Relational DataBases Tools

DataBase Foundations

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Outline

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What is a DBMS?

- A **Database Management System** (DBMS) is a software system that uses a standard method to store and organize data.
- The **data** can be stored in tables, which are related to each other.
- A **DBMS** is a software system that allows users to define, create, maintain, and control access to the database.
- A **DBMS** is a software package designed to manipulate, retrieve, and manage data in a database.

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Pros & Cons of DBMS

- **Pros**:
  - **Data Independence**: Data is stored independently of the applications that use it.
  - **Data Integrity**: Data is consistent and accurate.
  - **Data Security**: Data is protected from unauthorized access.
  - **Data Recovery**: Data can be recovered in case of failure.
- **Cons**:
  - **Complexity**: DBMS are complex systems.
  - **Cost**: DBMS are expensive for small applications.
  - **Performance**: DBMS can be slow.

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GUI Assistants

- A **Graphical User Interface** (*GUI*) is a type of user interface that allows users to interact with electronic devices using graphical icons and visual indicators.
- **GUIs** are easier to use than Command Line Interfaces (*CLI*) because they allow users to interact with the system using visual elements such as windows, buttons, and menus.
- **GUIs** are more intuitive and user-friendly than CLIs, which makes them ideal for users who are not familiar with the system.

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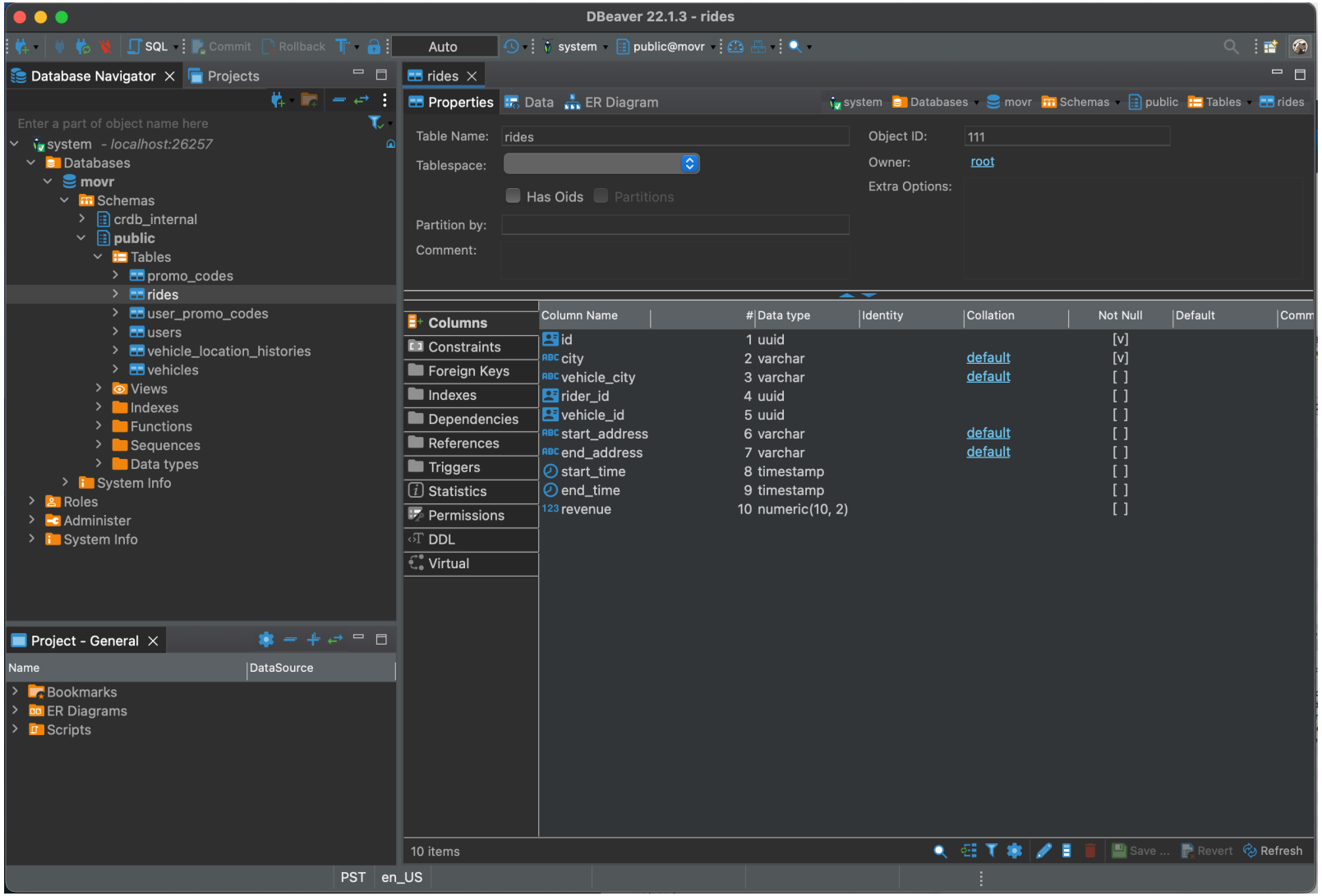
Case of Study: DBeaver



