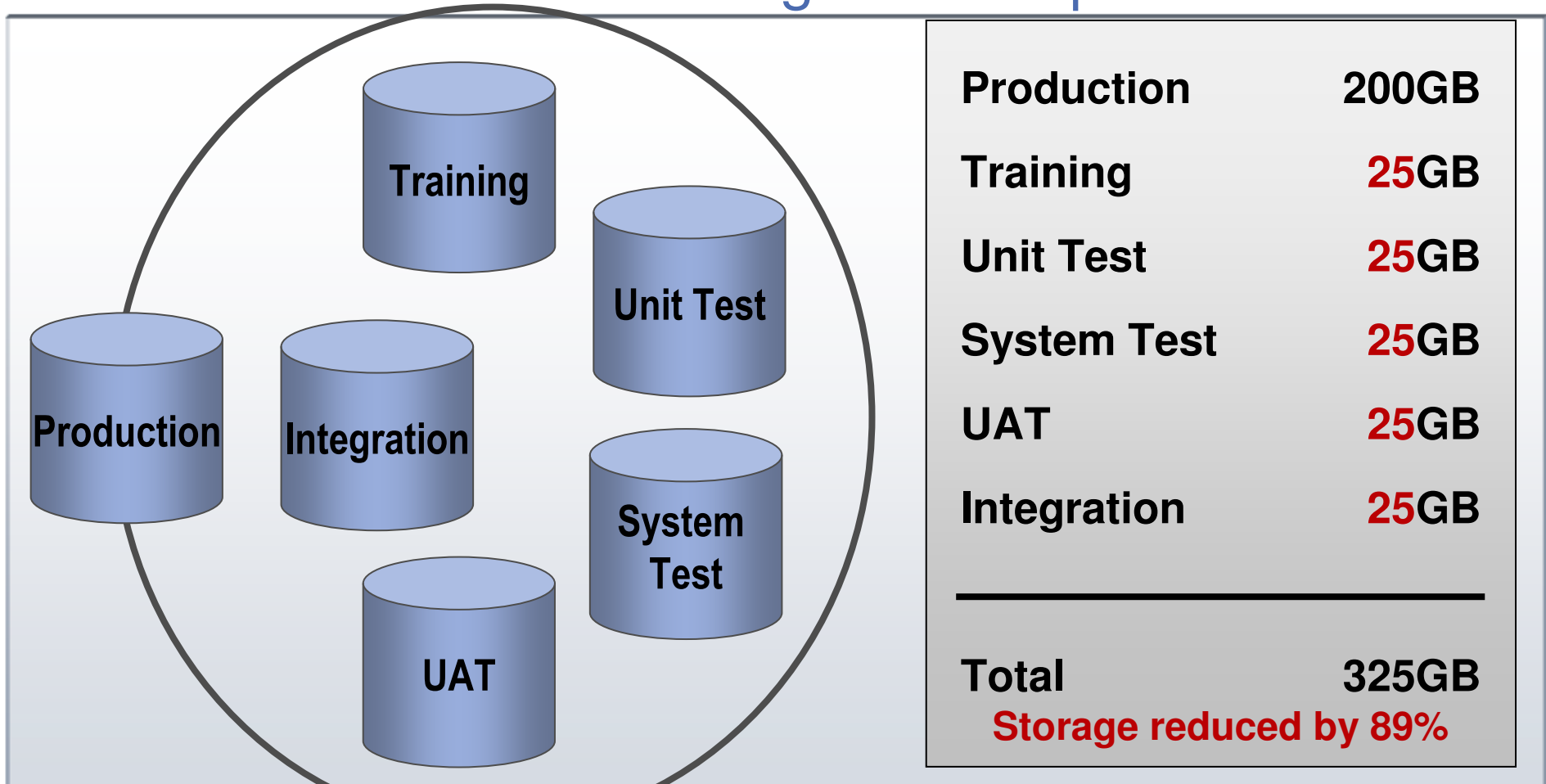
How Does Test Data Management Impact Cost?



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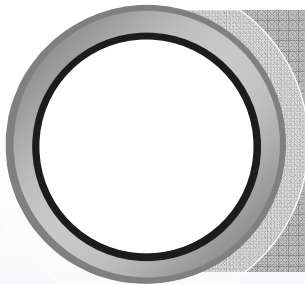


How Does Test Data Management Impact Cost?



