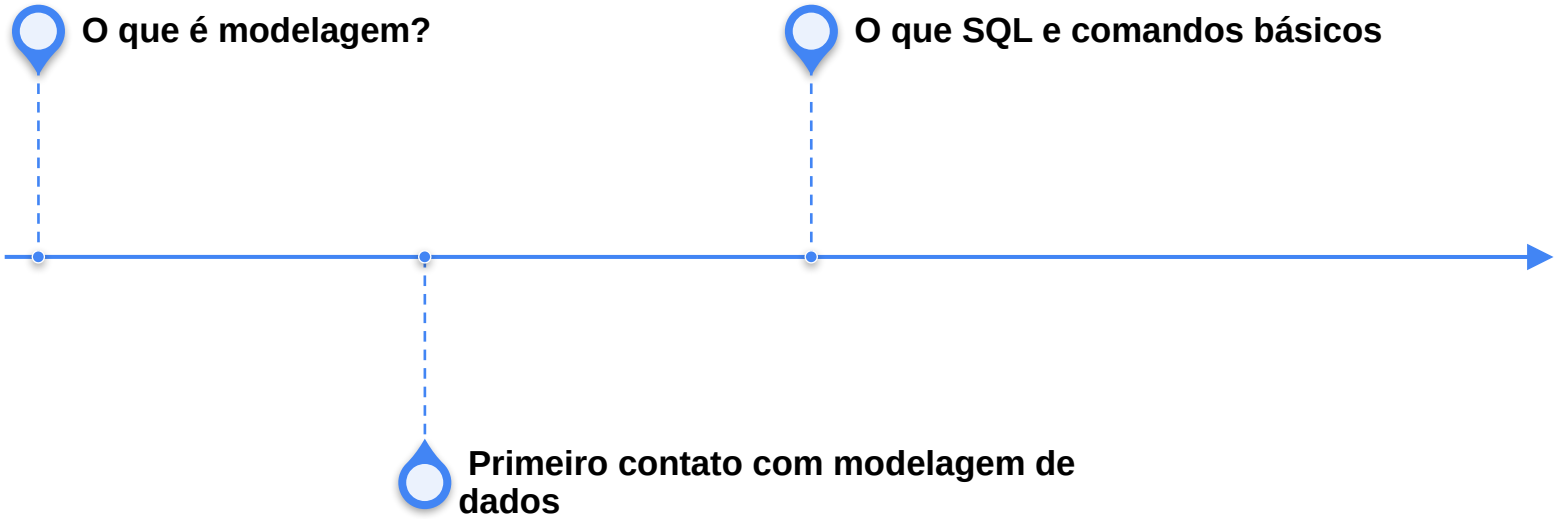
Etapa 7

Introdução à Modelagem de Banco de Dados e SQL

// Introdução à Banco e dados

Conversa

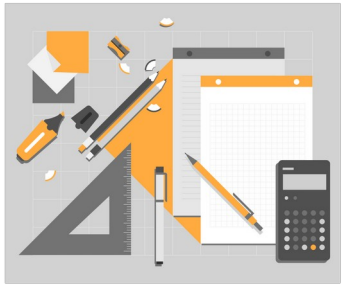

O que é modelagem?
O que SQL e comandos básicos
Primeiro contato com modelagem de dados

Por que modelar?

Construção
Plantas baixa

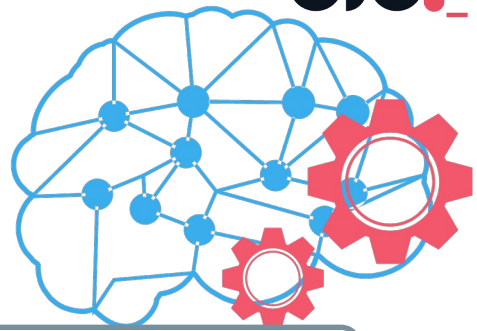
Desenvolvimento
Protótiopos

Eletrônicos
Esquema de circuitos



Compreensão do sistema

Modelagem



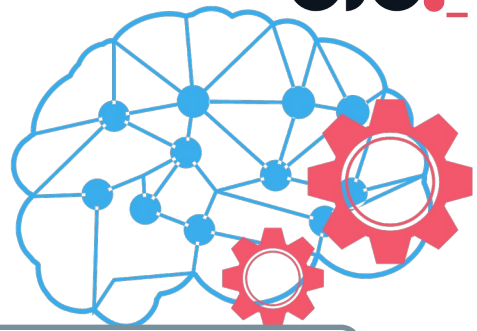
Modelagem

Representação

Modelo

Referência

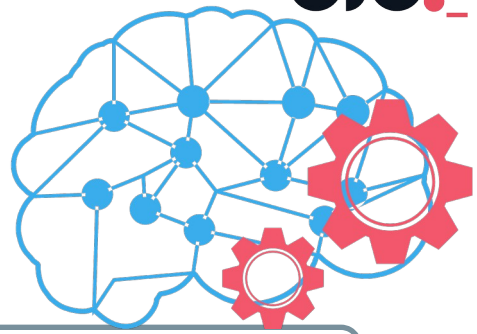
Modelagem



Modelagem

- Software
- Dados
- Computacional
- Conceitual
- Processo de negócios
- Matemática

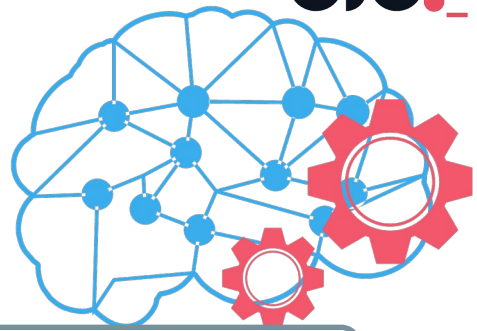
Modelagem



Modelagem

Possui foco na descrição e relacionamento dos elementos que compõem a representação do contexto (mini-mundo)

Modelagem

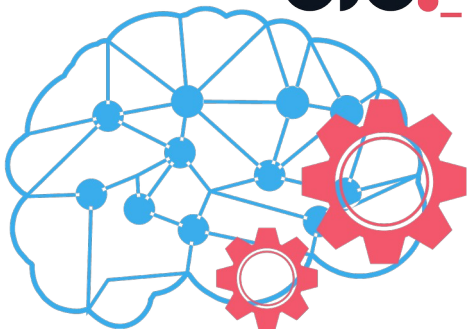


Modelagem

Possui foco na descrição e relacionamento dos elementos que compõem a representação do contexto (mini-mundo)

Conceitual ⟷ Físico

Modelagem



- Delimitando o contexto dos dados

Mini-mundo

Alto nível

- Requisitos para criação do modelo

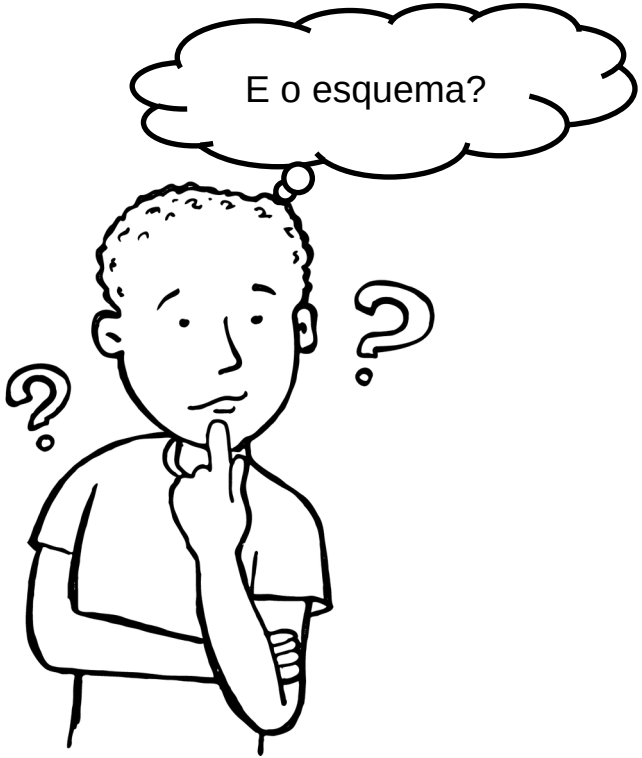
- Definindo estrutura relacional

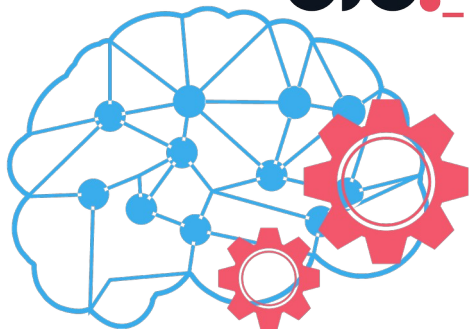
Esquema

SGBD

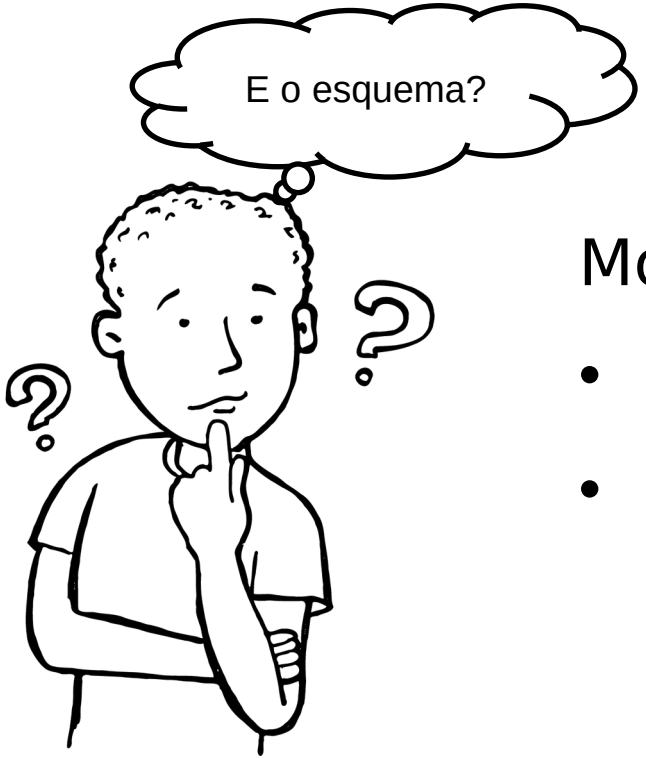
- Implementando - criando o DB.

