

## The Database System

By Victoria E Holt

Throughout the world now databases are becoming more and more prevalent, with our entire lives being documented and archived. There is such a reliance on this mode of storage, creation of mission critical systems and analysis of data contained there in, that an holistic view of the complex system behind them is needed.

The evolution of the database over the years has changed from storing very simple pieces of information to the ability to predict complex systems.

"The history of database system research is one of exceptional productivity and startling economic impact. Barely 20 years old as a basic science research field, database research had fuelled an information services industry estimated at \$10 billion per year in the US alone. Achievements in database research underpin fundamental advances in communications systems, transportation and logistics, financial management, knowledge-based systems, accessibility to scientific literature, and a host of other civilian and defence applications. They also serve as the foundation for considerable progress in the basic science fields ranging from computing to biology."<sup>2</sup>

Not only is it a place where data is stored and manipulated to produce results but it has now taken the metaphoric form of a persons life. It stores not only the information about a person's health, schooling, work status but also stores predictive information of what shopping trends or interests we have in a field.

Metaphorically I see

"the database as a toolbox full of all our most precious keepsakes. It is important to stop our toolbox from overflowing and losing our favourite keepsake yet it is important that the most precious keepsakes are stored together, so they don't get lost or stolen, otherwise we would be devastated or exposed."

The actual data or description of data, metadata, contained within these databases could be stored in any form of database from the mainframe ones to sql servers, oracle servers, mysql database servers to flat files or spreadsheets etc. This causes many great challenges for developers, solution architects and businesses. Today databases provide many functions some of the key functions are shown in figure 1.

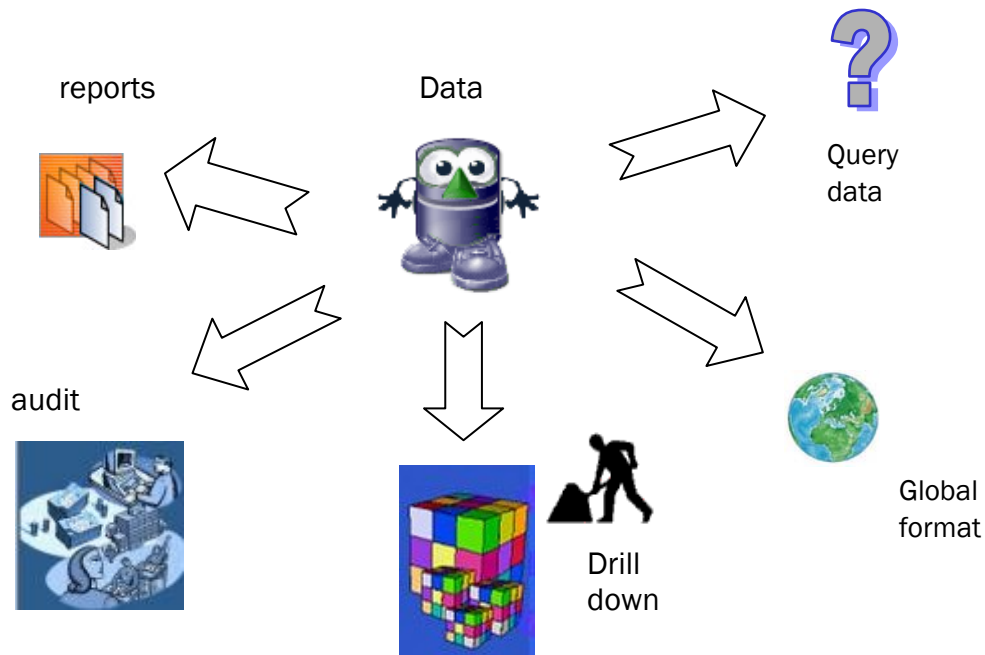


Figure 1 Database functions

The current vision of companies such as Microsoft is to integrate content from 2" displays on a phone to 10" displays on large screen plasma. To be able to share this virtual library worldwide containing subject databases or sites providing access to multiple databases, means there is a need for order. To obtain order further research into such things as defining best practice, standards, ethics for database administrators and metadata is required. There is significant research currently into the study of metadata and its key requirements which is a significant stage in the database system but it is only a stage.