*Creating right-sized targeted test environments
saves storage costs & speeds testing*

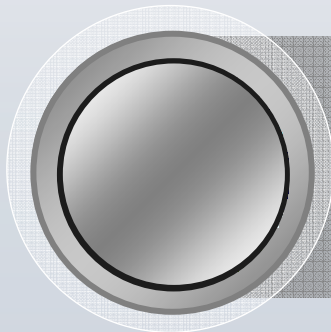
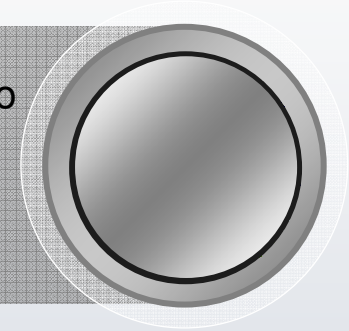
Why Do Something?



Eliminated downtime associated with rebuilding test environments - savings of up to **\$250,000 per year**. Achieved more than **\$100,000 annual savings** collectively for 10 to 15 projects.



Reduced the time needed to create a test environment by up to **90% (from 20 days to just 2 days)**. Improved time-to-deployment of new application functionality, contributing to critical business/financial initiatives.



Reduced **operational cost** and **improved efficiencies** by reducing the size of test database from 1.2TB to 24GB



Does this story happen to your business?

Real-World Scenario:

- ***70% of data breaches occur internally (Gartner)***
- ***Test environments use personally identifiable data***
- ***Standard Non-Disclosure Agreements may not deter a disgruntled employee***
- ***What about test data stored on laptops?***
- ***What about test data sent to outsourced/overseas consultants?***
- ***How about Healthcare/Marketing Analysis of data?***

A resilient goal that seems impossible:

- ***Can IBM help us to stay compliant therefore stay in business?***



The Cost of a Data Breach

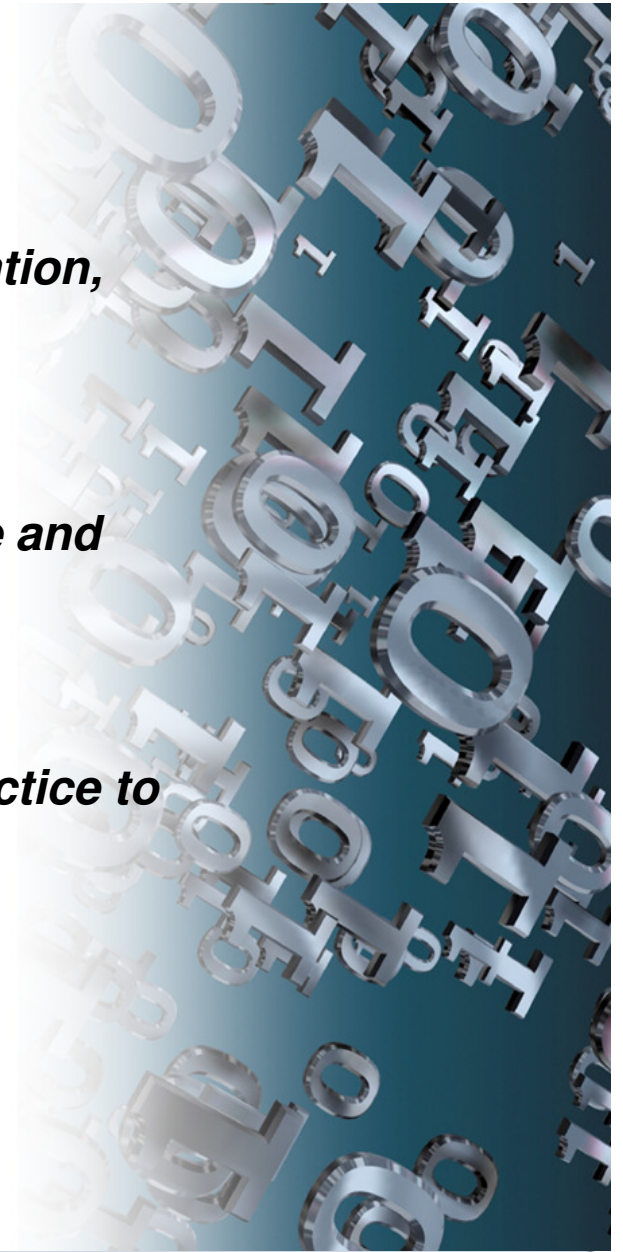
- **\$197**
 - Cost to companies per compromised record
- **\$6.3 Million**
 - Average cost per data breach “incident”
- **40%**
 - % of breaches where the responsibility was with Outsourcers, contractors, consultants and business partners

* Sources: Ponemon Institute, Privacy Rights Clearinghouse, 2007



What is Data Masking?