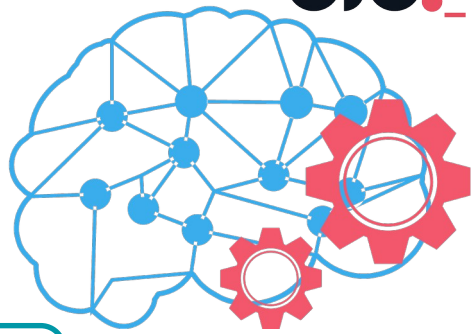
Modelagem





Modelagem



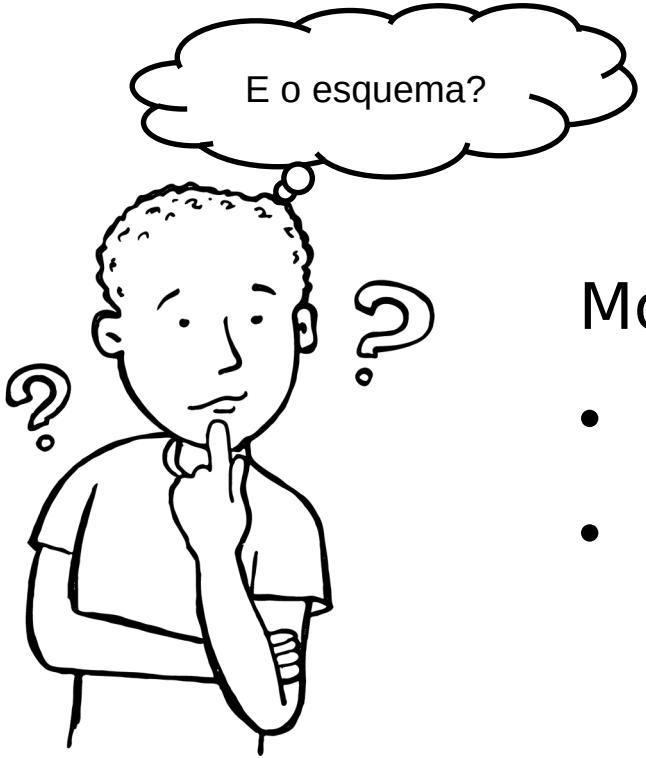


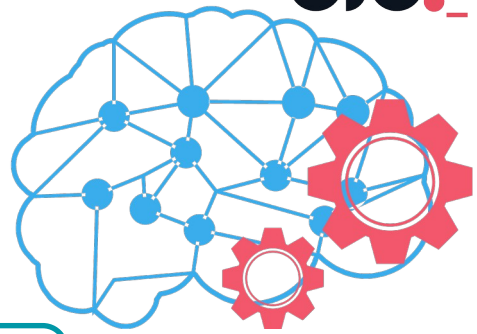
Facilita a compreensão do contexto dos dados

Modelos de alto nível:

- Entidade-Relacionamento
- UML (Unified Modeling Language)

Modelagem





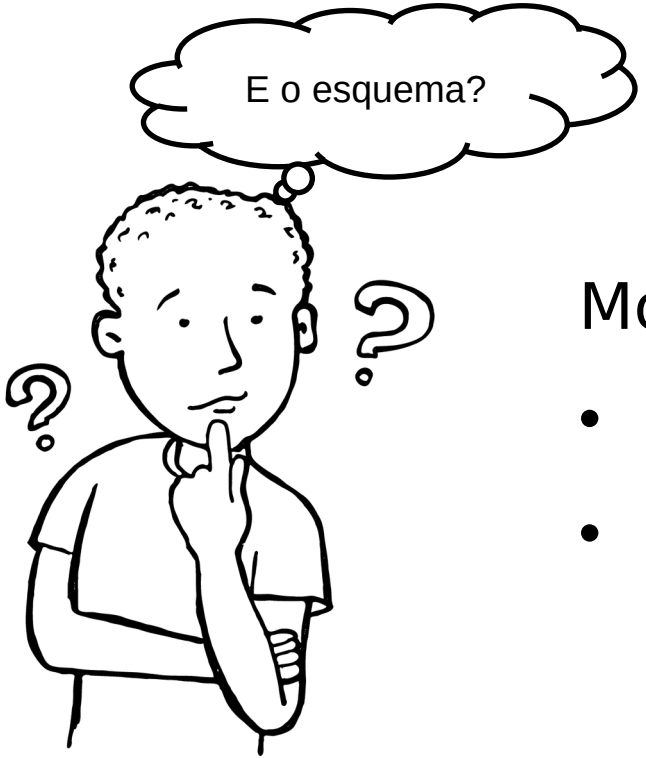
Facilita a compreensão do contexto dos dados

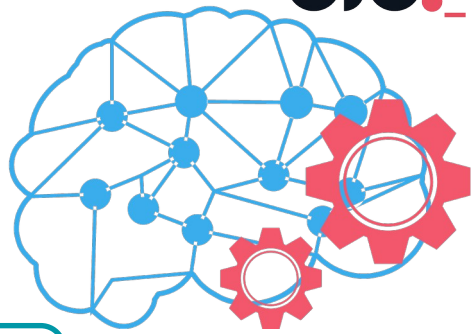
Modelos de alto nível:

- Entidade-Relacionamento
- UML

Modelos

Modelagem





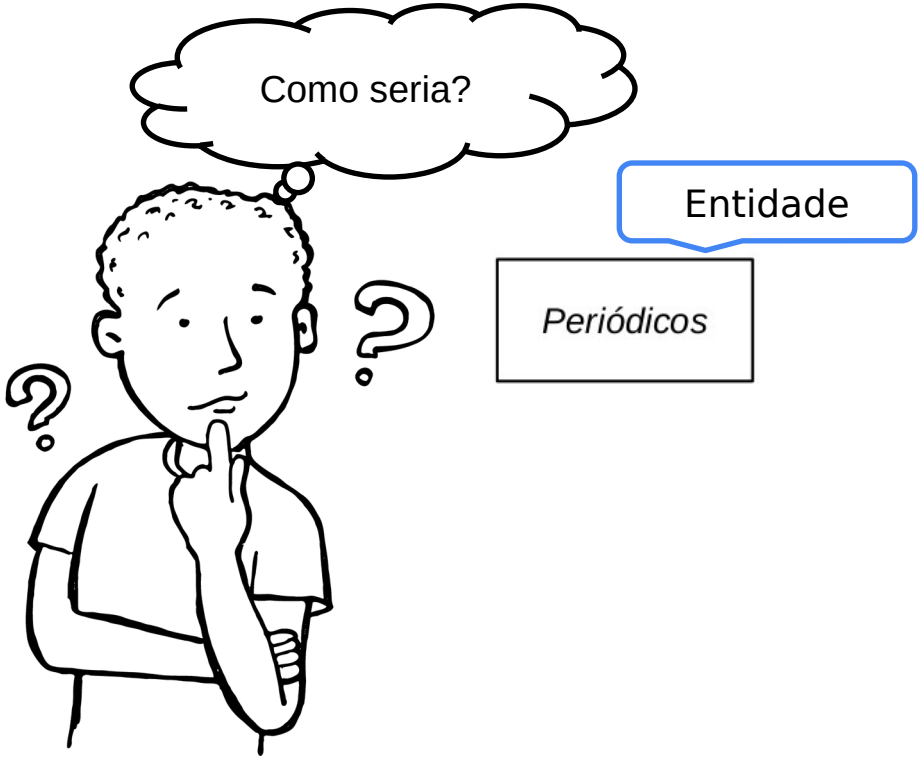
Facilita a compreensão do contexto dos dados

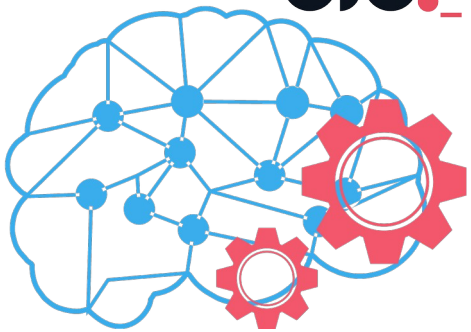
Modelos de alto nível:

- **Entidade-Relacionamento**
- UML

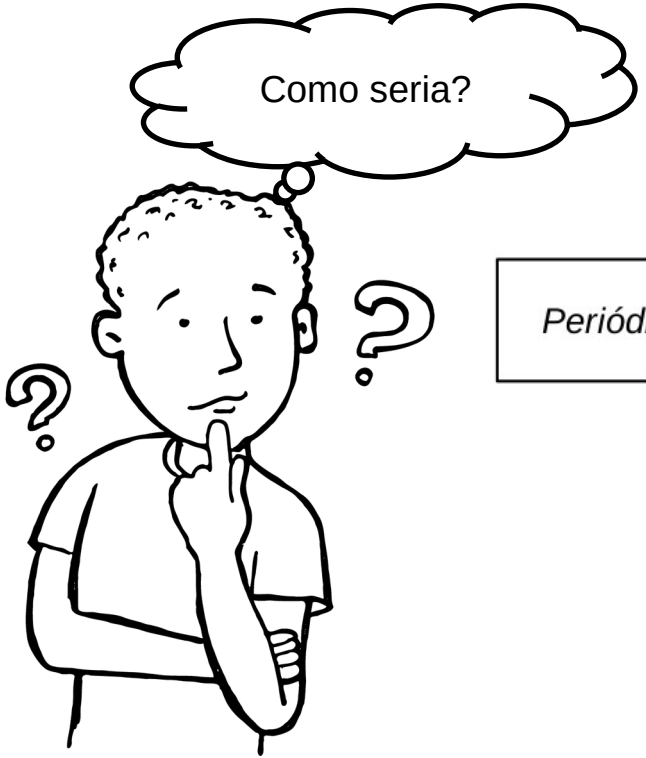
Modelos

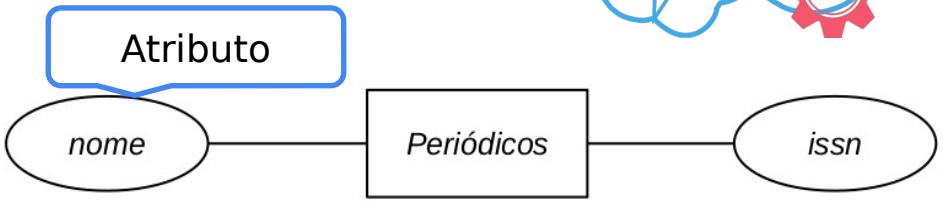
Modelagem

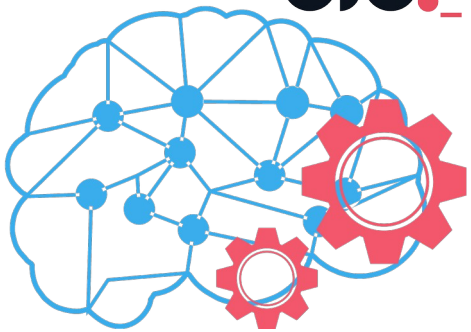




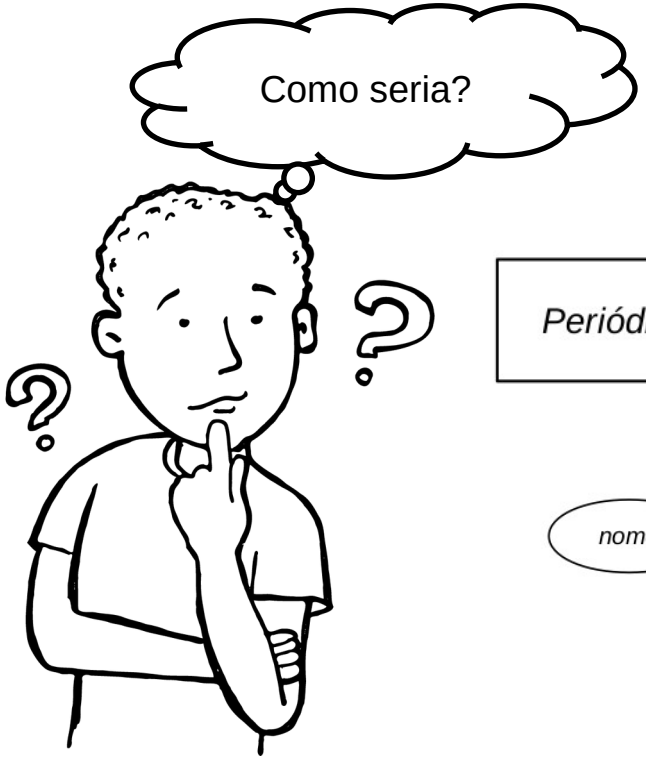
Modelagem

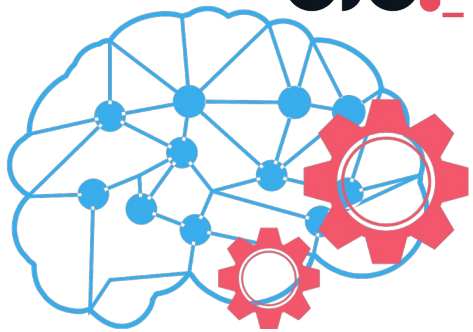


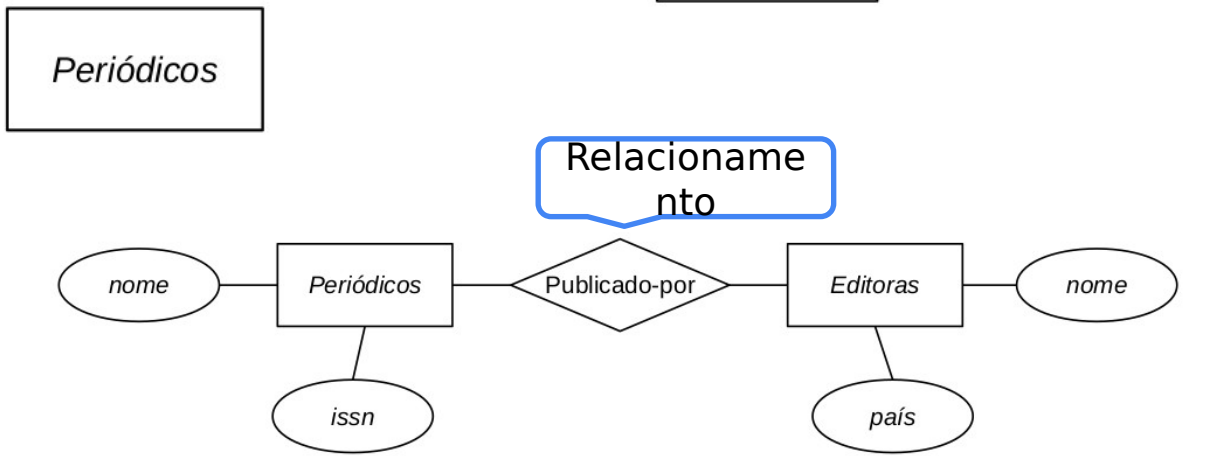




Modelagem


Como seria?

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Editoras
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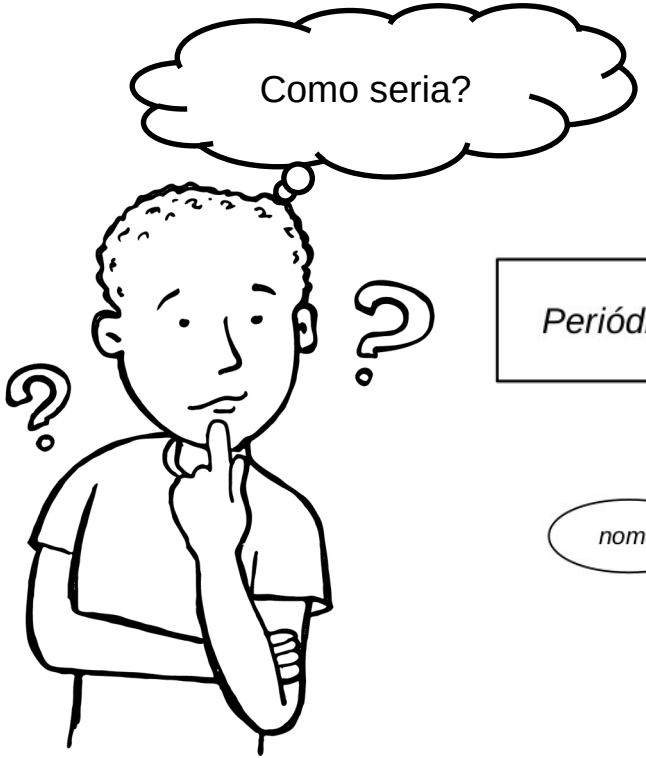
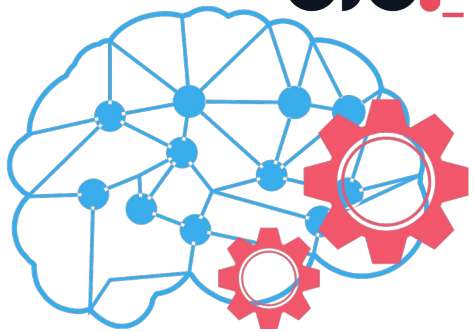
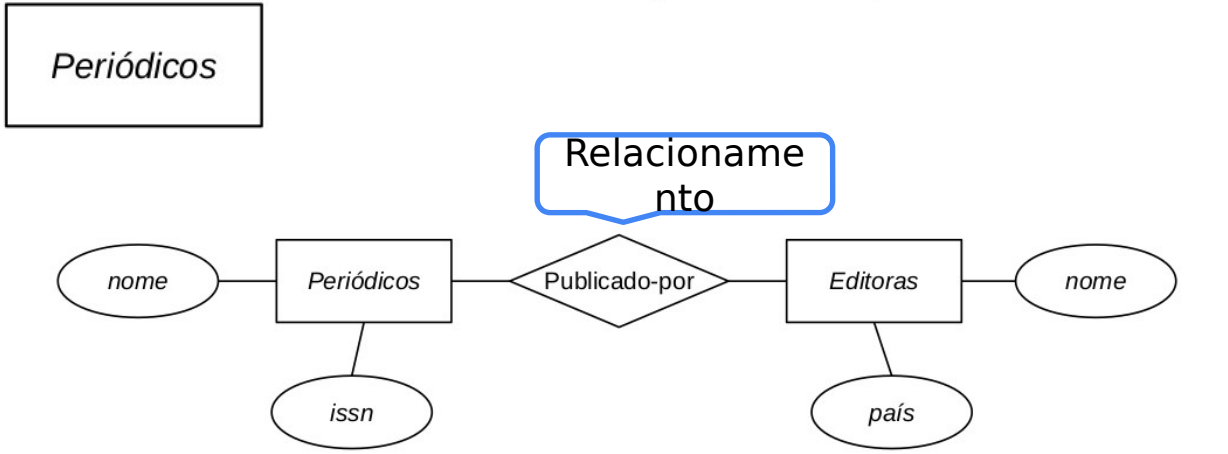
país

Modelagem


Como seria?

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Publicado-por
Editoras
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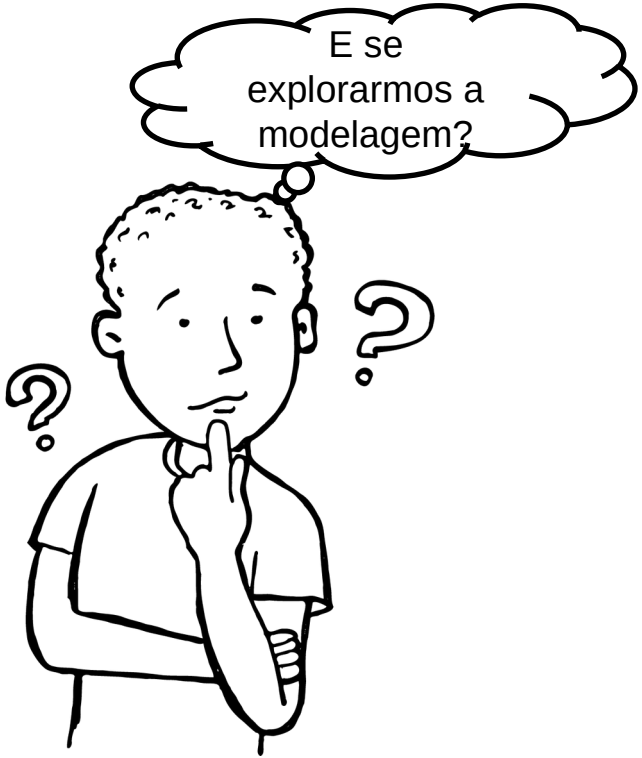
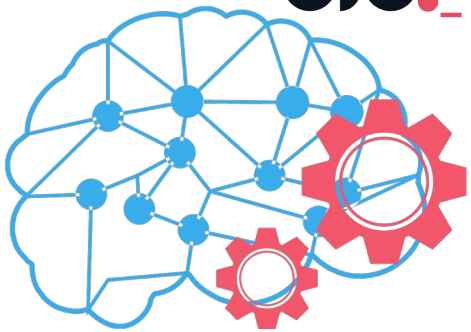
país

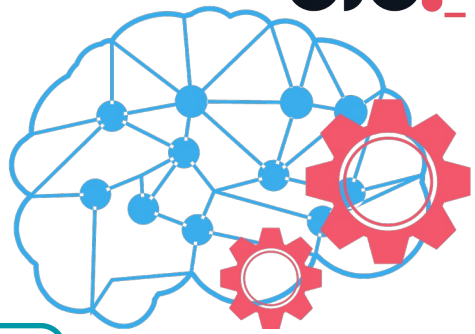
Modelagem

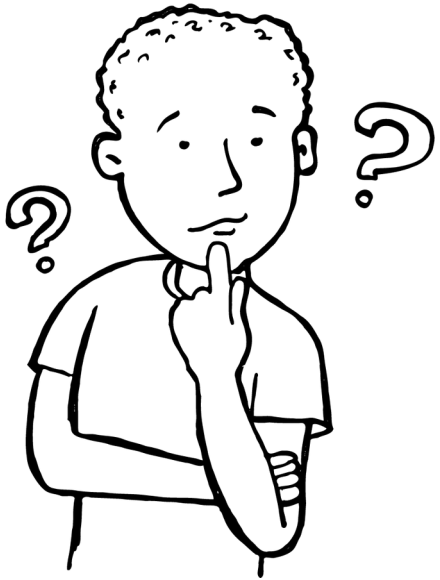




- Instâncias
- Multiplicidade
- Chaves e constrains
- Integridade de dados ...