I am interested in examining the database as a global system which comes under the umbrella of information systems. Information systems use many resources to change raw facts or observations, data, into information which is meaningful for end users. A way of storing and sharing information between one another is the database which has its own lifecycle, figure 2.

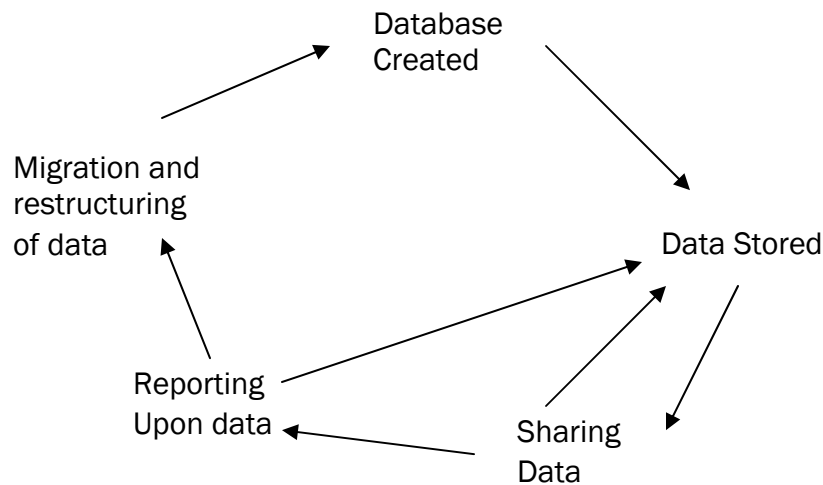


Figure 2 the database lifecycle

This lifecycle is recursive and iterations result in development of the structure, it's content and global features.