- ***Also known as: data de-identification, depersonalization, desensitization, obfuscation, data scrubbing***
- ***Technology that helps conceal real data***
- ***Scrambles data to create new, legible data***
- ***Retains the data's properties, such as its width, type and format***
- ***Common data masking algorithms include random, substring, concatenation, date aging***
- ***Used in non-production environments as a Best Practice to protect sensitive data***



Intelligent Data Masking

A comprehensive set of data masking techniques to transform or de-identify data, including:

- String literal values
- Character substrings
- Random or sequential numbers
- Arithmetic expressions
- Concatenated expressions
- Date aging
- Lookup values
- Intelligence

Example 1

| Patient Information | | | |
|---------------------|-----------------|-------|--------------|
| Patient No. | 123456 | SSN | 333-22-4444 |
| Name | Erica Schafer | | |
| Address | 12 Murray Court | | |
| City | Austin | State | TX Zip 78704 |

Data is masked with contextually correct data to preserve integrity of test data

Example 2

| Personal Info Table | | |
|---------------------|--------------|----------------|
| PersNbr | FirstName | LastName |
| 10000 | Jeanne | Renoir |
| 10001 | Claude | Monet |
| 10002 | Pablo | Picasso |
| | ⋮ | |

Referential integrity is maintained with key propagation



System-Related Problems

■ System-Related Problems

- Outage related to a REORG and locks
- Outage related to a dropped table
- DB2 runs out of disk space (eg. during an application update)

Possible Solution for Continuous Data Availability:

- ***DB2 Recovery Expert to create an instant copy that works with flash copy at the object level***
- ***DB2 Change Accumulation Tool while recovering data***
- ***DB2 Automation Tool***

Application-Related Problems

■ **Application-Related Problems**

- Batch loads corrupt data
- DB2 needs to come down for application maintenance due to table locks
- Schema changes/re-indexing

Possible Solution for Continuous Data Availability:

- DB2 Administration Tool
- DB2 Object Comparison Tool
- DB2 Change Manager Tool to generate the correct utilities to avoid human error
- DB2 Log Analysis Tool to recover data
- DB2 Object Restore
- DB2 Recovery Expert (to recover dropped objects to a point-in-time, without incurring a loss of data)

DB2 runs out of disk space (during application update)

- **DB2 runs out of Disk space (during application update)**

Possible Solution for Continuous Data Availability:

- DB2 Automation Tool to avoid situation
- Recovery Expert to optimize rollback, fix & reapply

Batch Loads Corrupt Data

- **Batch Loads Corrupt Data**

Possible Solution for Continuous Data Availability

- DB2 Recovery Expert, which provides multiple options, point-in-time recovery, undo/redo of undesired changes, and recovery of dropped objects
- DB2 Cloning Tool
- DB2 Log Analysis Tool to undo corrupted data
- DB2 z/OS v9 Backup Restore with DB2 Change Accumulation Tool

Bring Down DB2 for Application Maintenance

- Bring Down DB2 for Application Maintenance Due to table locks

Possible Solution for Continuous Data Availability

- DB2 Cloning Tool
- DB2 Utilities Enhancement Tool and DB2 Recovery Expert

What is your availability requirement?

| <i>Availability</i> | <i>Downtime Minute per Year</i> |
|---------------------|--------------------------------------|
| <i>99.999%</i> | <i>5 minutes</i> |
| <i>99.99%</i> | <i>50 minutes</i> |
| <i>99.9%</i> | <i>8 hours, 20 minutes</i> |
| <i>99%</i> | <i>3 days, 11 hours, 18 minutes</i> |
| <i>95%</i> | <i>18 days, 6 hours</i> |
| <i>90%</i> | <i>34 days, 17 hours, 17 minutes</i> |
| <i>85%</i> | <i>54 days, 18 hours</i> |

Direct Costs of Downtime

| <i>Application Segment</i> | <i>Average Cost of Downtime/Hour</i> |
|----------------------------------|--------------------------------------|
| <i>Shipping - Distribution</i> | <i>\$28,000 per hour</i> |
| <i>Tele-Ticket Sales</i> | <i>\$69,000 per hour</i> |
| <i>Airline Reservations</i> | <i>\$89,000 per hour</i> |
| <i>Home Shopping</i> | <i>\$113,000 per hour</i> |
| <i>Pay Per View - Television</i> | <i>\$150,000 per hour</i> |
| <i>Credit Card Sales</i> | <i>\$2,650,000 per hour</i> |
| <i>Financial Market</i> | <i>\$6,450,000 per hour</i> |

