



Data Integrity and Compliance Amid Tumult

***Database Management in the Age of
Regulatory Compliance***



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<http://www.CraigSMullins.com/DataComp.pdf>

Today's Agenda

- **The State of the DBMS Industry**
- **An Introduction to Regulations**
- **Data Integrity Issues**
 - **Database Change Management**
 - **Security and Auditability**
 - **Backup and Recoverability**
 - **Performance & Continuous Availability**
 - **Database Design**
- **Automation of Best Practices**



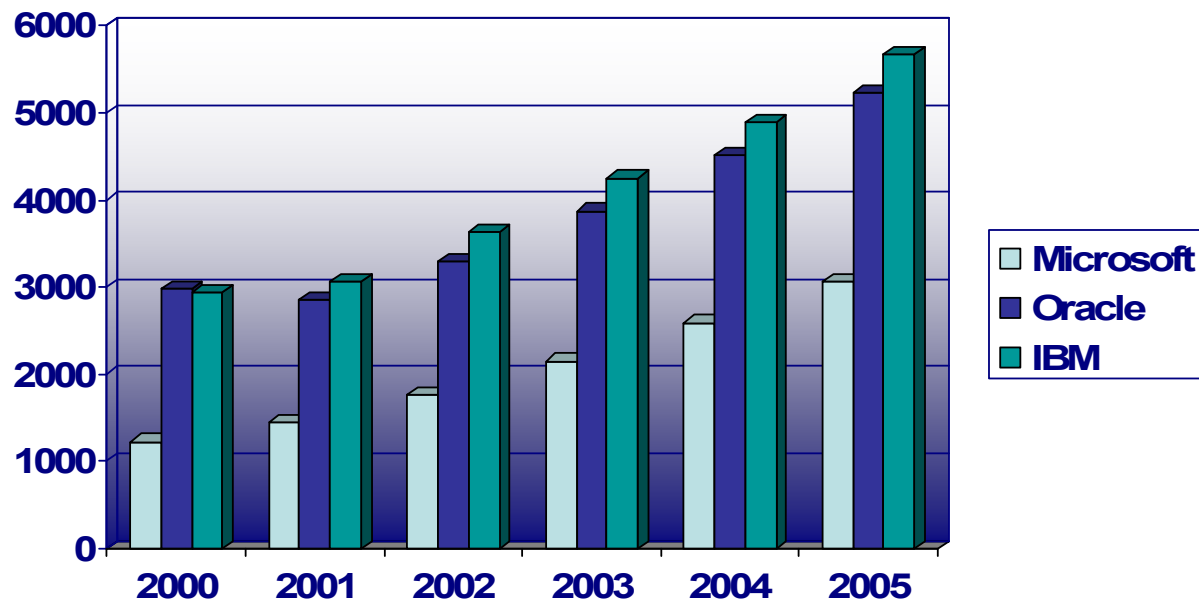
The State of the DBMS Industry

- **DBMS Market**
- **Trends**
- **Challenges**



The DBMS Market

- Mainframe and Distributed DBMS market size greater than \$14B
- Forecasted to grow 13% through 2005
- Data Growth 30-40% per annum
- DBA growth 3-5% per year



DBMS Industry Trends



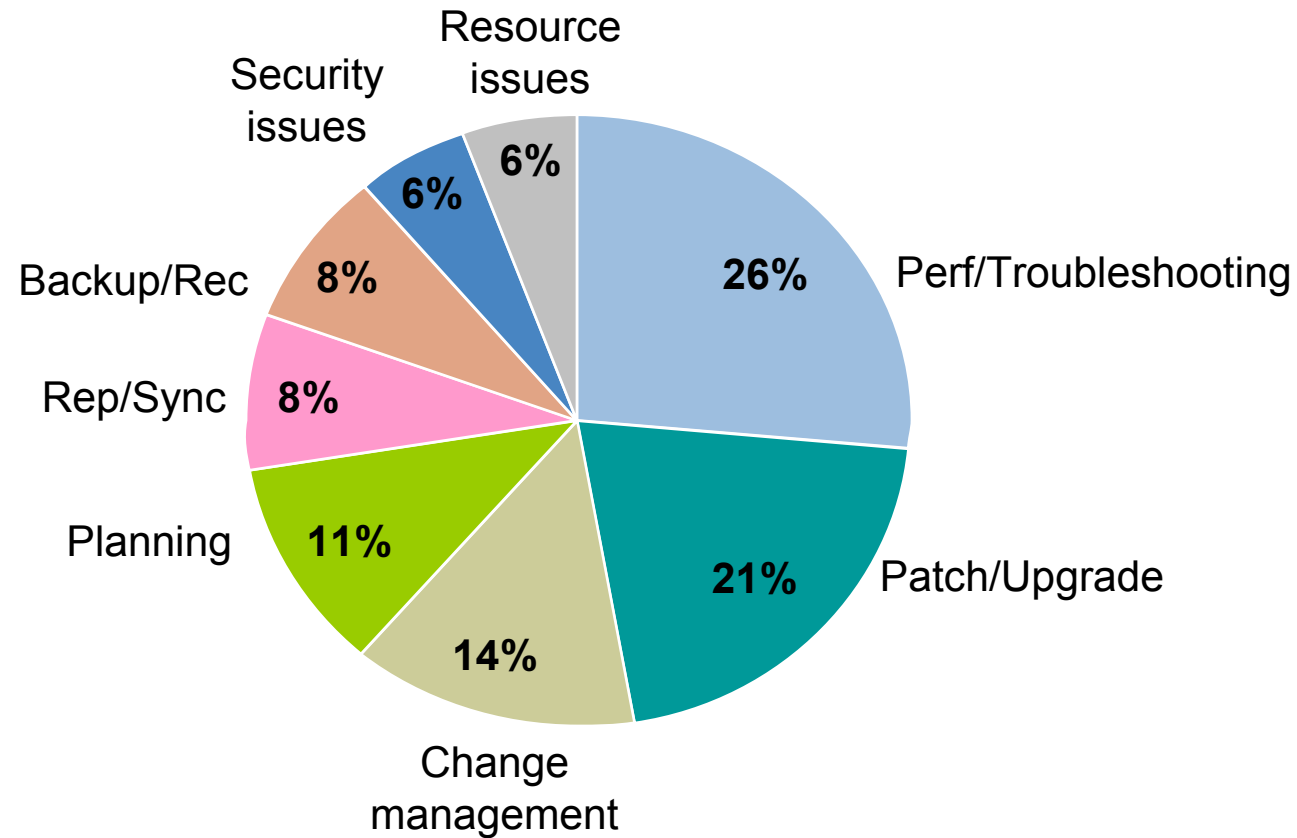
- **Increasing Complexity**
 - Heterogeneity
 - Rapid DBMS Versioning
- **Enabling for the Internet**
 - Java and .Net
 - XML
 - 24/7
- **Procedural logic**
- **ERP and CRM**
- **Data growth (VLDB)**
- **Non-traditional data**
 - Multimedia
- **Consolidation**
- **Open Source**
- **Regulatory Compliance**