Modelagem





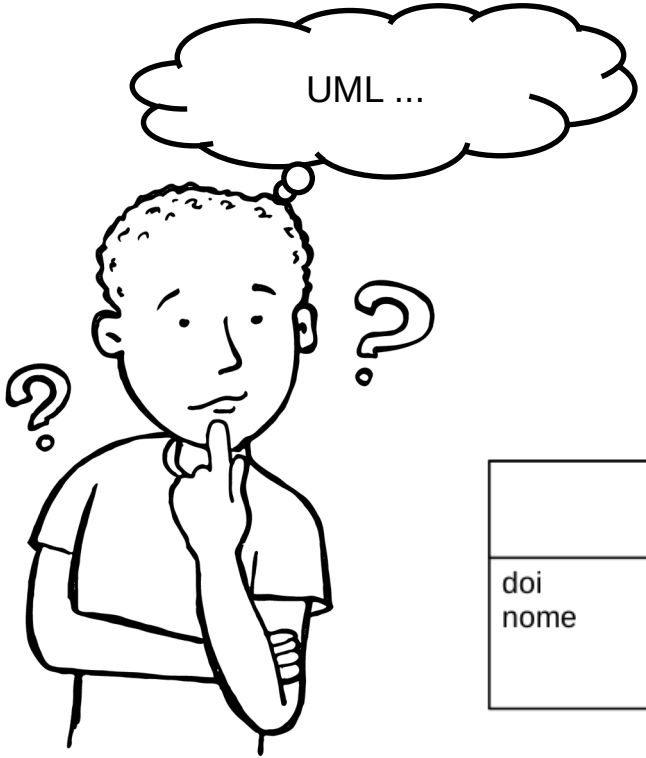
Facilita a compreensão do contexto dos dados

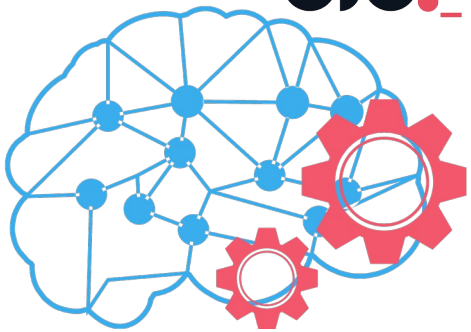
Modelos de alto nível:

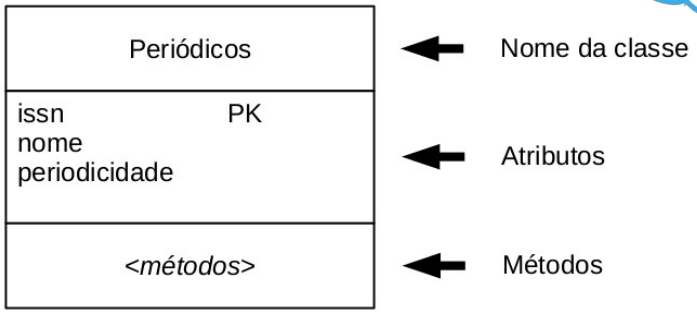
- Entidade-Relacionamento
- **UML**

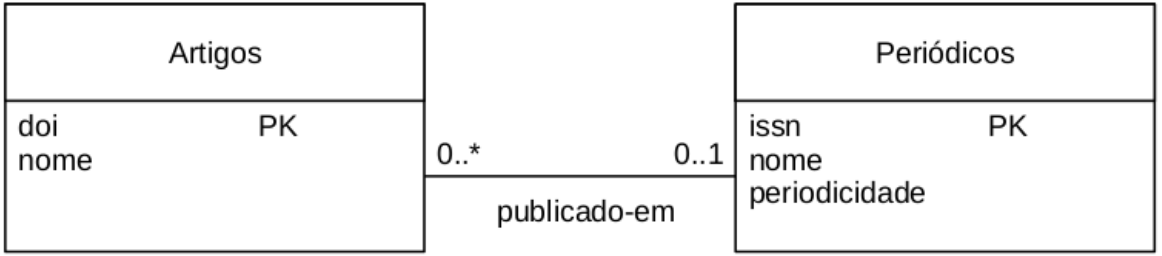
Modelos

Modelagem


UML ...




Periódicos
issn PK
nome
periodicidade
<métodos>
Nome da classe
Atributos
Métodos


Artigos
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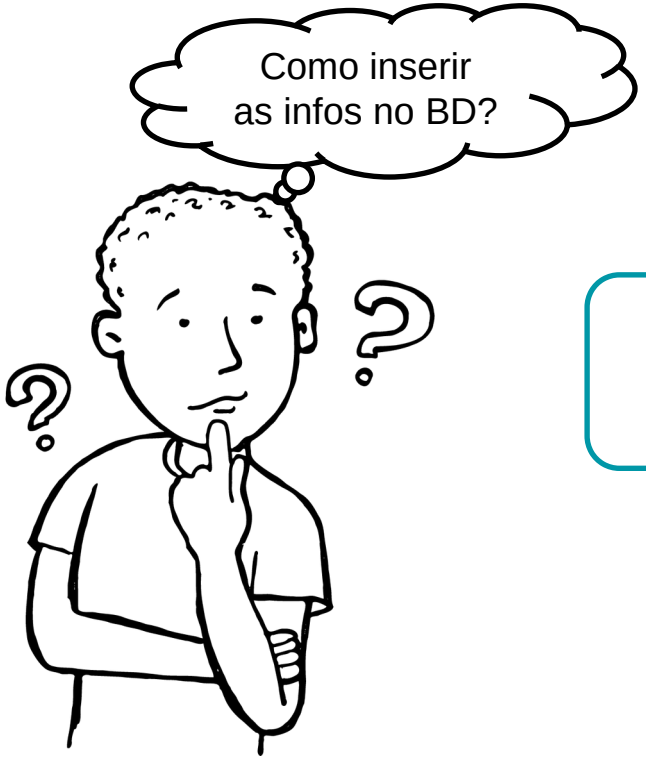
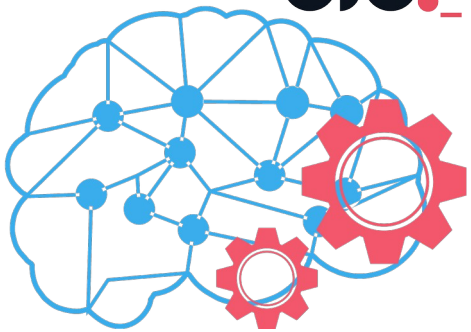
periodicidade

Modelagem



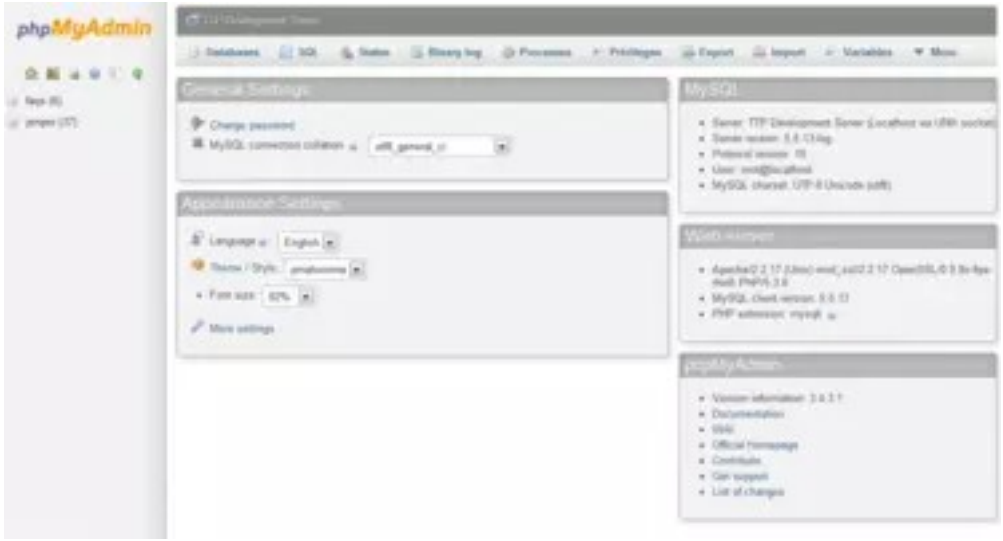


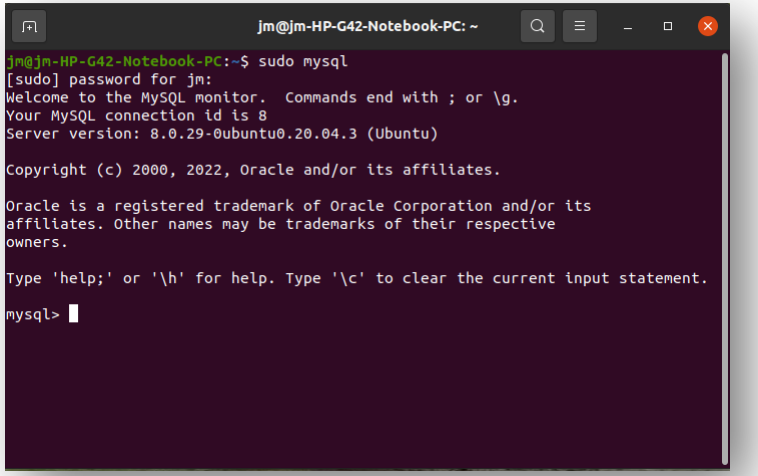
CREATE, ALTER, DROP ...

SELECT, INSERT, UPDATE ...