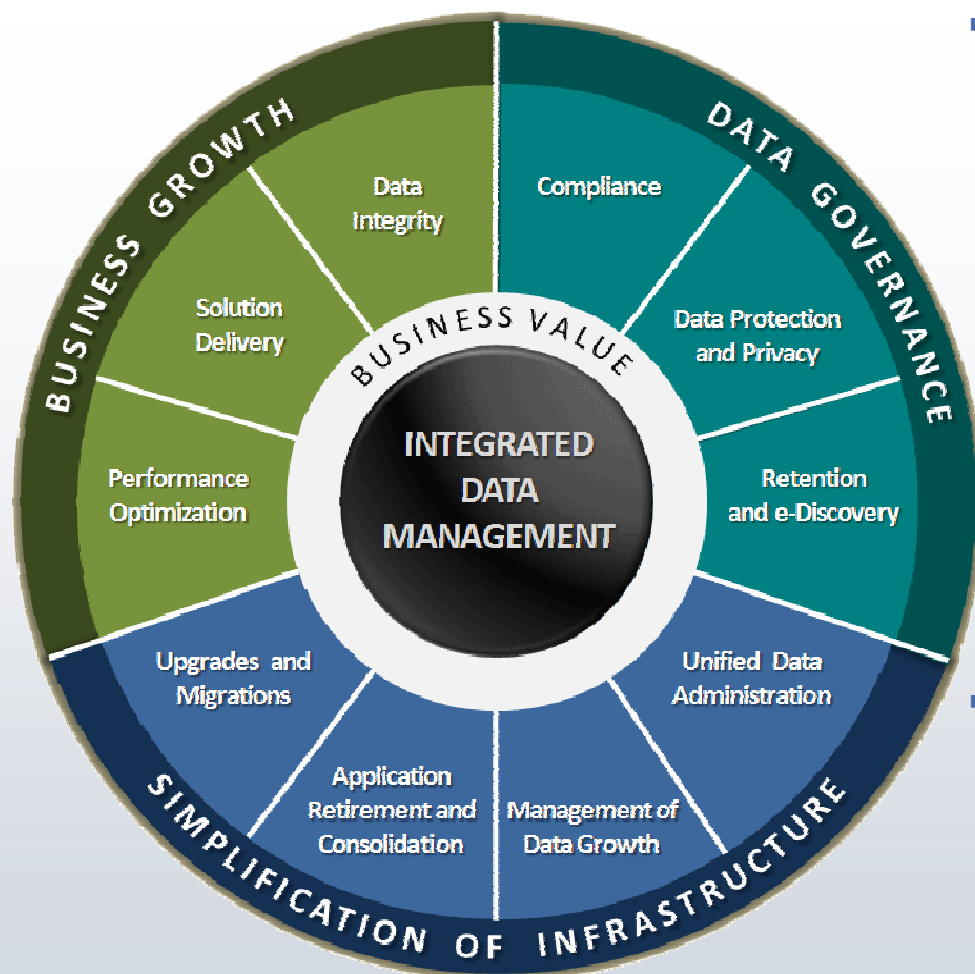
Source: Giga Group 2005



DB2 Tools to Ensure Resiliency

- ***DB2 Automation Tool***
- ***Optim Database Relationship Analyzer***
- ***DB2 Recovery Expert***
- ***DB2 Log Analysis Tool***
- ***DB2 Administration Tool***
- ***DB2 Object Comparison Tool***
- ***Tivoli OMEGAMON XE for DB2 Performance Expert***
- ***Tivoli OMEGAMON XE for DB2 Performance Monitor***
- ***DB2 Query Monitor***
- ***DB2 Cloning Tool***
- ***Optim Data Growth Solution***
- ***Optim Test Data Manager***
- ***Optim Data Privacy Solution***

IBM Optim™ Solutions



- **Optim Data Growth Solution (Archiving)**

- Improve performance
- Control data growth, save storage
- Support retention compliance
- Enable application retirement
- Streamline upgrades

- **Optim Test Data Management Solution**

- Create targeted, right sized test environments
- Improve application quality
- Speed iterative testing processes

- **Optim Data Privacy Solution**

- Mask confidential data
- Comply with privacy policies



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