Information Resource Management

• The importance and value of information to an organisation is widely recognised
  - drives much of the development of information systems
• Data is viewed as a corporate asset
  - similarly to personnel, physical resources, finances
• As with any asset, management is essential to exploit the resource to the maximum benefit
  - not a trivial exercise

Information Resource Management

• There are three major roles in information resource management
  - data administration
    • planning, analysis
  - database administration
    • physical design and operational use
  - application development
    • systems design and implementation

Information Resource Management

• Ineffective data administration leads to poor data utilisation
  - multiple definitions or inconsistent representation of the same data elements → integration problems
  - missing core data elements
  - low data quality
    • inappropriate sources, poor timing
  - lack of familiarity with data → loss of reliability
    • meaning, location
  - poor or inconsistent query response time, excessive downtime, inflexible or inadequate controls
Information Resource Management

- New technologies and trends are driving the evolution of the roles of data administrator and database administrator
  - proliferation of proprietary and open source technologies and software, diverse platforms
  - rapid growth in database size, complex data types, complex business intelligence needs
  - embedding business rules in databases
    - triggers, stored procedures, user-defined functions
  - growth in e-business applications and web-enabled systems

Data Administration

- "...a high level function that is responsible for the overall management of data resources in an organisation, including maintaining corporate-wide data definitions and standards."
- Custodian of the organisation’s data
- Develops procedures to protect and control the resource
- Resolves disputes concerning centralised and shared data
- Determine the contents and logical boundaries of each database
- Helps decide on data location and management
- The data administrator’s primary concern is logical design

Data Administration

- Perform business requirements gathering
- Requirements analysis
- Model business based on requirements
  - conceptual, logical
- Define and enforce standards and conventions
  - definitions, naming, abbreviations, policies, procedures,...
- Conduct data definition sessions with users
  - conflict resolution over shared data

Data Administration

- Manage and administer metadata repository and CASE tools
- Assist database administrator in creating physical tables from logical models
- Internal marketing
- Planning for effective use of data throughout the organisation
  - in advance of any application or DBMS development

Data Administration

- Requires strong technical and communications skill sets
  - data gathering, analysis, logical modelling, CASE tools, conflict resolution
- Requires a concrete grasp of the real nature of the industry that an organisation operates within
  - must understand the goals, objectives and tactics of the organisation and its core industry
- The data administrator (or data analyst) cannot be truly effective in an industry with which they are not familiar

Database Administration

- "...a technical function that is responsible for logical and physical database design and for dealing with technical issues, such as security enforcement, database performance, backup and recovery, and database availability."
- Hands on, physical involvement with the management of a database or databases
- Needs to understand models developed by the data administrator
Database Administration

- Transforms logical models into efficient and effective logical and physical database designs
- Implements standards and procedures determined by data administrator
- Interacts with and provides support for end users
- The database administrator's primary concerns are physical design and factors affecting database operations

Database Administration

- Select DBMS and related software tools
- Define required parameters for database definition
- Analyse usage, data volume and space requirements
- Install and upgrade the DBMS
- Perform database tuning and parameter enhancements
  - query processing, read/write operations, updates, parallel processing, record organisation, indexes, clusters, …
- Execute database backups and recoveries

Database Administration

- Monitor database space requirements
- Manage data security and privacy
  - authentication, authorisation, encryption, ...
- Verify integrity of data in databases
- Verify integrity of database transactions
  - concurrency, locking
- Coordinate the transformation of logical structures to properly performing physical structures

Database Administration

- The role of the DBA requires
  - broad technical background
    - including a sound understanding of current hardware and software architectures and capabilities, OS, networks, data processing, design and modelling skills
  - understanding of database development lifecycles
    - traditional, prototyping, incremental approaches
  - managerial and communication skills
    - manage IS personnel
    - interact with end users

Database Administration

- The Evolving Roles of DA and DBA

  The Procedural DBA
  - ensure all procedural logic is effectively planned, tested, implemented, shared and reused
  - typically filled by an application programmer

  The eDBA
  - full DBA skills plus capable of managing internet-enabled databases
  - deals with issues of
    - high data availability
    - integration with legacy systems
    - web activity tracking
    - internet performance engineering

The Evolving Roles of DA and DBA

- Blending data and database administration
  - emphasis on building effective databases quickly
  - fast track development

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The Evolving Roles of DA and DBA

- The PDA DBA
  - focus on managing databases for mobile applications
  - deals with issues of
    - data synchronisation and with back end databases while maintaining data integrity
    - personal database design
    - user support and rescue

- The Data Warehouse Administrator
  - performs many DA and DBA roles in data warehouse or data mart environment to support decision making applications and activities
  - deals with issues of
    - integration and coordination of metadata and data across many sources
    - stability and flexibility of data warehouse architecture
    - development of SLAs with suppliers and consumers of data

The Evolving Roles of DA and DBA

- It is expected that the roles of DA and DBA will continue to evolve towards increased specialisation
  - distributed database DBA
  - network capacity planning DBA
  - server programming DBA
  - off-the-shelf customising DBA

- New technologies will continue to affect the roles
  - open source software
  - self-tuning databases
  - intelligent systems

Summary

- Information Resource Management
- Data Administration and
- Database Administration