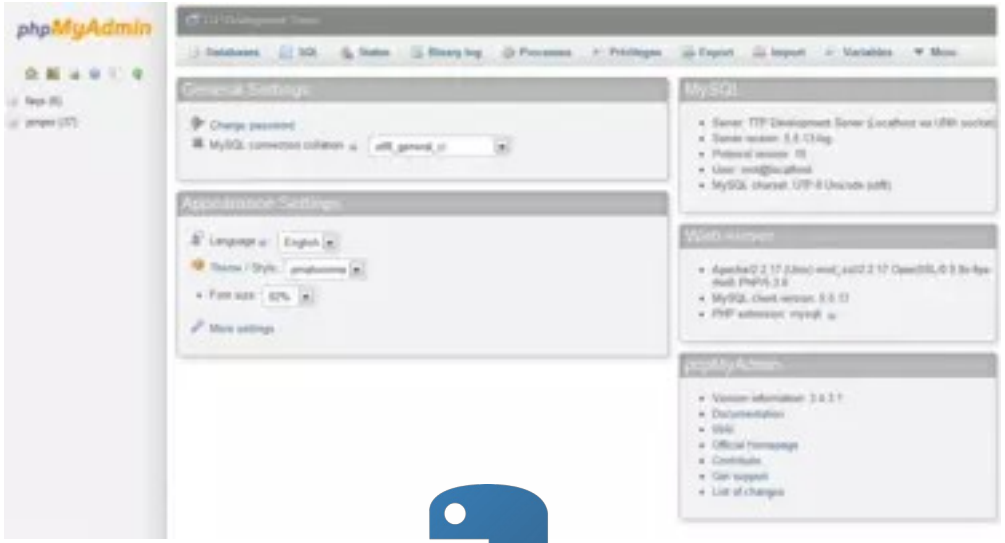
Linguagem declarativa

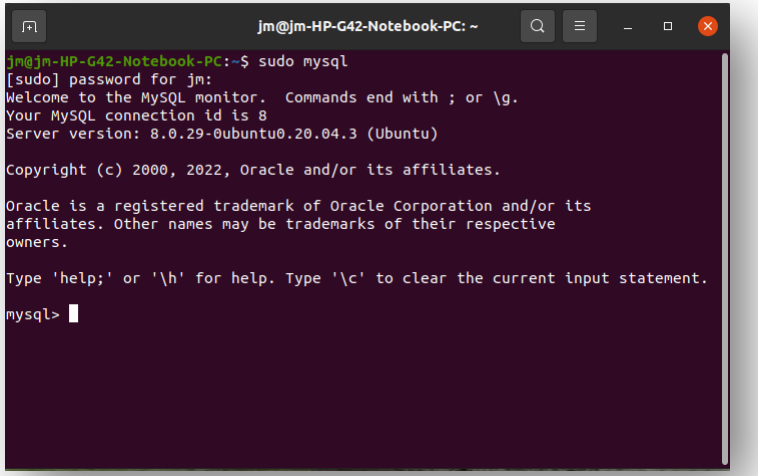
SQL – como acessar?





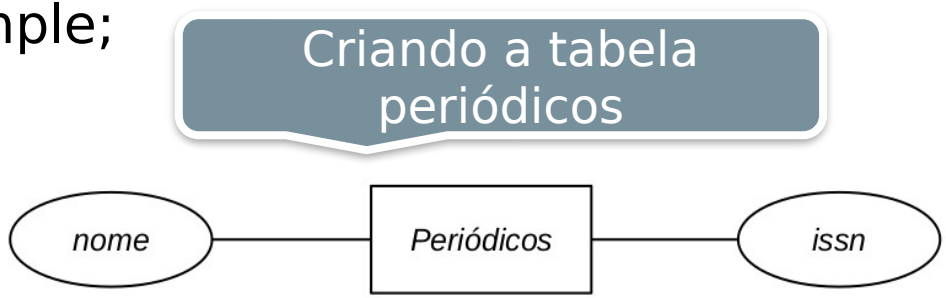
SQL – como acessar?





SQL – 1° exemplo

```
CREATE DATABASE firstexample;
CREATE TABLE periodicos(
        id integer,
        nome varchar(120),
        issn integer
);
```



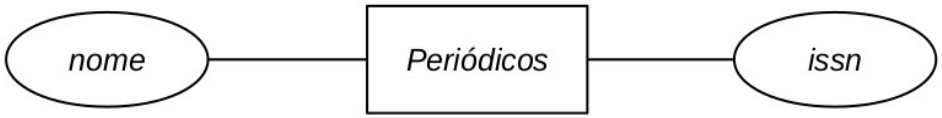
SQL – 1° exemplo

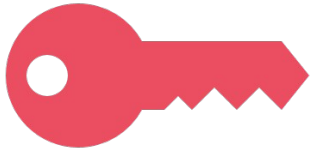
```
CREATE DATABASE firstexample;

CREATE TABLE periodicos(
        id integer,
        nome v
        iss
);
```

Como garantir unicidade?

Criando a tabela periódicos



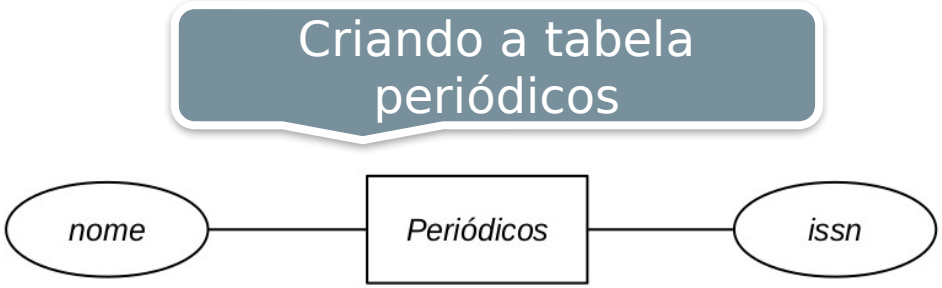


Primary Key

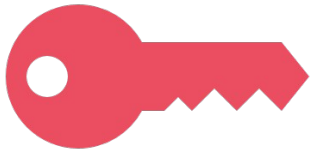
SQL – 1° exemplo

```
CREATE DATABASE firstexample;

CREATE TABLE periodicos(
        id integer,
        nome varchar(120),
        issn integer,
       PRIMARY KEY (id)
);
```

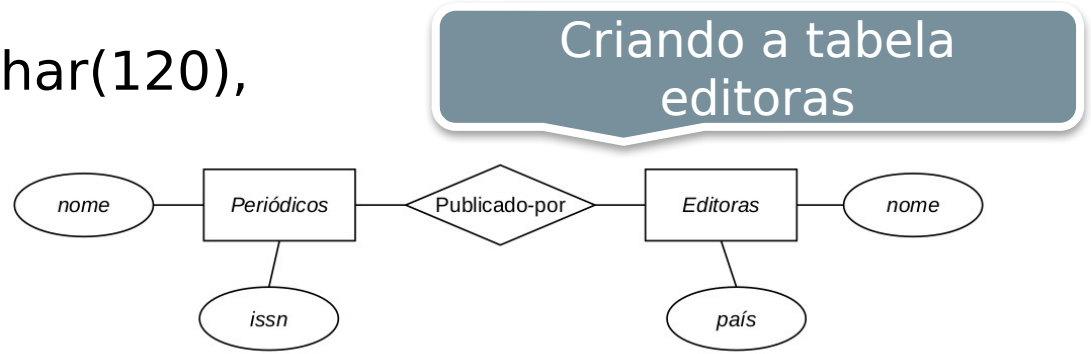


Primary Key



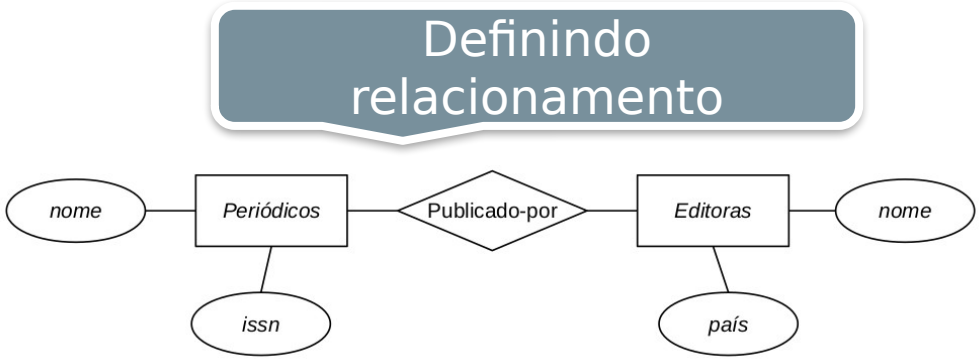
SQL – 1° exemplo

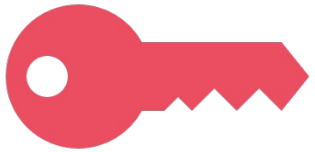
```
CREATE TABLE editora(
        id integer,
        nome_editora varchar(120),
        Pais integer,
       PRIMARY KEY (id)
);
```



SQL – 1° exemplo

```
CREATE TABLE periodicos(
        id integer,
        nome varchar(120),
        issn integer,
       PRIMARY KEY (id),
        FOREIGN KEY (id) REFERENCES
editora(id)
);
```





Desafio

Entidades

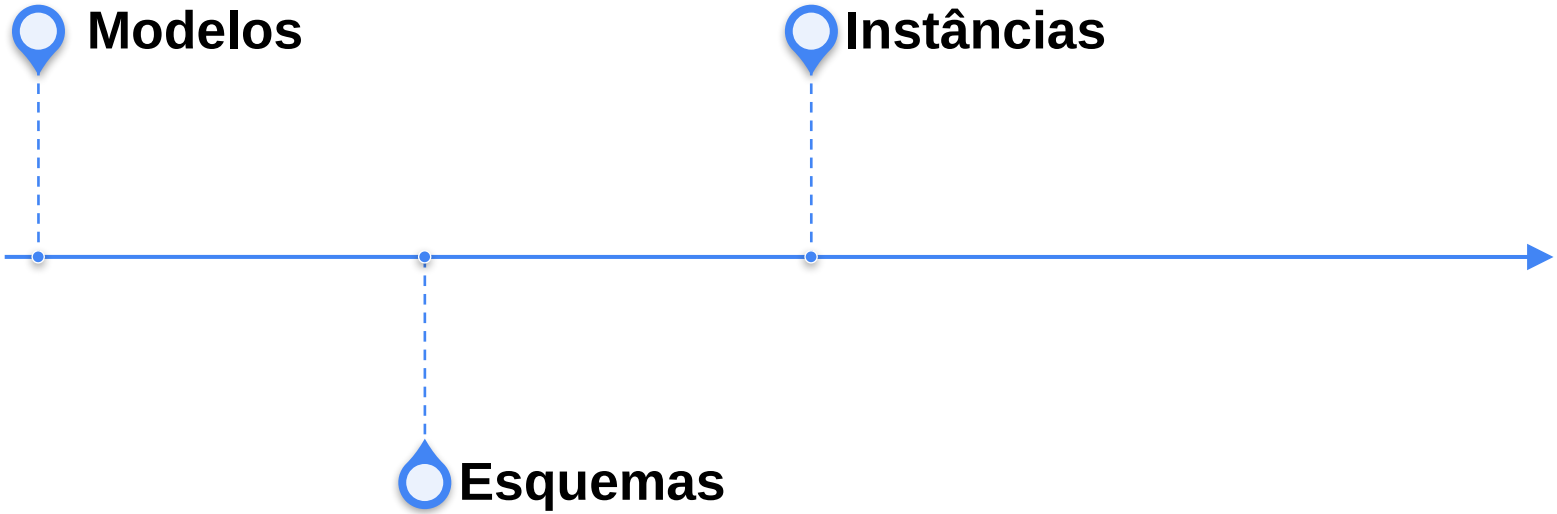
- Artigo/work
- Pesquisador/autor

Etapa 8

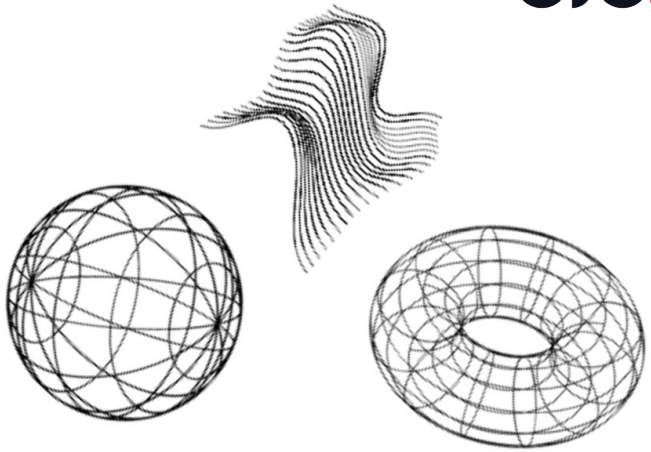
Arquitetura: Modelos, Esquemas e Instâncias

