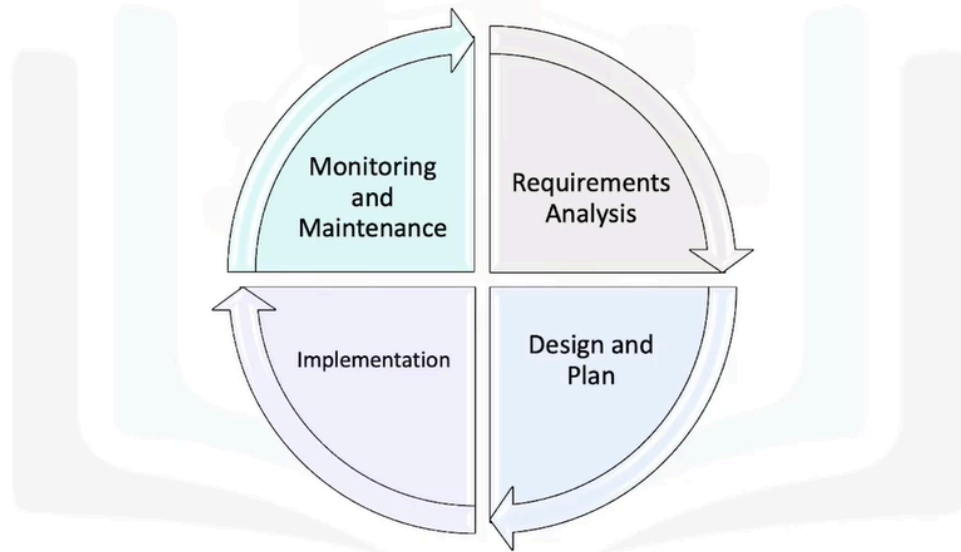# Database Management Lifecycle

The database life cycle

- The database lifecycle splits into four stages: The initial requirements analysis, designing and planning the database deployment, performing the actual implementation, and monitoring and maintaining day-to-day operations.
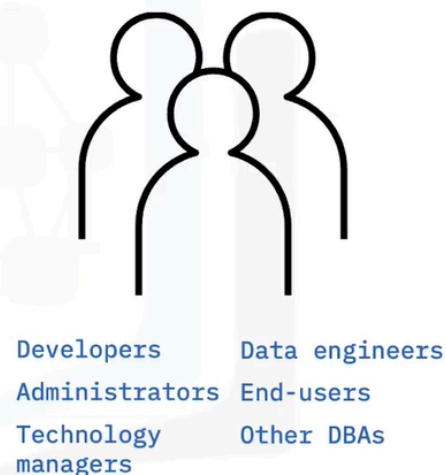
Requirements analysis