Command Line

- A **Command Line Interface** (*CLI*) is a type of user interface that allows users to interact with electronic devices using text-based commands.
- CLIs are more powerful and flexible than GUIs because they allow users to perform complex tasks using simple commands.
- **CLIs** are more efficient than GUIs because they do not require users to navigate through menus and windows to perform tasks.

Case of Study: MariaDB CLI

```
arnel@arnel.com [~]# mysql -u arnel_test2 -p
Enter password:
Welcome to the MariaDB monitor.  Commands end with ; or \g.
Your MariaDB connection id is 8643
Server version: 10.1.25-MariaDB MariaDB Server

Copyright (c) 2000, 2017, Oracle, MariaDB Corporation Ab and others.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

MariaDB [(none)]> show databases;
+--------------------+
| Database           |
+--------------------+
| arnel_test1        |
| arnel_test2        |
| information_schema |
+--------------------+
3 rows in set (0.00 sec)

MariaDB [(none)]> use arnel_test1
Reading table information for completion of table and column names
You can turn off this feature to get a quicker startup with -A

Database changed
MariaDB [arnel_test1]>
```

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Why use an agnostic tool?

- An **agnostic tool** is a tool that is not tied to a specific technology or platform.
- **Agnostic tools** are useful because they allow users to work with multiple databases without having to learn different tools.
- **Agnostic tools** are also useful because they allow users to work with multiple databases without having to switch between different tools.

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What is the cloud Computing?

- **Cloud computing** is the delivery of computing services over the internet.
- **Cloud computing** allows users to access computing resources such as servers, storage, and databases **on demand**.

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What is On-Premises Computing?

- **On-premises computing** is the traditional way of accessing computing resources.
- **On-premises computing** requires users to purchase and maintain their own computing resources such as servers, storage, and databases.

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Pros & Cons of Cloud Computing

- **Pros**:
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  - **Scalable**: Cloud computing is a scalable way to access computing resources.
  - **Flexible**: Cloud computing is a flexible way to access computing resources.
- **Cons**:
  - **Security**: Cloud computing can be less secure than on-premises computing.
  - **Performance**: Cloud computing can be slower than on-premises computing.
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SaaS Vs. IaaS Vs. PaaS

- **Software as a Service** (*SaaS*) is a software distribution model in which a third-party provider hosts applications and makes them available to customers over the internet.
- **Infrastructure as a Service** (*IaaS*) is a cloud computing model that provides virtualized computing resources over the internet.
- **Platform as a Service** (*PaaS*) is a cloud computing model that provides a platform for developers to build, deploy, and manage applications over the internet.