McKinsey & Company reports
a **CAGR of 76%** for data storage.



Most Challenging DBA Tasks



Database activities that are most challenging

Data at Risk

- **A recent SAS/Risk Waters Group survey indicated that 93% of respondents had experienced losses of \$10 million in one year...**
 - **And 21% of respondents said that at some point, their company suffered a loss between \$10,000 and \$1,000,000 in a single day.**
- **The prime reasons given for such losses were **incomplete, inaccurate or obsolete data**, and inadequate processes.**



How Bad is the Problem?

- **How good is your data quality?**
- **Estimates show that, on average, data quality is suspect:**
 - **Payroll record changes have a 1% error rate;**
 - **Billing records have a 2-7% error rate, and;**
 - **The error rate for credit records: as high as 30%.**

Source: T.C. Redman, *Data Quality: Management and Technology*, (New York, Bantam Books).

Similar studies in ComputerWorld and the Wall Street Journal back up the notion of overall poor data quality.



Regulatory Compliance

- **GLB**
- **HIPAA**
- **Basel II**
- **Sarbanes-Oxley**



GLB: Gramm-Leach-Bliley Act

- The Gramm-Leach-Bliley Act (GLB Act), also known as the Financial Modernization Act of 1999, is a federal law enacted in the United States to **control the ways that financial institutions deal with the private information of individuals.**
- The Act consists of three sections:
 - The Financial Privacy Rule, which regulates the **collection and disclosure of private financial information;**
 - The Safeguards Rule, which stipulates that financial institutions must implement **security programs to protect such information;**
 - and the Pretexting provisions, which **prohibit the practice of pretexting** (accessing private information using false pretenses).
- The Act also requires financial institutions to give customers written privacy notices that explain their information-sharing practices.



HIPAA: Health Insurance Portability and Accountability Act

- The HIPAA Privacy Rule creates national standards to protect individuals' medical records and other personal health information and to give patients more control over their health information.
- The Privacy Rule provides that, in general, a covered entity **may not use or disclose an individual's healthcare information without permission** except for treatment, payment, or healthcare operations.
- The Privacy Rule requires the average healthcare provider or health plan to do the following:
 - Notify patients about their privacy rights and how their information can be used.
 - Adopt and implement privacy procedures for its practice, hospital, or plan.
 - Train employees so that they understand privacy procedures.
 - Designate an individual to be responsible for seeing that privacy procedures are adopted and followed.
 - Secure records containing individually identifiable health information so that they are not readily available to those who do not need them.



BASEL II

- **Basel II is a round of deliberations by central bankers from around the world, under the auspices of the Basel Committee on Banking Supervision (BCBS) in Basel, Switzerland.**
 - **Goal: to produce uniformity in the way banks and banking regulators approach risk management across national borders.**
- **The New Basel Capital Accord is about improving risk and asset management to avoid financial disasters.**
- **Compliance requires all banking institutions to have sufficient assets to offset any risks they may face, represented as an eligible capital to risk aggregate ratio of 8%.**
- **Part of this compliance dictates that data capture must be fully operational by 2004, and financial institutions must have three years of data on file by 2007.**



SOX: Sarbanes-Oxley Act

- **On June 30, 2002, President Bush signed the U.S. Public Accounting Reform and Investor Protection (Sarbanes-Oxley) Act of 2002**
 - “...to use the full authority of the government to expose corruption, punish wrongdoers, and defend the rights and interests of American workers & investors.”
- **Impacts auditors, corporations, and IT**
 - **Public companies with a market capitalization of at least \$75M**
 - **Companies listed on a United States exchange even if they are incorporated outside of the United States**