// Introdução à Banco de dados

Conversa

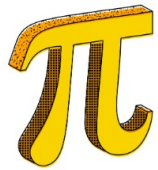


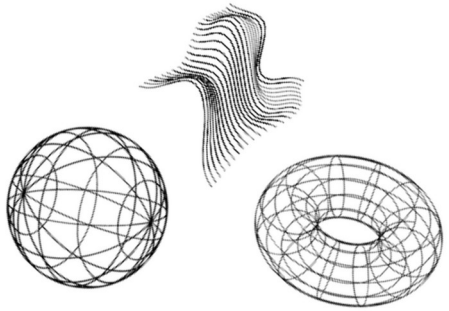
Modelo



Abstração = essencial

Modelo

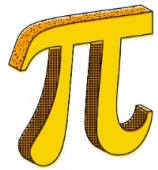


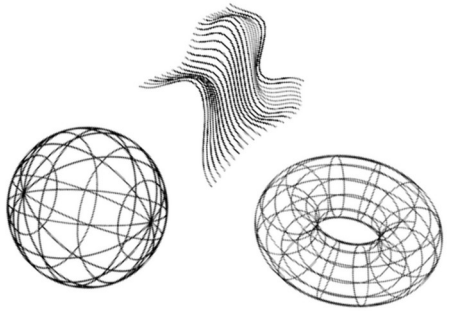


Data model

Abstração = essencial

Modelo



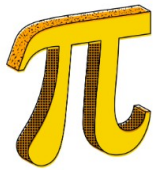


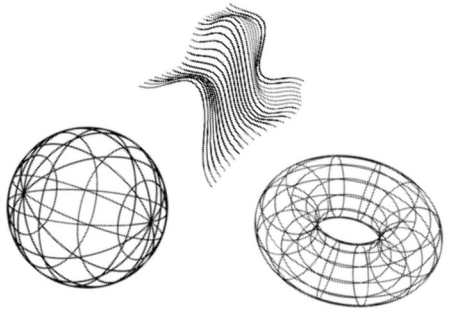
Operações

Data model

Abstração = essencial

Modelo





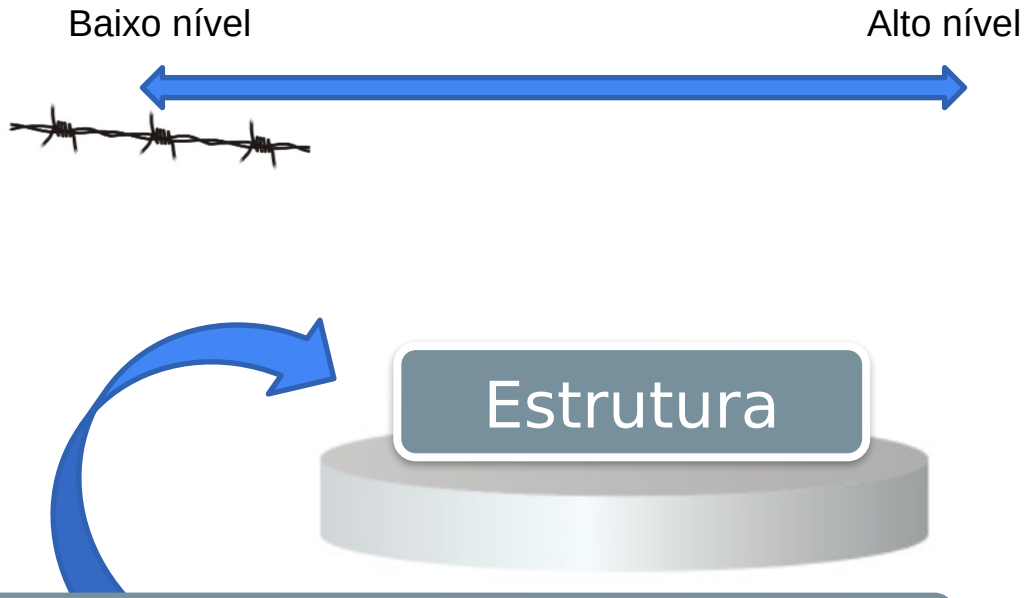
Operações

Data model

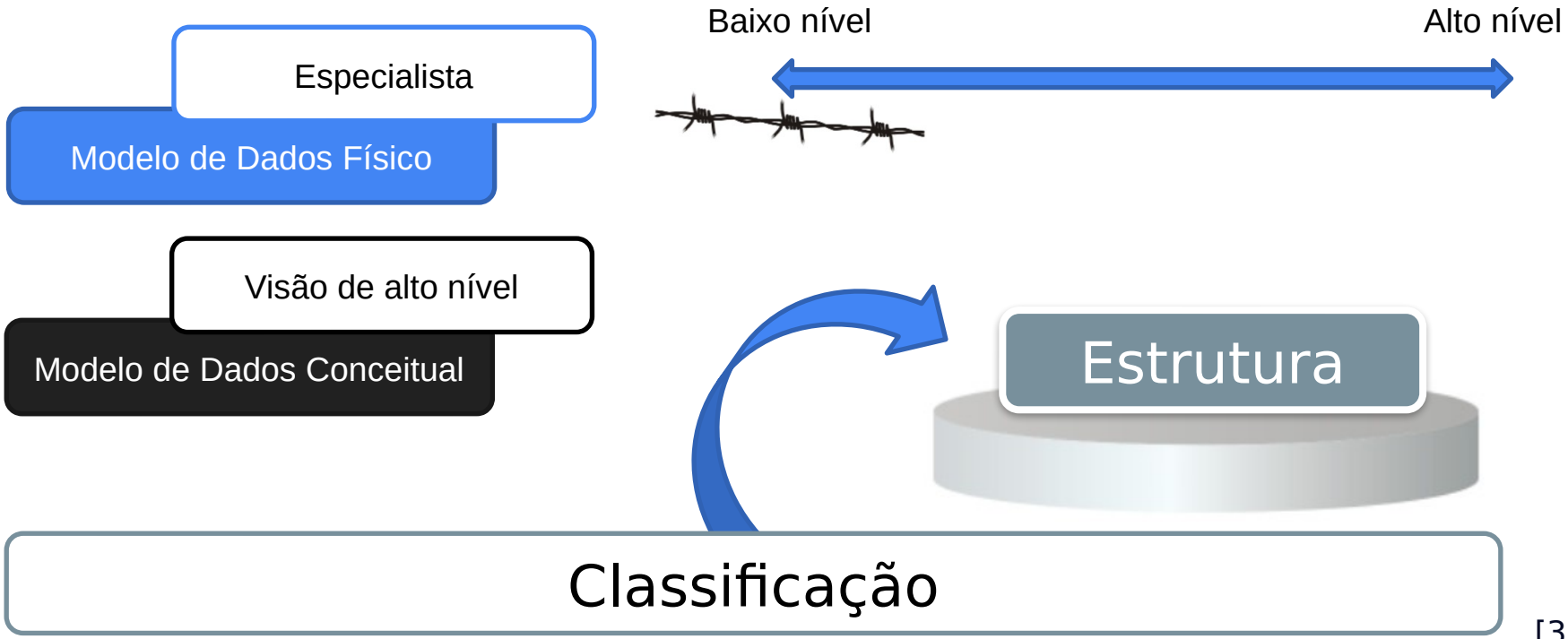
Classificação

Abstração = essencial

Modelo



Modelo


Baixo nível
Alto nível
Especialista
Modelo de Dados Físico
Visão de alto nível
Modelo de Dados Conceitual
Estrutura
Classificação