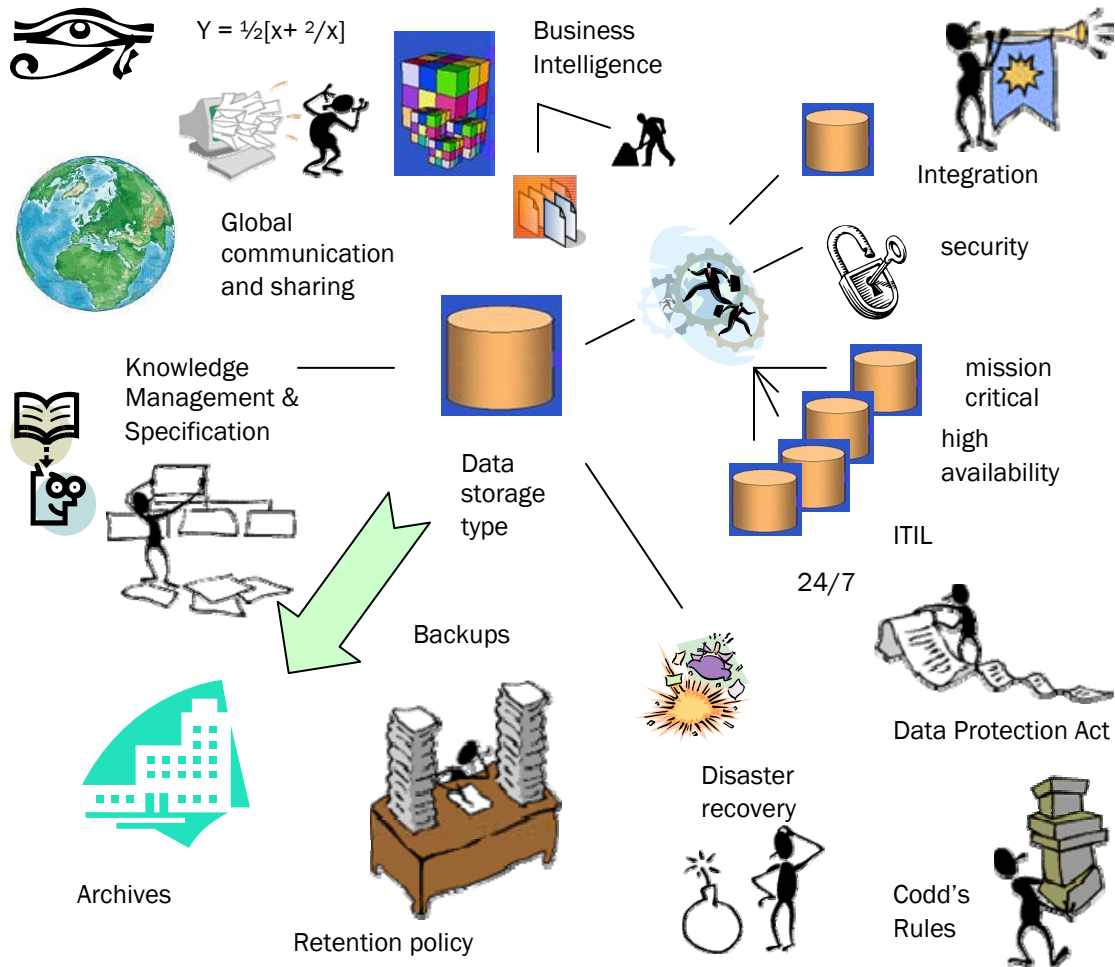
Databases are bought and sold, secured because they contain personal or sensitive details, store vital research on climate affecting change, medical research and are the basic building block of the technological age. It is quite irrelevant which database product or storage engine is used as they all have their advantages and disadvantages for providing different functionality, storage methods, speed of access, global availability etc. However, choosing the correct database is still an important decision as it is the key for achieving the defined goal. Databases also allow for the management of information to be distributed in different ways to the public. This could be by serving data via a local network or remotely over the internet thus sharing its content worldwide.

So can it be argued that a database is a system? Well what actually defines a database

" A shared collection of logically related data, and a description of this data designed to meet the information needs of an organization." <sup>1</sup>

At a slightly higher level the database consists of one or many physical files located on Servers which could be running various operating systems. Holistically the database is still more than this. For example a key feature in managing operational databases is change management<sup>5</sup>, included in the IT Infrastructure Library (ITIL) framework, which helps avoid costly and chaotic processes. The database paradigm should be innovative, support conscious and environmental to cope with the fact that systems are becoming more and more complex to meet everyday demands. The rich picture, figure 3 encompasses the components required for the database system.