The Primary Objectives of SOX

- **To strengthen and restore public confidence in corporate accountability and the accounting profession;**
- **To strengthen enforcement of the federal securities laws;**
- **To improve executive responsibility;**
- **To improve disclosure and financial reporting;**
and
- **To improve the performance of “gatekeepers.”**



Section 404: Management Assessment of Internal Controls

- **Requires CEOs, CFOs, and outside auditors to attest to the effectiveness of internal controls for financial reporting**
- **Section 404 is the largest driver of SOX projects**
 - **It is the most important section for IT because the processes and internal controls are implemented primarily in IT systems;**
 - **...and the data is stored mostly in database management systems (DB2, Oracle, SQL Server, etc.)**



SOX Section 404

- **Definition of control/control activity**
 - Safeguards or processes that mitigate risk
 - Processes effected by people designed to accomplish specified objectives (COSO)
 - Infrastructure, and other components maintain confidentiality, integrity, availability
- **Company Management**
 - Assures evaluation of controls effectiveness, provides written assessment
 - Accepts responsibility for it; supports audit evaluation with evidence
- **Compliance With Sarbanes-Oxley**
 - 404 requires external auditor's opinion on effectiveness of internal controls
 - Ability to demonstrate controls implemented for quarterly certification
 - If controls can be bypassed, management cannot with certainty attest to integrity, confidentiality and non-repudiation of financial reporting
 - Standards and repeatability critical in demonstrating controls for data integrity



Why SOX Matters: #1

- **Sec. 802(a) "Whoever knowingly alters, destroys, mutilates, conceals, covers up, falsifies, or makes a false entry in any record, document, or tangible object with the intent to impede, obstruct, or influence the investigation or proper administration of any matter within the jurisdiction of any department or agency of the United States or any case filed under title 11, or in relation to or contemplation of any such matter or case, shall be **fined** under this title, **imprisoned** not more than 20 years, **or both**."**



Why SOX Matters: #2

- **Sec. 802(a)(1)** *"Any accountant who conducts an audit of an issuer of securities to which section 10A(a) of the Securities Exchange Act of 1934 (15 U.S.C 78j-1(a)) applies, shall **maintain** all audit or review work papers for a period of **5 years** from the end of the fiscal period in which the audit or review was concluded."*



Why SOX Matters: #3

- **Sec. 802(a)(2) "The Securities and Exchange Commission shall promulgate, within 180 days, such rules and regulations, as are reasonably necessary, relating to the *retention of relevant records* such as work papers, documents that form the basis of an audit or review, memoranda, correspondence, communications, other documents, and records (*including electronic records*) which are created, sent, or received in connection with an audit or review and contain conclusions, opinions, analyses, or financial data relating to such an audit or review."**



Other Regulations?

- **Of course, there are other regulations that need to be considered – for example, the USA Patriot Act, Can SPAM Act of 2003, Telecommunications Act of 1996, etc.**
- **And, there are more regulations to contend with; based upon your industry, location, etc.**
- **And, new regulations will continue to arise over time...**



Current Regulations:

Just the Tip of the Iceberg

- **Recent theft of credit card information.**
 - http://searchcio.techtarget.com/originalContent/0,289142,sid19_gci1100136,00.html?track=NL-162&ad=521394
 - Dozens of similar breaches have been disclosed this year after a California state law required businesses to make such incidents public.
- **US Senate may introduce a national data breach law. (The House is also working on similar legislation.)**
 - <http://msnbc.msn.com/id/8318664/>



Effect?

- **Regulations have brought to light some of the personal financial information that has been compromised** (*stolen*)
 - **ChoicePoint** – data on as many as **145,000**
 - **LexisNexis** – **310,000**
 - **TimeWarner** – as many as **600,000**
 - **Bank of America** – **1.2 million**