Modelo

Representacional

Modelo de Dados de implementação

Especialista

Modelo de Dados Físico

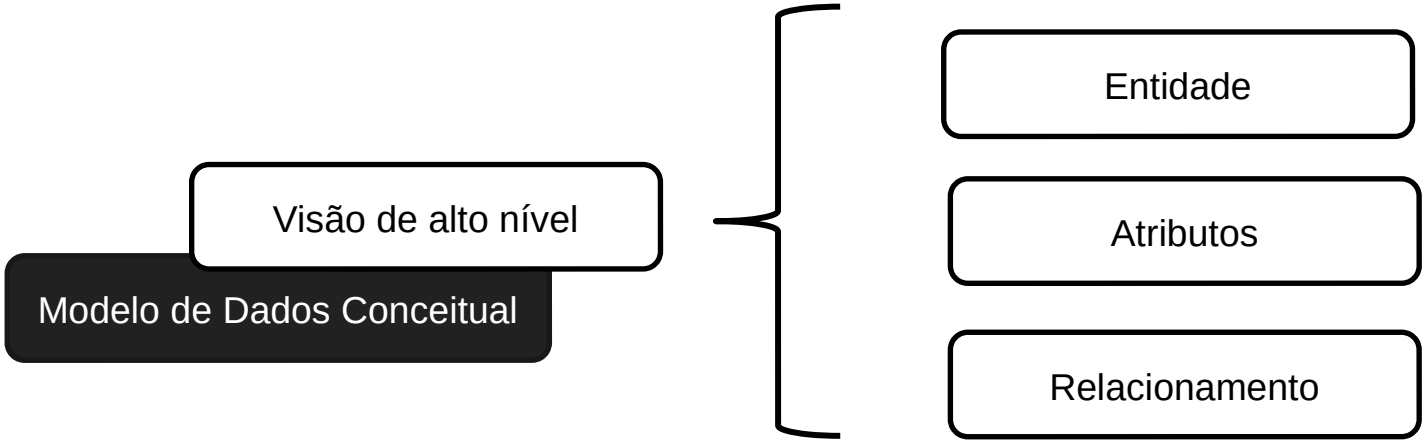
Visão de alto nível

Modelo de Dados Conceitual

Estrutura

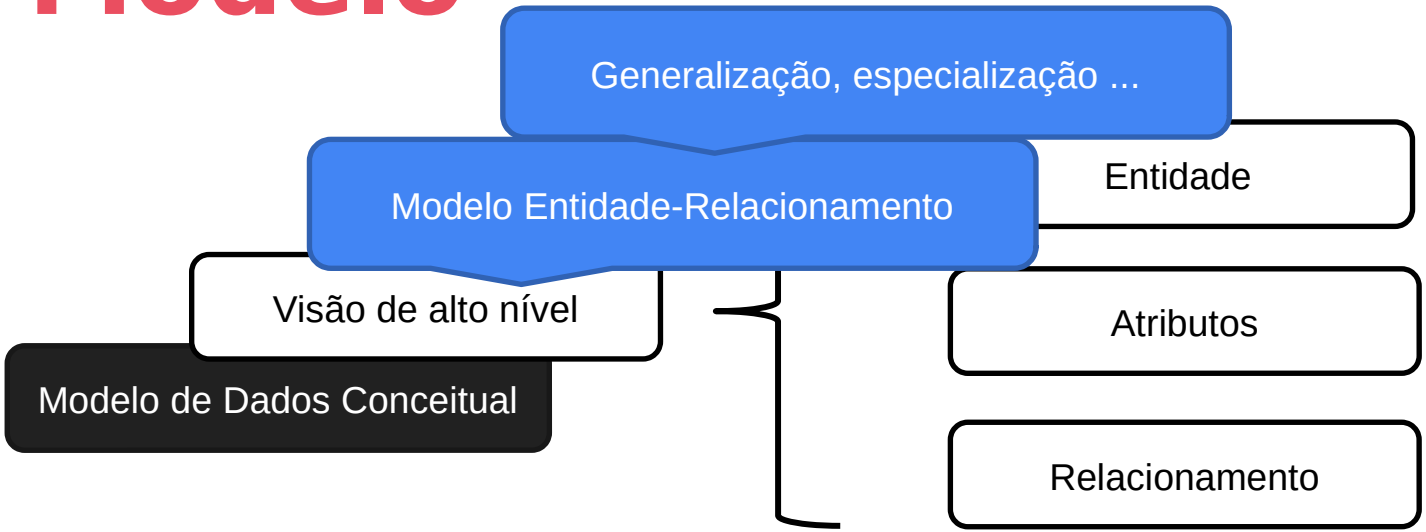
Classificação

Modelo



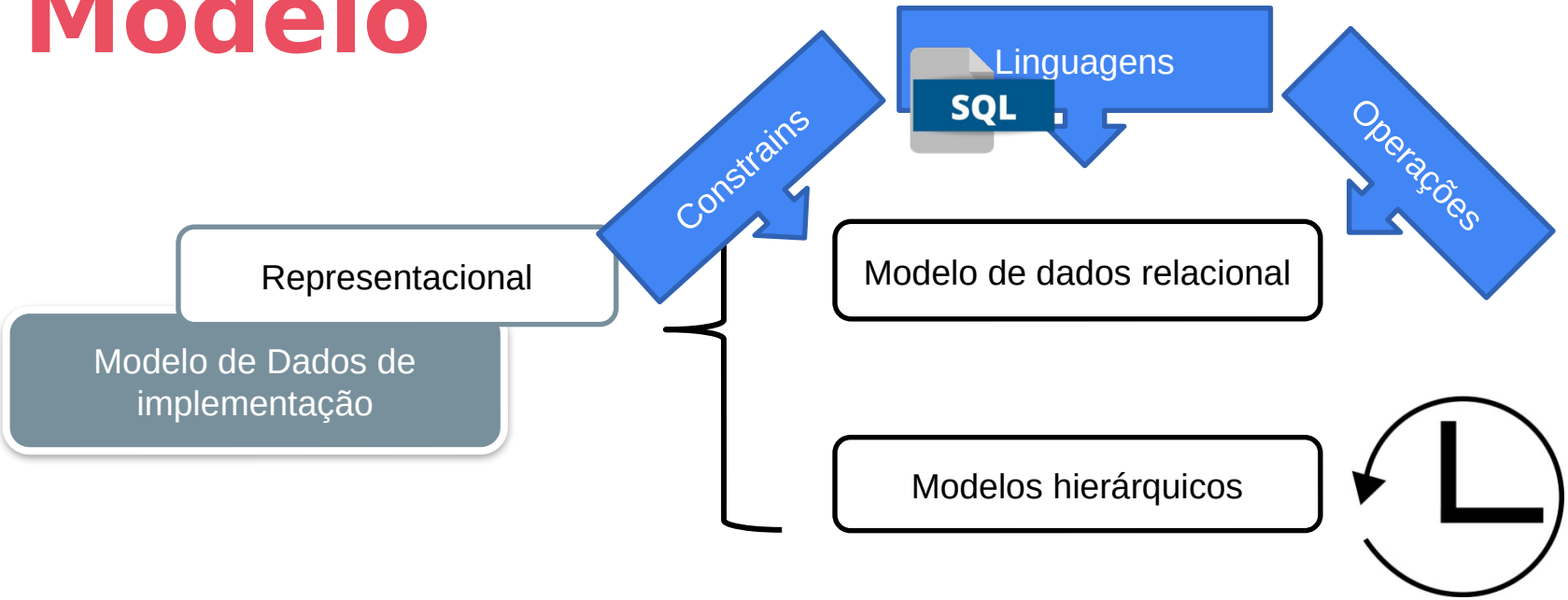
Classificação

Modelo



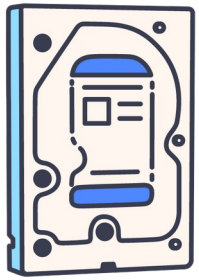
Classificação

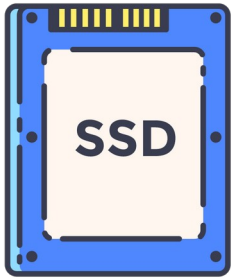
Modelo



Classificação

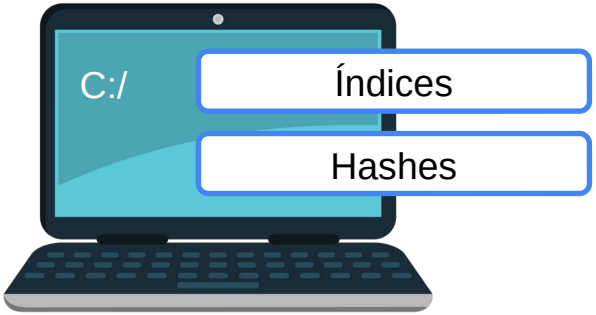
Modelo





Especialista

Modelo de Dados Físico



Classificação

Modelo

Modelo de Dados
Auto-descritivo

Descrição

Dados

KEY-VALUE

Classificação

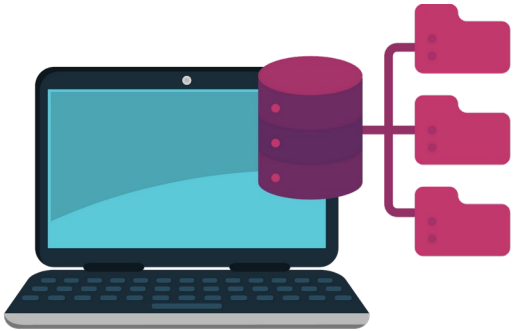
Esquemas, Instâncias e Estados do BD

Esquema

Diagramas

Descrição

≠



Esquema

Esquema

Diagramas

Descrição

STUDENT

Name	Student_number	Class	Major

COURSE

Course_name	Course_number	Credit_hours	Department

PREREQUISITE

Course_number	Prerequisite_number

SECTION

Section_identifier	Course_number	Semester	Year	Instructor

GRADE_REPORT

Student_number	Section_identifier	Grade

Esquema

Esquema

Diagramas

Descrição

Construct

STUDENT

Name	Student_number	Class	Major

COURSE

Course_name	Course_number	Credit_hours	Department

PREREQUISITE

Course_number	Prerequisite_number

SECTION

Section_identifier	Course_number	Semester	Year	Instructor

GRADE_REPORT

Student_number	Section_identifier	Grade

Esquema

Esquema

Diagramas

Descrição

~~Tipos de dados & Itens~~

Construct

STUDENT

Name	Student_number	Class	Major

COURSE

Course_name	Course_number	Credit_hours	Department

PREREQUISITE

Course_number	Prerequisite_number

SECTION

Section_identifier	Course_number	Semester	Year	Instructor

GRADE_REPORT

Student_number	Section_identifier	Grade

Esquema

Snapshot

Dados mudam

STUDENT

Name	Student_number	Class	Major

COURSE

Course_name	Course_number	Credit_hours	Department

PREREQUISITE

Course_number	Prerequisite_number

SECTION

Section_identifier	Course_number	Semester	Year	Instructor

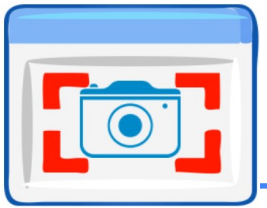
GRADE_REPORT

Student_number	Section_identifier	Grade

Instância | Ocorrência

Esquema

Snapshot



Dados mudam

Insert, Delete

STUDENT

Name	Student_number	Class	...jor

COURSE

Course_name	Cours...	...	...

Mudança de estado

PREREQUISITE

Course_number	Prerequisite_number

SECTION

Section_identifier	Course_number	...emester	...ar	Instructor

GRADE_REPORT

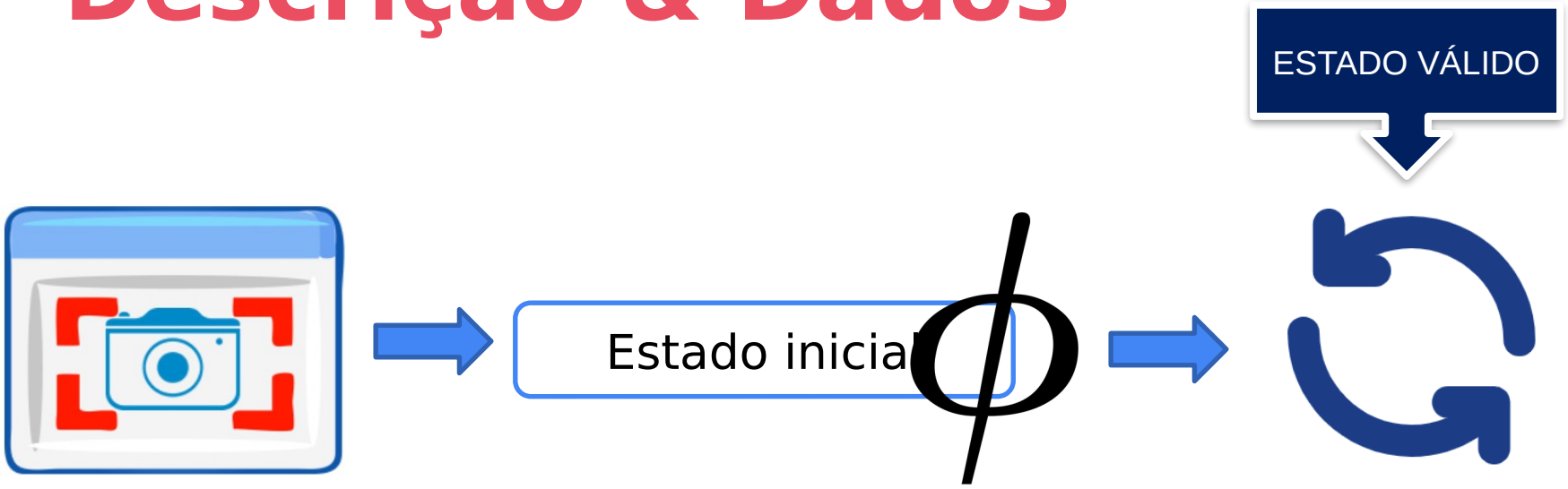
Student_number	Se...