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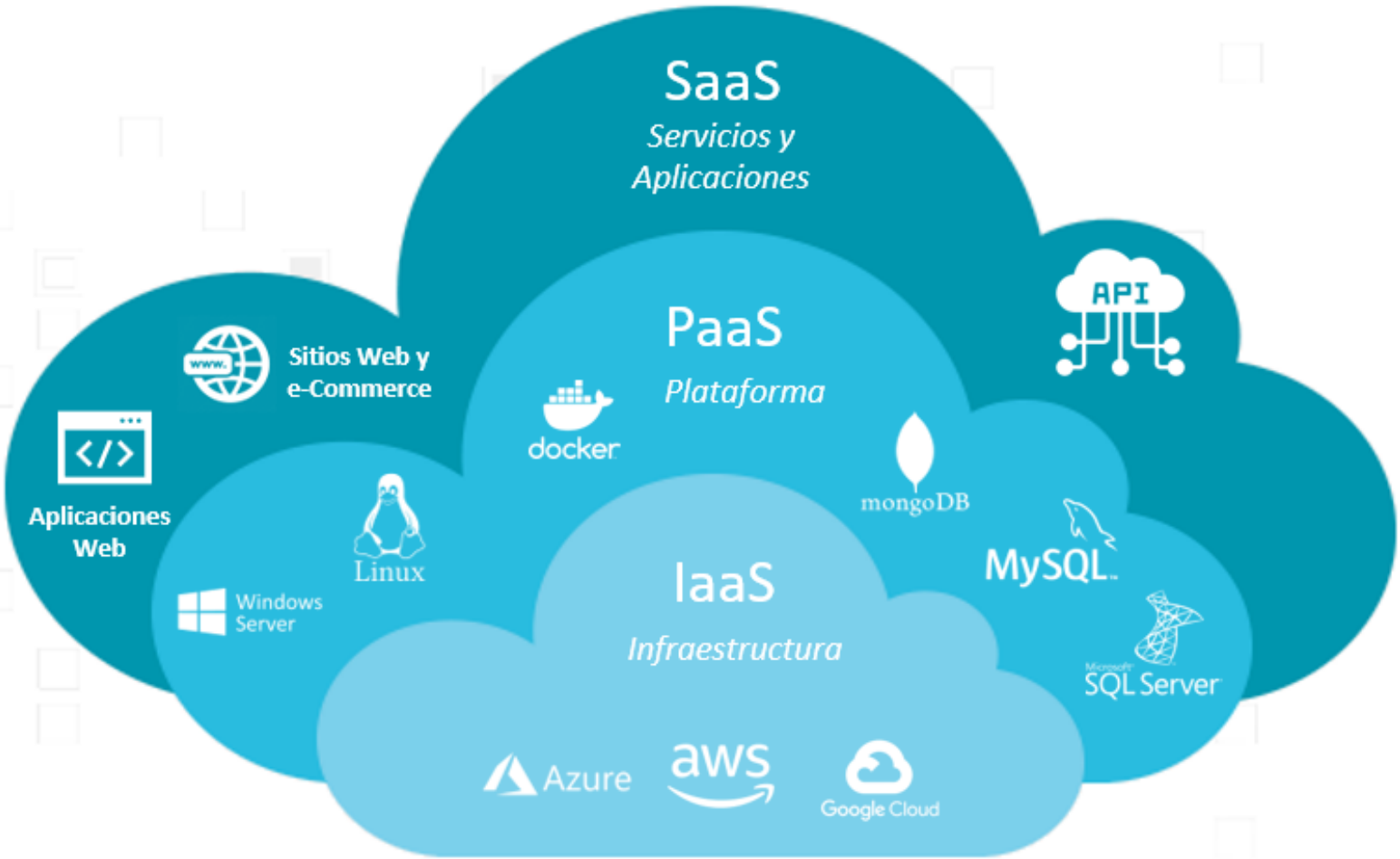
Cloud Levels



DataBases as a Service

Database as a Service (DBaaS) is a cloud computing model that provides database services over the internet.