Source: Money Magazine, July 2005



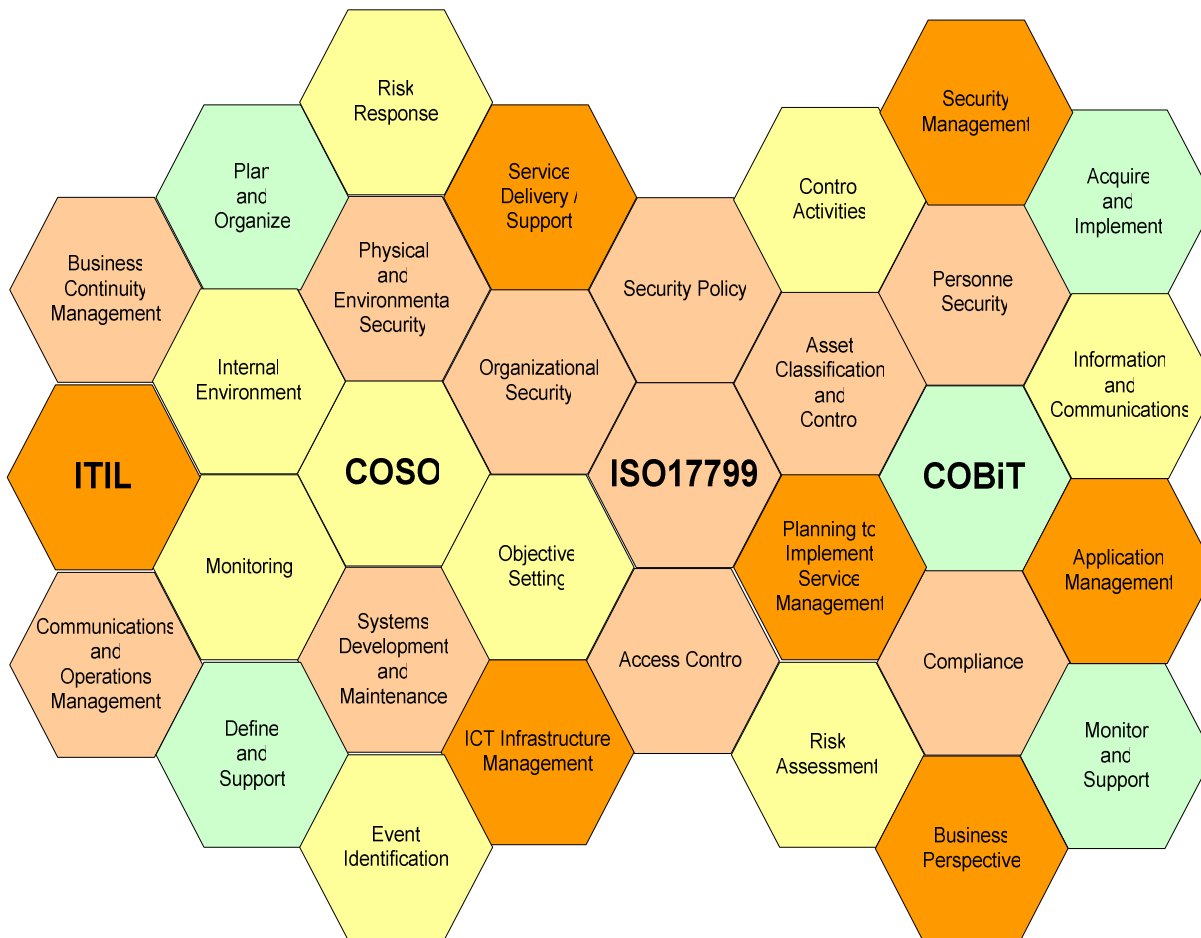
And Compliance Matters to Your CIO

- **According to Gartner Group, by the end of 2005, 70% of publicly traded companies will require CIOs to sign attestations on the reliability of financial IT systems, as well as CIO compliance with SOX and other regulations.**

Source -- Gartner Group: October 1, 2003



Compliance Is About Methods and Controls



Compliance with most regulations, including Sarbanes-Oxley, is not a software issue alone but also a process issue...

A purely software equivalent of a silver bullet for regulatory compliance does not exist.

But...

- **Government and Industry regulations have direct impact on database administration and data management standards and practices.**
- **Software *can* help. Regulations can be a driving force to implement new:**
 - **Policies and procedures**
 - **Tools and utilities**



Standards and Process

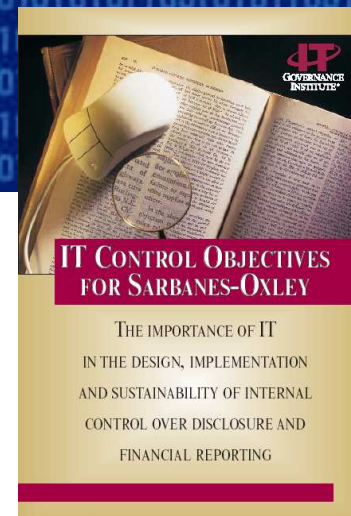
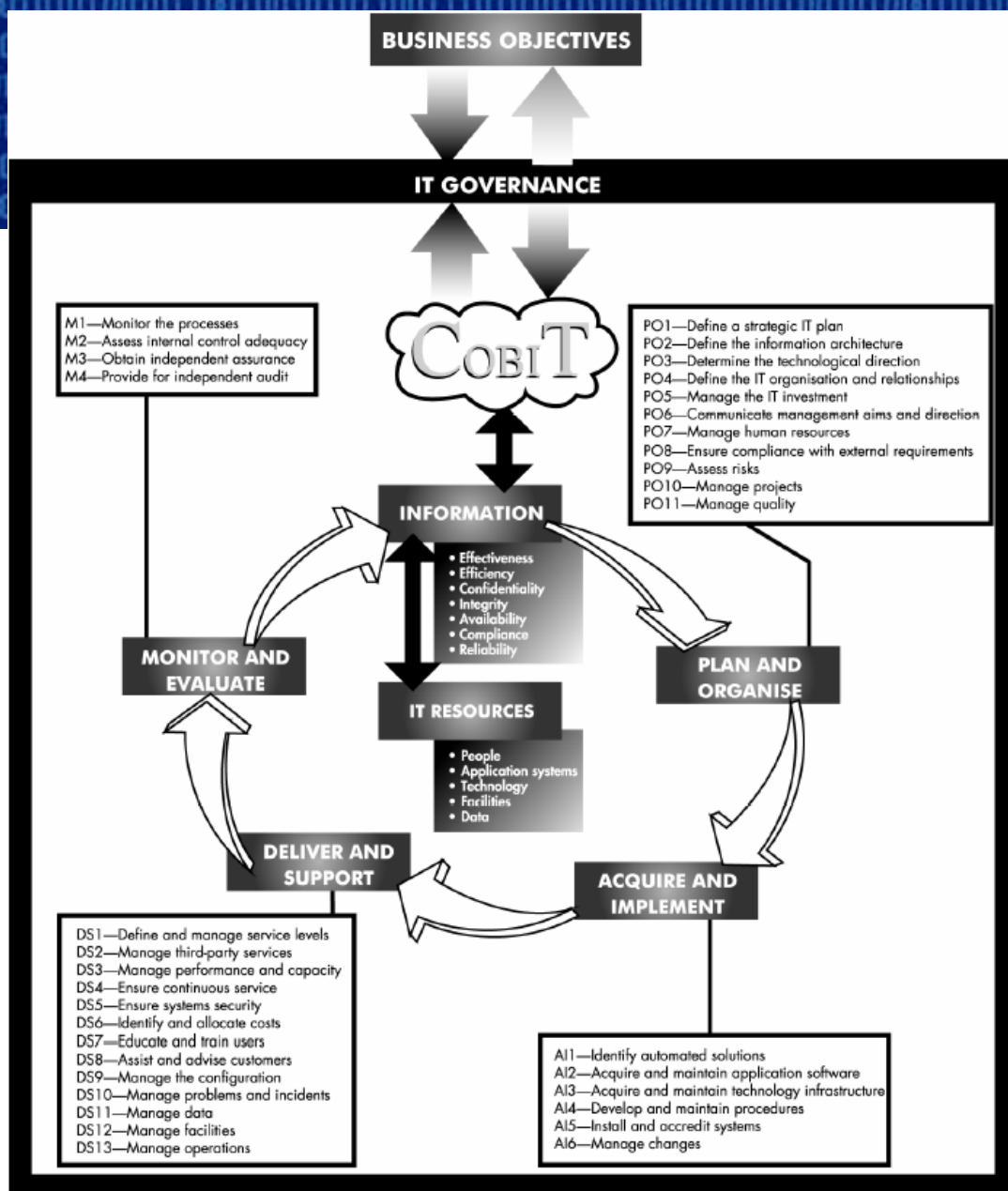
- **Auditors may use standards such as CobiT for IT controls and objectives**
 - **CobiT approaches IT controls looking at information and data that supports business requirements and associated IT resources and processes**
 - **Don't create a non-standard approach, when you can leverage something known by an auditor**



