Operational Database Management

DR and Back-ups

- Back-ups and scheduling (daily's, weekly's, monthly's, media types, full versus partial, etc) and Disaster Recovery (part of wider organisational plan)
- > Disaster loss of service, disruption to data, etc
- Causes power failure, natural disaster, cyber-attack, hardware/software failure, human error, etc
- Factors to consider are cost and time versus actual service requirements and then implement appropriate plan to suit i.e. what is the required uptime as per SLA 95% or 99.9999%
- It is not possible to avoid, hence you need a documented plan up front which may include solutions like:
 - Failover clustering
 - Database mirroring
 - Replication
 - Log shipping
 - Backup and restore

Database design changes and development (additional queries, version developments/releases with abstraction)

- It is likely that as part of the contractual arrangements for the system that you have provided that additional development work will be specified as part of the existing contract or will be requested by the client as an addition at cost.
- The development lifecycle for the additional work follows the same design process as the original design i.e. requirements capture, conceptual design, logical design, physical design, etc.
- These stages themselves are incorporated into an overall development approach for management e.g. waterfall, RAD, Agile
- In itself at the development company and within the clients organisation that development work sits within an overall project management methodology e.g. Prince2
- Evaluation, testing and updated documentation are critical with any development work as is sign off for completed works contractually by the client

Version migration

- With any development work or updates a migration plan and physical migration approach is required
- During a system update all existing data at the organisation must be transferred to the new system with no loss or service damage. This is a design issue in terms of abstraction of the physical database
- A plan to minimise service disruption for the customer is also required and tied into their SLA e.g. 95% service uptime

Database and data maintenance (e.g. indexing, query optimisation, history tables, redundant data)

Need to ensure database is clean and easy to use and to ensure that systems performance is maintained

- Data and Log File Management
- Index Fragmentation
- Statistics
- Corruption Detection
- Backups
- Wrap-Up

See <u>https://technet.microsoft.com/en-us/library/2008.08.database.aspx</u> for more information

User support (helpdesk, knowledge base, training, etc)

- Provision of support by supplier and access to support by client
- FAQs
- Knowledge base
- > SLA and contractual consideration, how much support and by which methods
- Training sessions
- Phone, web and email support
- > Internal clients support mechanism, expert, helpdesk, etc

User maintenance (user accounts)

- Largely a client issue
- > DBA for internal account management e.g. new staff, staff exiting the organisation
- > Permissions
- Client Application interface access (windows control and/or web application)

Hardware upgrades, Software upgrades (DBMS software version and updates)

- As part of an organisational technology strategy hardware will routinely need to be upgrade in line with technological developments. The effect on the DBMS software and applications must be considered with close liaison with the system supplier (support agreement)
- The DBMS software e.g. SQL Server will also require routine updates e.g. benefit from new features, security requirements, bug fixes, performance improvements, etc and the implications for the system must be considered
- Also see future proofing for its implications for hardware and software changes in the client organisation

Contractual obligations, licensing, legislation

- > Any procured system will have contractual and licensing implications.
- Licence models are varied and complex depending on number of users, type e.g. perpetuity, licenses with support and version upgrades, etc
- Entering, exit, and change of contract mid term may have serious financial or service availability implications and should be carefully managed supported by expert advice

- Legislation such as the GDPR, Computer Misuse Act, Freedom of Information act apply strongly to DBMS systems
- Licensing also applies to the underlying DBMS application at client and server level i.e. SQL Server vXXX

Future Proofing (e.g. cloud, mobile, etc)

- Both the client organisation and the development company should be considering future proofing of the developed system as part of a 3 to 5 year strategy.
- > For the client this will likely be an aspect of a wider organisational technology strategy.
- Future proofing is needed and driven largely by business drives such as efficiency, wider market capture, customer expectations.
- Cloud services and mobile device access are examples of recent direction that clients and development companies have had to consider.

Further Reading

Disaster Recovery and Backups https://www.sqlshack.com/sql-server-disaster-recovery/

Licensing <u>https://netlicensing.io/blog/2013/06/13/software-licensing-models-types-sizes-and-uses/</u>

Legislation https://www.eugdpr.org/

https://www.legislation.gov.uk/ukpga/1990/18/contents

https://www.legislation.gov.uk/ukpga/2000/36/contents

DBMS Maintenance

https://technet.microsoft.com/en-us/library/2008.08.database.aspx