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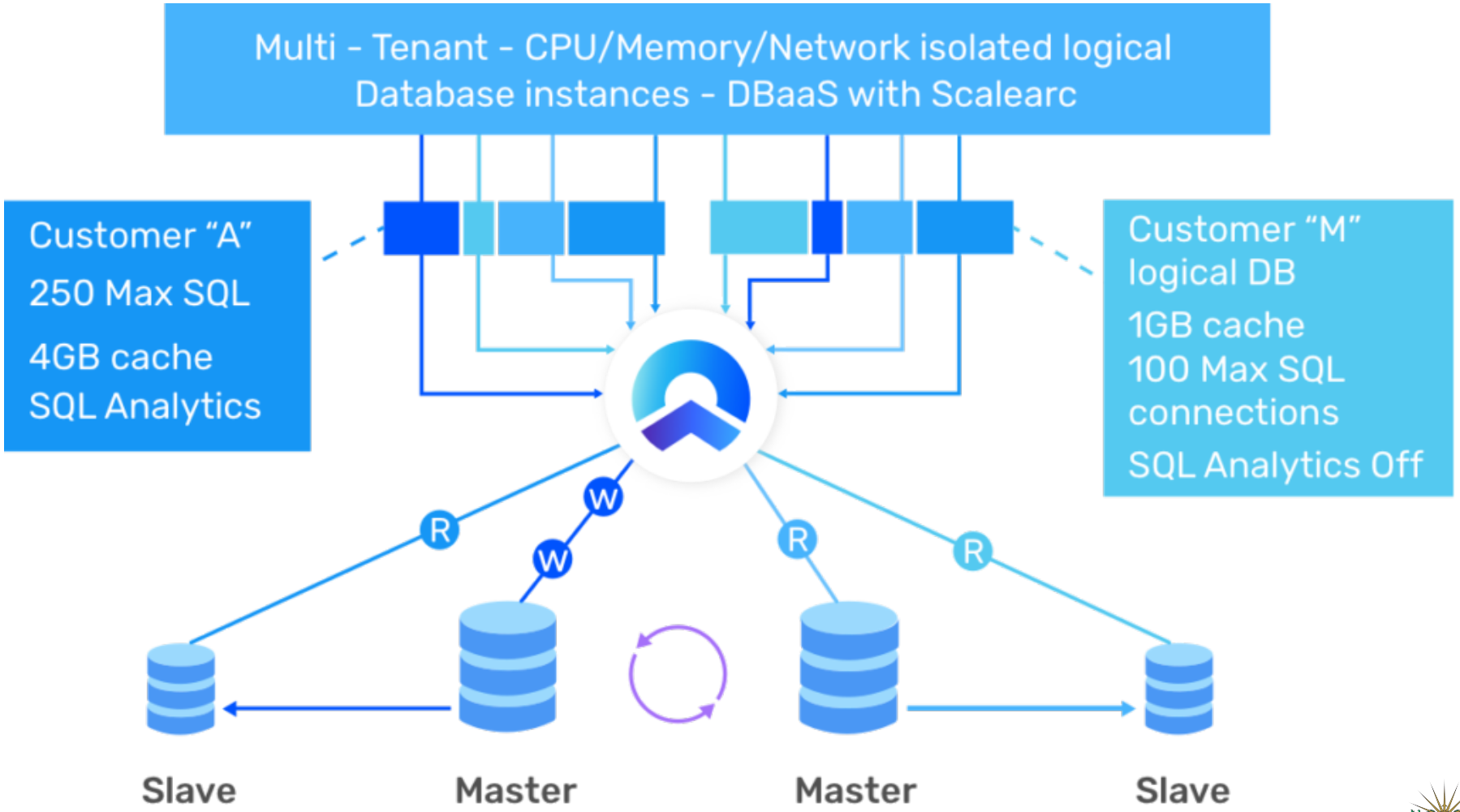
Case of Study: DBaaS Custom for Clients



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Localhost

- **Localhost** is a hostname that refers to the local computer that a program is running on.
- **Localhost** is used to access the services that are running on the local computer.
- **Localhost** is used to access the database services that are running on the local computer.
- **Localhost** is used to access the web services that are running on the local computer.