CobIT – A Standard for IT Governance

- **CobIT provides detailed audit guidelines for IT processes**
 - Enables auditor to review specific IT processes against Control Objectives to determine where controls are sufficient or advise management where processes need to be improved
 - Helps process owners answer questions: Is what I'm doing adequate?
- **36 control models used as basis**
 - Business control models (COSO); IT control models (DTI's CoP)
- **CobIT control model covers**
 - Security (Confidentiality, Integrity, Availability)
 - Fiduciary (Effectiveness, Efficiency, Compliance, Info. Reliability)
 - IT Resources (Data, Application Systems, Technology, Facilities, People)





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Figure 1 - COBIT IT Processes Defined Within the Four Domains

Page 12 COBIT® MAPPING Overview of International IT Guidance whitepaper



Management Controls Applicable To Database Systems

- **Delivery and Support**
 - Managing IT operations – including access to programs and data
 - **DS1** – Define and Manage Service Levels
 - **DS3** – Manage Performance and Capacity
 - **DS4** – Ensure Continuous Service
 - **DS7** – Educate and Train Users
 - **DS9** – Manage the Configuration
 - **DS10** – Manage Problems and Incidents
 - **DS11** – Manage Data
 - **DS13** – Manage Operations
- **Acquisition & Implementation**
 - Database development and database changes
 - **AI1** – Identify Solutions
 - **AI3** – Acquire and Maintain Technology Infrastructure
 - **AI4** – Develop and Maintain Policies and Procedures
 - **AI5** – Install and Accredite Systems
 - **AI6** – Manage Changes
- **Monitoring**
 - **M1** – Monitor the Process



Getting Started

- **Inventory and Identify – vulnerability at the database level**
 - All financial system databases
 - Any thing they exchange data with
- **Database Change Management and Tracking**
 - Managing object permissions, or schema changes to eliminate risk of unauthorized viewing, altering, or copying of data
 - Audit validation of changes as authorized or unauthorized
 - Rapid analysis and response when unauthorized changes occur
- **Database Log Auditing and Tracking**
 - Ensure protection of database transaction logs from alteration and deletion
 - Routinely review database logs to verify approved modifications and identify unauthorized changes. Reconstruct transactions
 - Reconstruct and report on every transaction against the database
- **Database Backup & Recovery**
 - Demonstrating recoverability within reasonable business continuance
 - Database archival, backups, loading/unloading, routinely verified
- **Monitoring availability of financial databases**
- **Proper database design techniques**



Review and Preparation

- **Data integrity ownership and responsibilities communicated to appropriate data/business owners acceptance of responsibilities**
- **Key database systems inventoried and owners identified**
- **Database Management staff understands and accepts their responsibility regarding internal controls**
- **Division of roles and responsibilities (segregation of duties) that prevents a single DBA from unauthorized alterations**
- **Review documented Database Management processes**
- **Review documented Database Management risks**
- **Documented Database Management process controls**
- **Testing of Database Management control methods**
- **Gap identification and controls improvement process**
- **Update Database Management processes and document controls**



CobIT and Change Management

- **Control Objectives**

- Changes to data structures are authorized, made in accordance with design specifications and are implemented in a timely manner.
- Changes to data structures are assessed for their impact on financial reporting processes.