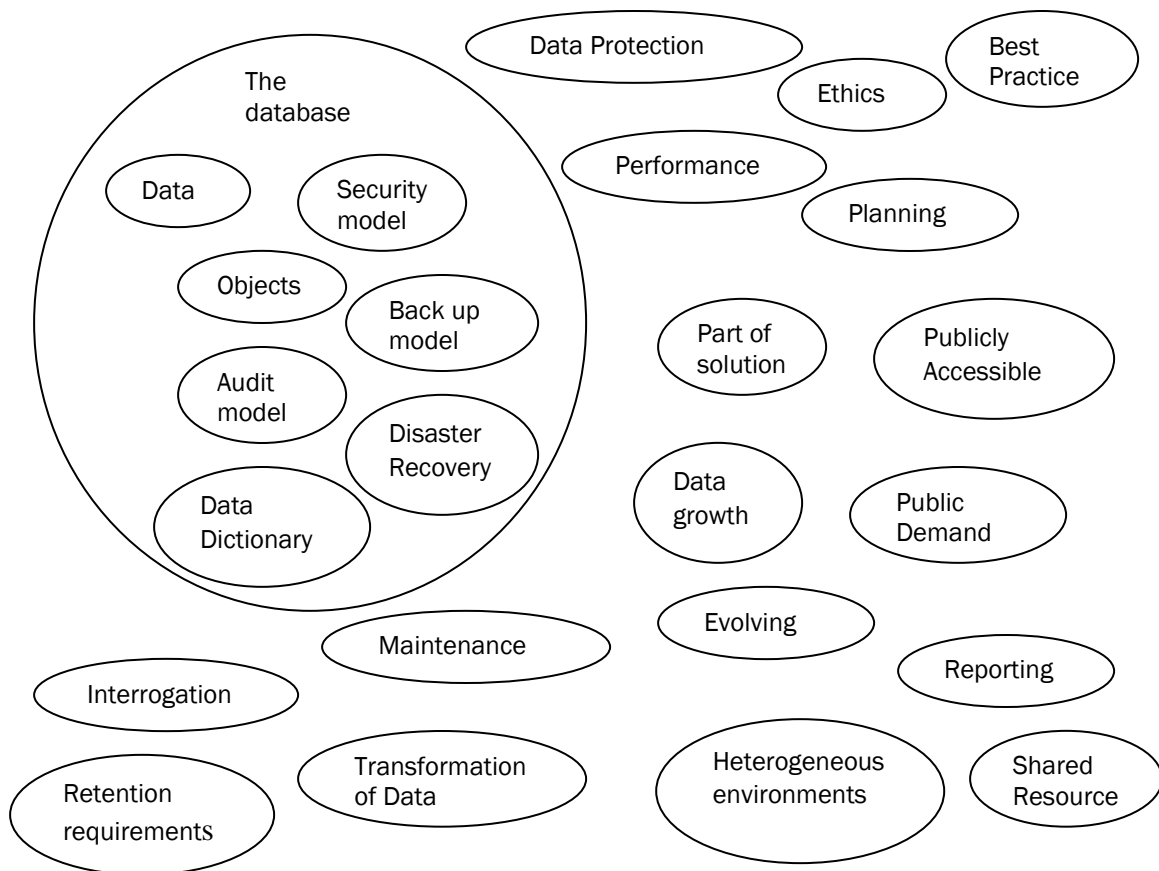
Figure 3 A rich picture of a database



As can be seen the database arena is enormous and it is not just about the data storage engine, although this is central to ensuring certain types of processes or analysis can be carried out. The need for a code of Ethics amongst Database Administrators is apparent to protect integrity, security, data availability, best practice and future development.

The database is also becoming governed more and more by regulations such as the data protection act and things such as the retention period for backups, version control and audit trails are very important. There are many things which need to be brought together as a whole if managing, maintaining and developing databases is to progress. The database system is shown in figure 4.

Figure 4 A Systems Map showing the database system



We design the database to fit into our everyday lives and mould it into the useful tool that it is. There are obvious benefits and risks of creating such a global tool which could lead to security breaches and trading or personal information but this sustainable system is an evolving one and should be looked into holistically to stop the chaotic development which is currently happening.

Many companies are all developing the system as they see fit with no epistemology, environmental concerns or governing body. I would like to see and be a part of creating a global methodology to help forge the future.

### Mapping a methodology for database creation, management and the future

Systems theory allows for the development of a methodology to produce effective change within a none managed society. With databases becoming more complex and the demand for functionality increasing it is important a methodology be devised to assist with the chaotic ever changing world. A

possible starting point to assist in the development and use of global databases is

### **SAFMGT**

- Step 1 Scope and Understanding
- Step 2 Audience. What is the business need and target audience
- Step 3 Fundamental design checking including knowledge management, business intelligence review, ethics, best practice
- Step 4 Meta data solution and regulations
- Step 5 Global linkage - holistic view
- Step 6 Technological mapping – A tool / database with backup, mission critical and disaster recovery potential. Spatial geographic solution and ITIL service management.

I would conclude that the database system is a chaotic one at the moment with no real future vision as systems theory needs to be applied in greater depth to this problem.

### **References**

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