Understand purpose and scope of the database

Data

Users

Producers

sample

Samples
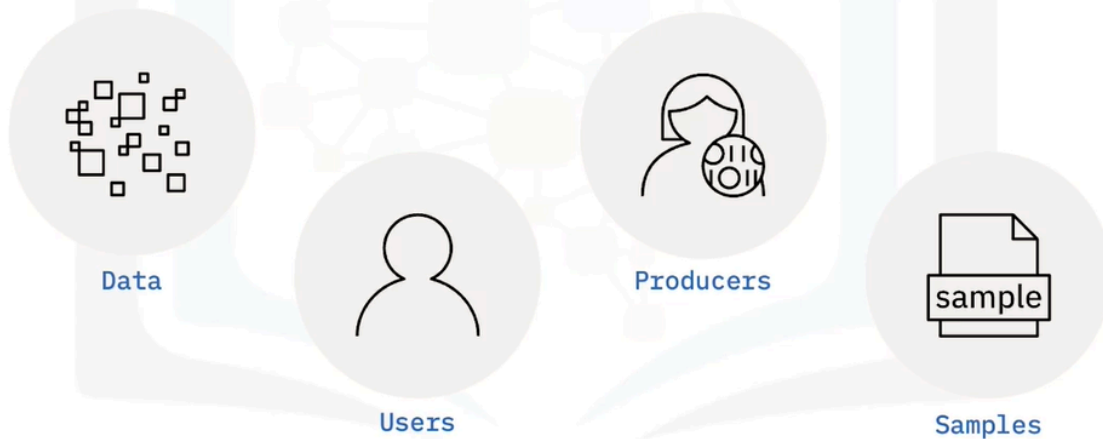
Requirements analysis

- Work with stakeholders
  - Analyze need for database
  - Clarify goals for database

| Developers | Data engineers |
| Administrators | End-users |
| Technology managers | Other DBAs |

- In the requirements analysis stage, DBAs like Rygel work with data engineers to understand the purpose and scope of the database. Rygel and the rest of the design team must establish what data is involved, talk to the users and producers of that data, and develop samples of how users will use the data, such as reports or dashboards.

- Rygel and the design team work with the stakeholders to determine their requirements. Stakeholders may include developers, data engineers,

administrators or end-users of the applications supported by the database, technology managers, and other DBAs. A few of the tasks they might perform include: Analyzing the need for the database; Clarifying the goals the database fulfills; and Identifying the users of the database.

Design and plan

Work with database objects

| Instances | Databases | Tables | Indexes |

Design and plan

Database Modelling   Capacity Planning
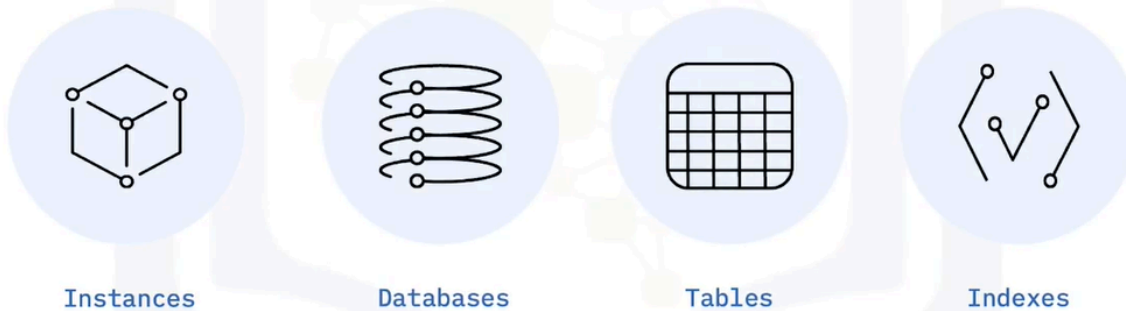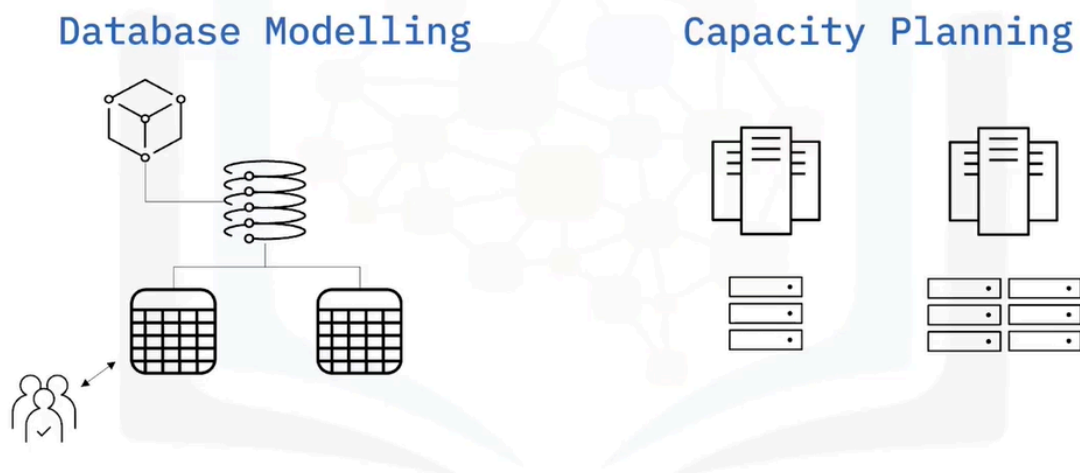
- In the design and plan stage, Rygel's job is to develop a plan for implementing the database. To do so, he works with database objects such as instances,