Database Change Management

- **Databases protected with controls to prevent unauthorized changes**
 - Proper security for DBAs including access to tools
- **Ensure controls maintained as changes occur in applications, software, databases, personnel**
 - Maintain user ids, roles, access
 - Ability for replacement personnel to perform work
 - Test processes
 - Control logs and nonrepudiation
 - Prove what you said was done has been done
 - Backout procedures
 - Reduce system disruptions
 - Accurate and timely reporting of information
- **Routine, non-routine, emergency process defined and documented**
- **Utilization of off the shelf software with logging reduces manual risks and efforts providing better security and backup**



Change Management Issues

- **Complex alterations – simple ALTER or DROP/re-CREATE**
 - Simplifying change specification
 - Global search and replace
 - Seamless object comparison and synchronization
 - Migration of objects and their dependencies
 - Awareness of database object dependencies and constraints (RI)
- **Impact analysis**
 - Know the impact of change before starting to implement a change
 - Avoid problems during implementation through pre-analysis of changes
- **Ability to deploy a single change to many databases/instances**
 - Database change management solutions can be used to build, group and package change requests
- **Repeatability of change processes**
 - Automation enables repeatability
 - “Strategies” can be stored in a central repository to be edited, renamed, or analyzed and used at a later time
 - Reuse: edit, rename, or re-analyze a change specification
- **Scheduling ability to implement change at appropriate time**
 - Once built, the change strategies can be scheduled to provide multiple, simultaneous database changes at a later, specific time
- **Logging of activities**
 - Know exactly what was changed and when
 - Recovery rollback and restart



Object Comparison and Synchronization

- **Ability to deploy schema updates across multiple platforms simplifies change management and reduces errors**
 - **Synchronize two schemas by comparing and migrating the differences**
 - **Compare and migrate subsets of objects ensuring referential integrity**
 - **Generate code to update destination to match original**
 - **Compare objects between databases and generate a report of differences**



Comparison Issues

- **Ad Hoc Flexibility**
 - Choose any object for comparison
- **Intersection**
 - Compare objects that exist in the source and destination identifying all differences in an entire instance / subsystem
- **Union**
 - When destination instance has many schemas but source only has one
 - Compares objects that exist in the source and the destination, identifying all differences in the entire instance / subsystem, but extra objects in destination are not reported



So What?

- **Proper change management tools enforce standard procedures**
- **Change management tools can reduce errors by automating manual processes**
- **Change management tools can produce change logs (difficult to produce by other means)**



CobIT and Database Security/Auditing

- **Control Objectives**

- Management protects sensitive information, both logically and physically, in storage and during transmission against unauthorized access or modification.
- Policies and procedures exist and are followed to ensure that personally identifiable information is appropriately safeguarded and meets regulatory requirements.
- Procedures exist to ensure that the contents of a media library containing sensitive data are inventoried and that discrepancies from physical inventory are remedied in a timely manner.



Database Security

- **Roles versus Userid**
- **Who has access to high-level roles: SYSADM, SA, DBADM, DBO.**
- **Do any applications require DBA-level authority? Why?**
- **Security monitoring**
 - **Audit from the log**
 - **Additional tools**
- **Encryption**



Database Security Issues

- **Authentication**
 - Who is it?
- **Authorization**
 - Who can do it?
- **Encryption**
 - Who can see it?
- **Audit**
 - Who did it?



Database Log Auditing

- **How to review the changes made to large financial databases?**
- **Confirming approved modifications and identification of unauthorized changes**
 - **Object change that might affect financial reporting**
 - **Unauthorized transactions**
 - **Who?**
 - **What?**
 - **Catch, report and correct . . .**
- **Perform without impact or need for additional hardware**
- **Ensure data recoverability in a timely manner**



Database Log Auditing & Analysis

- **The key is to decrypt the information contained in the database logs**
 - **Log auditing**
 - **Verification of modifications**
 - **Easy access to online and archive logs**
 - **Change identification and correction**
 - **Pinpoint transactions**
 - **Selective rollback and recovery**
 - **Restoration of data**



Visibility to Database Activity

- **Log report generation**
 - To create readable information from encoded database log data
- **Track all database modifications:**
 - Data Manipulation (DML)
 - Data Definition (DDL)
 - Data Control (DCL)
- **What about reads?**



So What?

- **Database log auditing software can produce multiple reports on database modification activities**
 - **Database transaction logs are difficult to read without a tool that understands the page formats**



CobIT and Database Recovery

- **Control Objectives**

- **Must be able to restore or restart the processing in a manner such that it sustains operations and does not lose the integrity and completeness of financial transactions or data.**
- **Policies and procedures exist and are followed to ensure that data retention practices meet business, legal and regulatory requirements.**
- **Procedures exist and are followed to periodically test the effectiveness of the restoration process and the quality of backup media.**



Data Protection & Availability

- **Ensure that data is recoverable in a timely manner**
- **Appropriate backups taken**
- **Recovery just as important**
 - **Effects of failure curtailed to minimize financial loss**
 - **Transaction consistency and continuity**
 - **Recovery involves**
 - **Removing effects of transactions**
 - **Transactions re-executed**
 - **Transactions undone or redone**
 - **Fast restoration of the data**



Database Backup

- **Image Copy Backups**
 - **Full versus Incremental Image Copy Backups**
 - **Merging Incremental Copies**
 - **Database Objects and Backups**
 - **Copying Indexes?**
 - **DBMS Control**
 - **Backup Consistency**
 - **When to Create a Point of Consistency**
 - **Log Archival and Backup**
 - **Determining the Backup Schedule**
 - **DBMS Instance/Subsystem Backup**
 - **Designing the DBMS Environment for Recovery**
 - **Database Object Definition Backups**