Monolithic Architecture

- **Monolithic Architecture** is a software architecture in which all the components of the software are combined into a single program.
- **Monolithic Architecture** is a traditional software architecture that was used to build large and complex software systems.
- **Monolithic Architecture** is a simple and easy-to-understand software architecture that is used to build software systems that do not require high scalability and flexibility.

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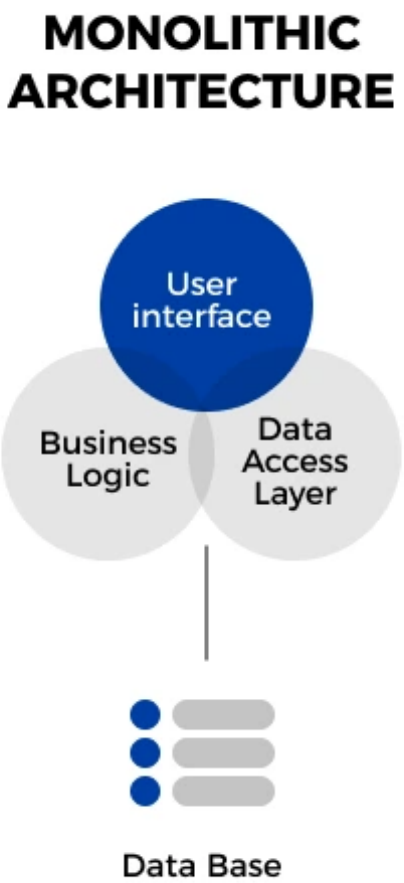
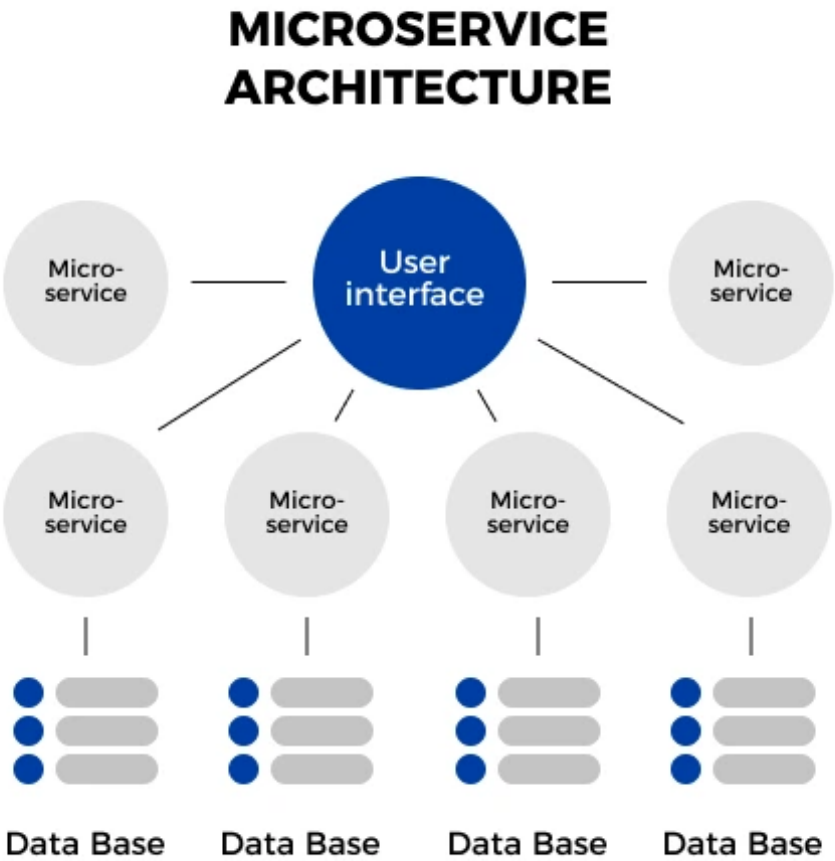
Monolithic Architecture Schema