databases, tables, and indexes. A database model represents the design of a database: which instance contains which databases and tables, how the tables relate to each other, how users access the data, and so on. Database Architects and DBAs model the databases and their objects with the help of Entity Relationship Diagrams or ERDs.

- In self-managed environments such as on-premise databases, DBAs also need to consider size, capacity, and growth. They determine appropriate server resources like storage space, memory, processing power, and log file size. They also need to plan for how database objects are physically stored. For example, DBAs can choose to store frequently used data on a high-speed disk array or to store indexes separately from the data for better performance.

Implementation

- Create and configure database objects
- Grant access for database users, groups
- Automate repeating tasks
- Deploy data movement

- In the implementation stage, DBAs roll out the carefully planned design. Rygel creates database objects like instances, databases, tables, views, and indexes. Another task Rygel performs is configuring database security, granting access for database users, groups, and roles, so database objects are accessible only by the specific users and applications authorized to access them. He also automates repeating database tasks such as backups, restores, and deployments to improve efficiency. In populating the database, he might import data from other databases, export data based on a query from a different source, or migrate projects from one environment to another, such

as moving a project from the Application Development environment to the Production environment.
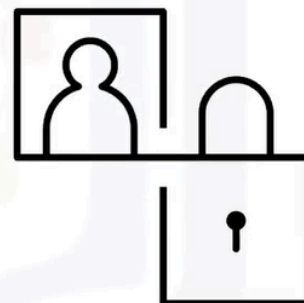
Monitor and maintain

- Monitor system for performance issues
- Review reports
- Apply upgrades and patches to RDBMSes
- Automate deployments and routine tasks
- Troubleshoot issues

Monitor and maintain

- Security and Compliance
  - Ensure data is secure and only authorized users can access it
  - Review logs, monitor failed logins and data access activity
  - Maintain database permissions – grant/revoke access

- In the monitor and maintain stage, Rygel looks after the daily operations of the database. He will monitor the system for long-running queries and help end-users optimize them to run faster and not overuse system resources. A key

part of Rygel's job is to review reports. Most Relational Database Management Systems have built-in reports to monitor activity, identify expensive queries, resource waits, and other relevant items.

- Often companies build custom reports on top of these, and DBAs help with that. To keep the databases working at top efficiency, Rygel may also apply upgrades and security patches to database software. He needs to stay up to date on issues and advancements in the field so he can recommend and implement emerging database technologies. Rygel might also automate deployments and routine tasks such as backups whenever possible to keep processes working efficiently. In every database, operational issues will sometimes arise. Rygel troubleshoots these issues, escalating problems where necessary.

- DBAs are responsible for keeping data safe. Part of Rygel's job is to regularly perform user audits and ensure that only authorized users are allowed to get into the system and that users can only see things they are supposed to see. Rygel reviews logs and alerts, looking for failed logins and data access attempts to identify potential threats and vulnerabilities. He also maintains database user and application permissions – revoking access to users and groups who should no longer have access and adding new users and roles as required to perform their jobs.

Summary

In this video, you learned that:
- The database life cycle stages are requirements analysis, design and plan, implementation, and monitor and maintain
- In the requirements analysis stage, DBAs determine the purpose and scope of the database
- In the design and plan stage, DBAs work on logical and physical design
- In the implementation stage, DBAs deploy the database
- In the monitor and maintain stage, DBAs manage the daily operations of the database