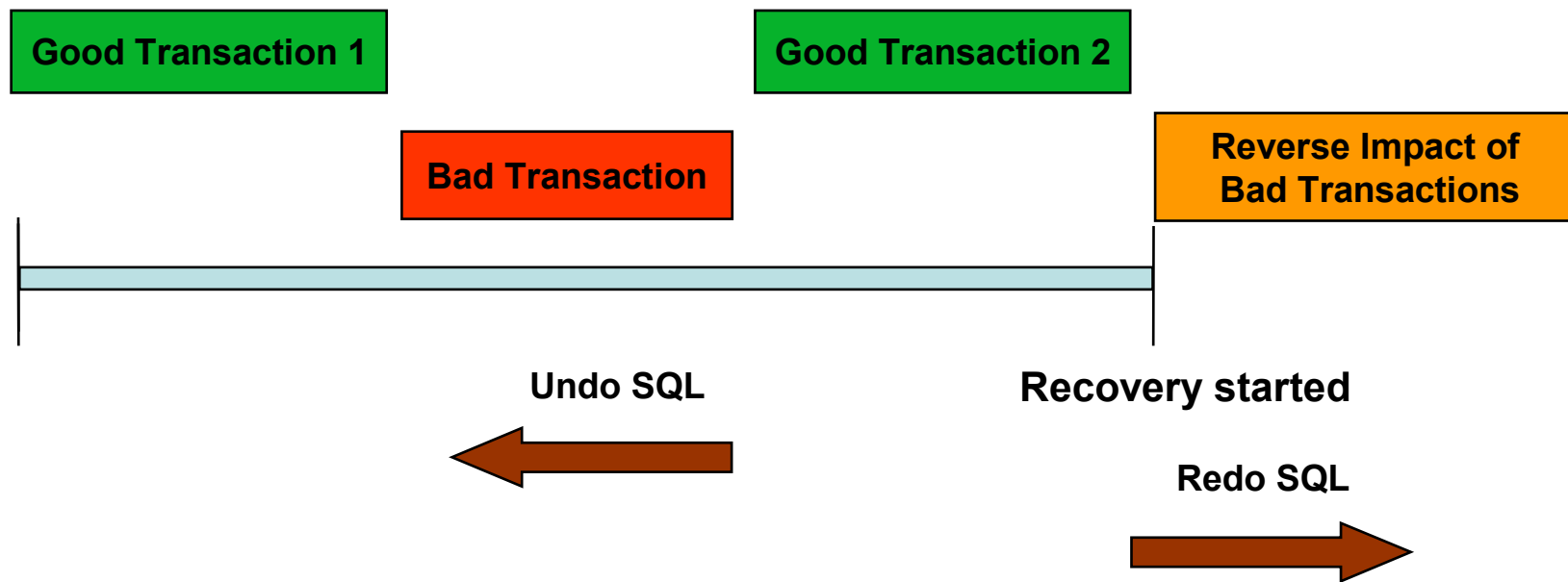


Database Recovery

- **Recovering from Image Copy Backups**
 - **Determining Recovery Options**
 - **Error Analysis**
 - **Image Copy Analysis**
 - **Index Recovery**
 - **Testing Your Recovery Plan**
 - **Recovering a Dropped Database Object**
 - **Recovery of Broken Blocks and Pages**
- **Types of Recovery**
 - **Recover to Current**
 - **Point in Time Recovery**
 - **SQL Based Recovery (log-based)**
- **Disaster Recovery (contingency planning)**



SQL-Based Recovery



Undo/redo SQL, generated from the database log, can be used to get rid of bad transactions. And the database can remain online.



Disaster Planning

- **“Disaster: any unplanned, extended loss of critical business applications due to lack of computer processing capabilities for more than a 48-hour period.”**

- ***Sungard Recovery Services***

- **DBAs must integrate database recovery into the corporate disaster recovery plan**
- **DBAs must test the disaster plan**
- **DBAs must work with the application owners/sponsors to accurately gauge the criticality of each piece of data to create a valid database disaster plan**



Backup and Recovery Issues

- **Schedule regular testing of your entire recovery process; not just DR.**
 - Identify any missing resources that are required to successfully complete the recovery – and correct.
 - Potentially this can include components other than database components
- **Storage**
 - Ensure proper interoperation with storage devices used for backup & recovery
 - DBAs must work with storage management technicians



So What?

- **Automation of backup & recover processes can reduce time, effort, and human error**
- **“Timely” recovery is a component of compliance; but what does that mean?**
 - **Speed of the recovery is important – how fast are your recovery utilities?**
 - **Reproducing undo/redo SQL from the log for recovery can boost speed**



CobiT and Data Availability

- **Control Objectives**

- Procedures exist for identifying, correcting and reporting errors to ensure that no transactions are lost that could effect the validity of the financial reports
- Procedures exist and are followed to manage errors in a consistent and authorized manner



Performance

- **Setting appropriate database traces**
 - Audit traces
 - Performance traces
- **Visibility to all database access**
 - Planned and ad hoc; static and dynamic SQL
- **Historical information (read/SELECT auditing)**
 - Programs and SQL statements run
 - When and by which userids



Availability

- **Proactive availability monitoring**
 - Alerts or takes immediate corrective action when financial data that should be available is not available
- **Online Maintenance**
 - Database structure changes
 - Utility processing
 - Automation of reorganization (online/offline)
 - Faster off-line utility processing can reduce downtime
 - System parameters



Automation & Integration

- **Automate error detection and correction**
 - **Alert notification**
 - Inform the proper authority
 - Possibly even take immediate corrective actions
 - **Integration**
 - Send events to help desk and service level management tools
 - Proper reporting of problems and corrective actions undertaken



So What?