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Continuous Integration

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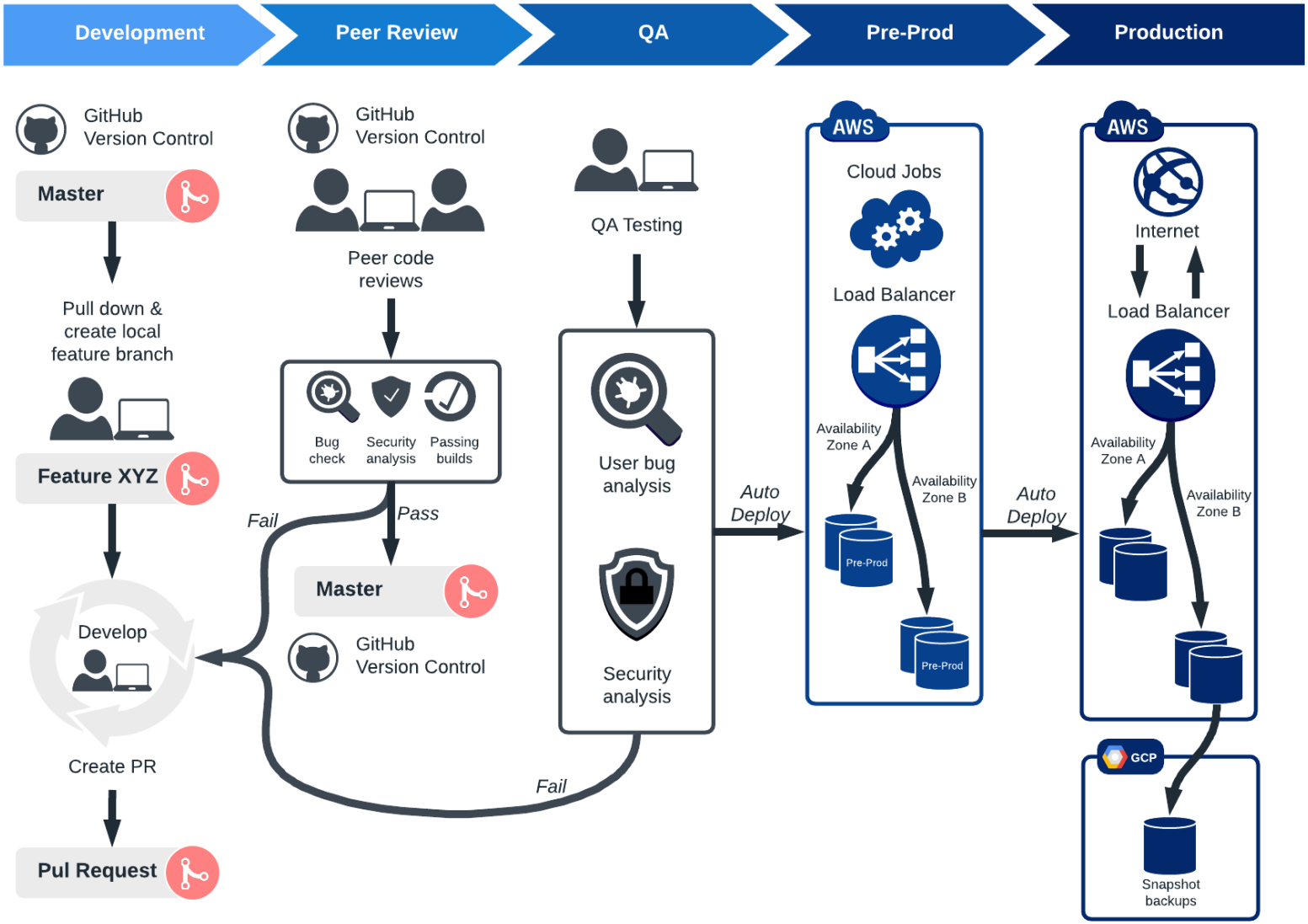
Development Workflow using CI/CD



Containers and Docker

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- **Containers** are a way to isolate applications from the underlying system.
- **Docker** is a platform that allows developers to build, ship, and run containers.