- **Performance management tools that monitor system, database, and SQL performance assist in compliance**
- **SQL performance monitors can help to audit data access**



CobiT and Database Design

- **Control Objectives**

- Control procedures exist for maintaining the accuracy and validity of data inputs, including edit checks, validity checks and bound checks.



Data Modeling

- **In the IT and business world, knowledge starts with data, and risk factors are identified by analyzing data:**
 - **So the logical place to begin is data modeling and database design.**
- **By understanding how you currently operate and what controls you have or haven't got on the quality of your data, you will begin to identify where your risk areas might be.**



Why Model Data?



Capital - *Chart of Accounts*

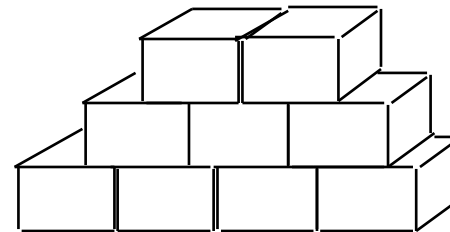


Human Resources - *org chart*

Data?



Facilities - *blueprints*



Materials - *Bill of Materials*



Database Design

- **Many data quality issues can be addressed through better database design:**
 - **Logical data modeling**
 - Designed for business needs
 - Normalization
 - **Logical to physical mapping and translation**
 - Proper data types and lengths
 - **Non-bypassable data integrity mechanisms**
 - Check constraints
 - Unique constraints
 - Referential constraints
 - Triggers



Database Design Solutions

- **Data modeling**
 - Provide structure for well-designed databases
 - Should work with all of the DBMS technologies in use at your company
 - Schema review and validation
- **Works with process modeling**
 - To integrate data and process
- **Metadata Management**
 - To capture business meaning



So What?

- **Properly implemented data modeling tools institutionalize good database design techniques**



Some Statistics

- **64% of all commercial firms currently have an active SOX compliance program underway.**
- **78% will have a SOX compliance program in place before the end of the year.**
- **Many private companies are deciding to comply with SOX to increase their valuations or to gain an advantage when securing blue chip customers.**



Source: Aberdeen Group

Additional Statistics

- **SOX is increasing the IT spend:**
 - **According to a SearchCIO survey:**
 - **43%** indicated that the 2005 IT budget would exceed the 2004 IT budget;
 - **33%** said spending would remain the same.
 - **Four of the top six IT spending categories in the survey were not in last year's Top 10:**
 - **security technologies**
 - **BPM**
 - **customer portals**
 - **data synchronization**



Action Items (1)

- **Complexity of business operations, business processes, and enabling technologies must be specific areas of concern**
- **For larger organizations, scope is an issue; automation of SOX compliance controls is recommended**
- **Implement formalized management, monitoring, and measurement tools**



Action Items (2)

- **SOX is a regulatory requirement and *must* be followed for all large, public companies**
- **Many private companies are deciding to comply with SOX to increase their valuations or to implement best practices for financial data.**
- **Use SOX as a driving force to secure the proper tools and technologies for automating your database systems and applications**
- **There is rarely a better time to install and implement useful technologies than when it helps to adhere to a legal mandate**



Ongoing Quarterly Review

- **SOX does not mandate software, however technology and automation ease the compliance process**
 - **As compared to manual or paper-based processes**
 - **Auditors seek consistent and repeatable processes and controls**
 - **Software solutions enable great consistency and help automate controls**



Scrushy Walks

Scrushy experiences joy of SOX and walks free

by David Quainton



[Wed, Jun 29, 2005] The U.S. government's first attempted prosecution under Sarbanes-Oxley has ended in failure. Richard Scrushy, 52, former CEO of healthcare company Healthsouth, walked free from a federal courthouse yesterday after being acquitted of 38 charges of fraud.

Scrushy's charges related to a multi-billion dollar scheme that added false profits to Healthsouth's accounts. He was cleared after convincing the jury he was unaware of the financial irregularities, which were private only to the finance department.

The case comes as a blow to U.S. prosecutors who believed they had a cast-iron test case for Sarbanes-Oxley. The legislation puts the onus on board members to regulate their companies in a financially sound manner and was a direct response to the Enron and Worldcom scandals at the turn of the millennium.

"We went from 85 counts to zero. There are a lot of wrongs that need to be made right and I look forward to seeing that happen," said Scrushy in an interview with the *Financial Times*.

In April [SC reported](#) companies could avoid a Sarbanes-Oxley headache by using encryption technology.



Questions and Information

- **Industry Organizations and References**

- www.isaca.org
- www.coso.org
- www.aicpa.org/news/2004/2004_0929.htm
- www.auditnet.org/sox.htm
- www.itgi.org
- www.sox-online.com/coso_cobit.html
- search390.techtarget.com/general/0,295582,sid10_gci1082578,00.html?track=NL-173&ad=516088
- *Implementing Database Security and Auditing* by Ron Ben Natan (2005, Elsevier Digital Press, ISBN: 1-55558-334-2)



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