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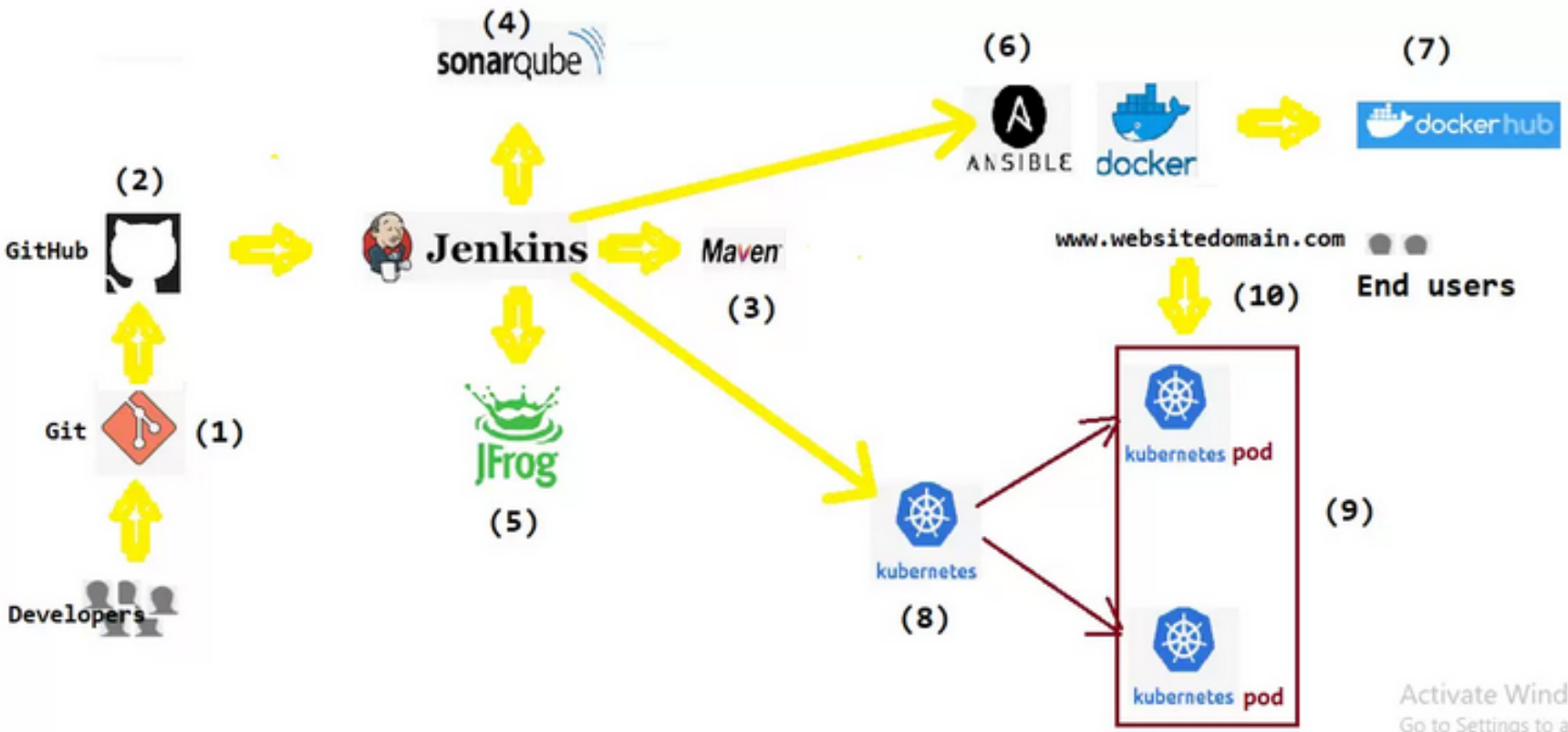
From Code to Docker



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Thanks!

Questions?

Repo: *https://github.com/EngAndres/ud-public/tree/main/courses/databases-foundations*

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