Update

Instância | Ocorrência

Esquema

Descrição & Dados



Esquema

Snapshot

Dados mudam

Mudança = evolução

STUDENT

Name	Student_number	Class	Major

COURSE

Course_name	Course_number	Credit_hours	Department

PREREQUISITE

Course_number	Prerequisite_number

SECTION

Section_identifier	Course_number	Semester	Year	Instructor

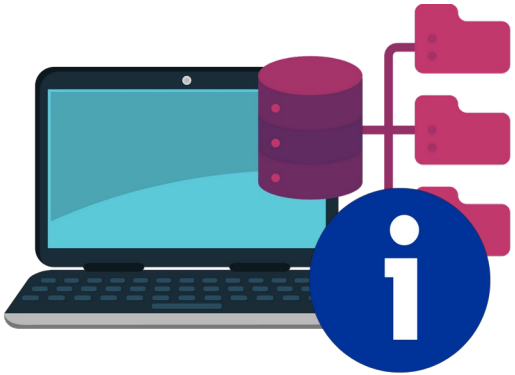
GRADE_REPORT

Student_number	Section_identifier	Grade

Instância | Ocorrência

Esquema

Meta dados



Descrição esquema

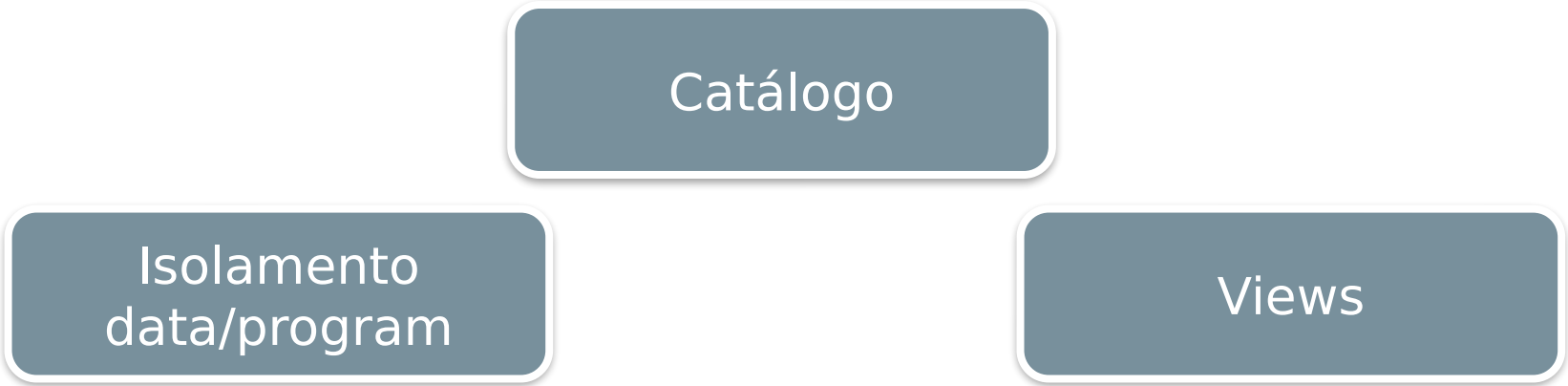
Construtores

Constrains

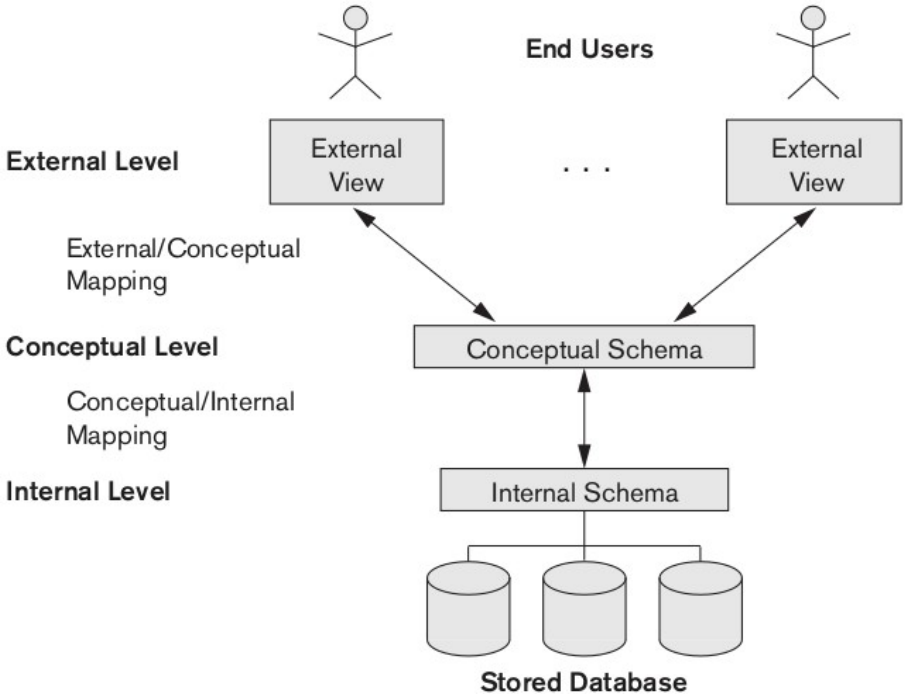
Esquema

Three-Schema Architecture

Three-Schema



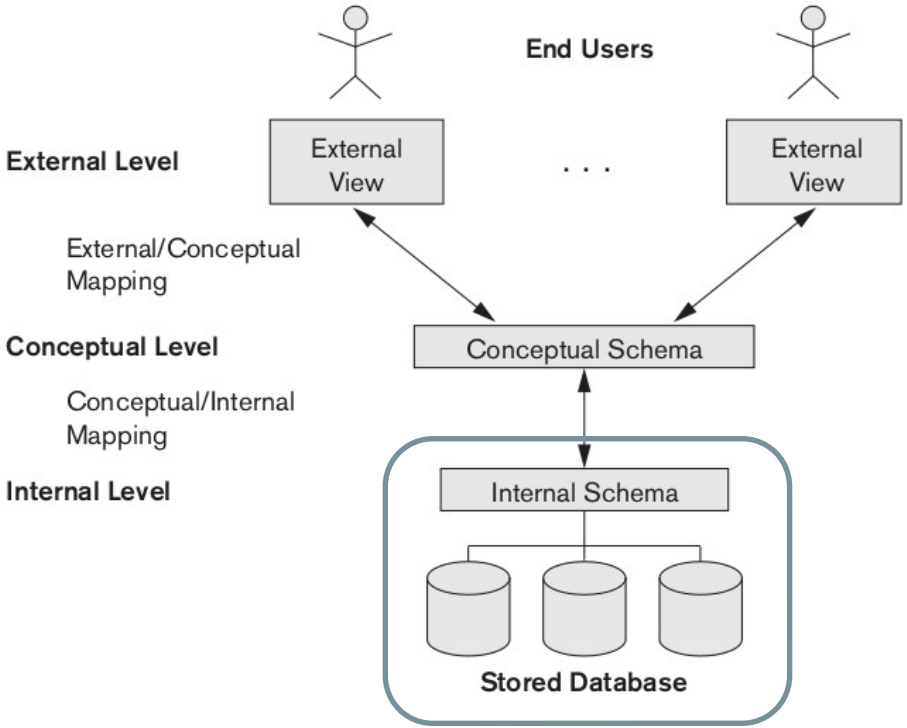
Arquitetura

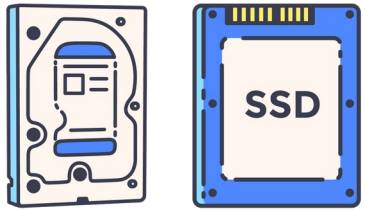


Aplicações de Usuário

Físico BD

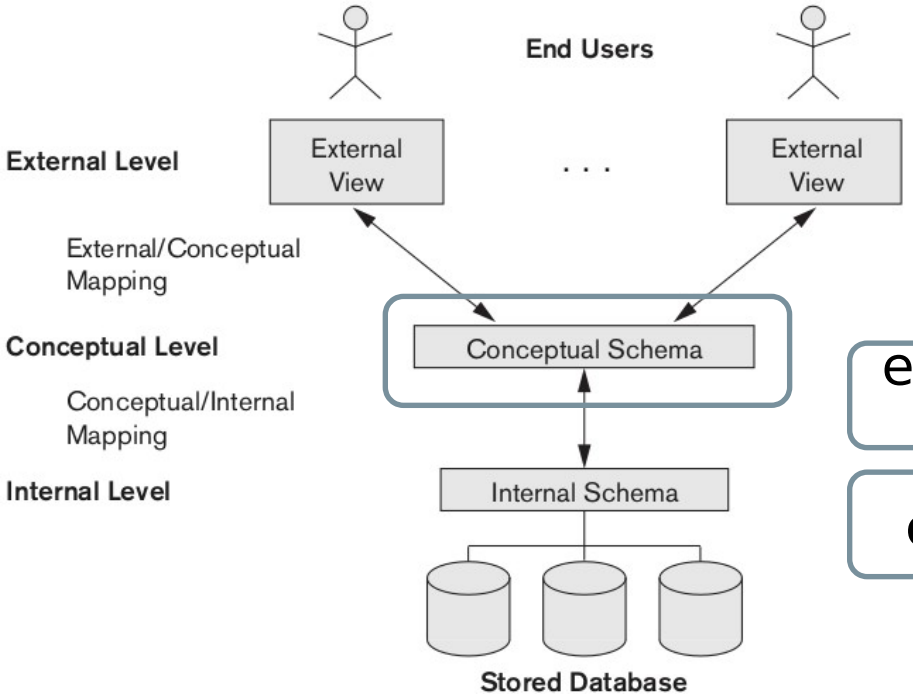
Arquitetura





Modelo de dados físico

Arquitetura



Modelo de Implementação

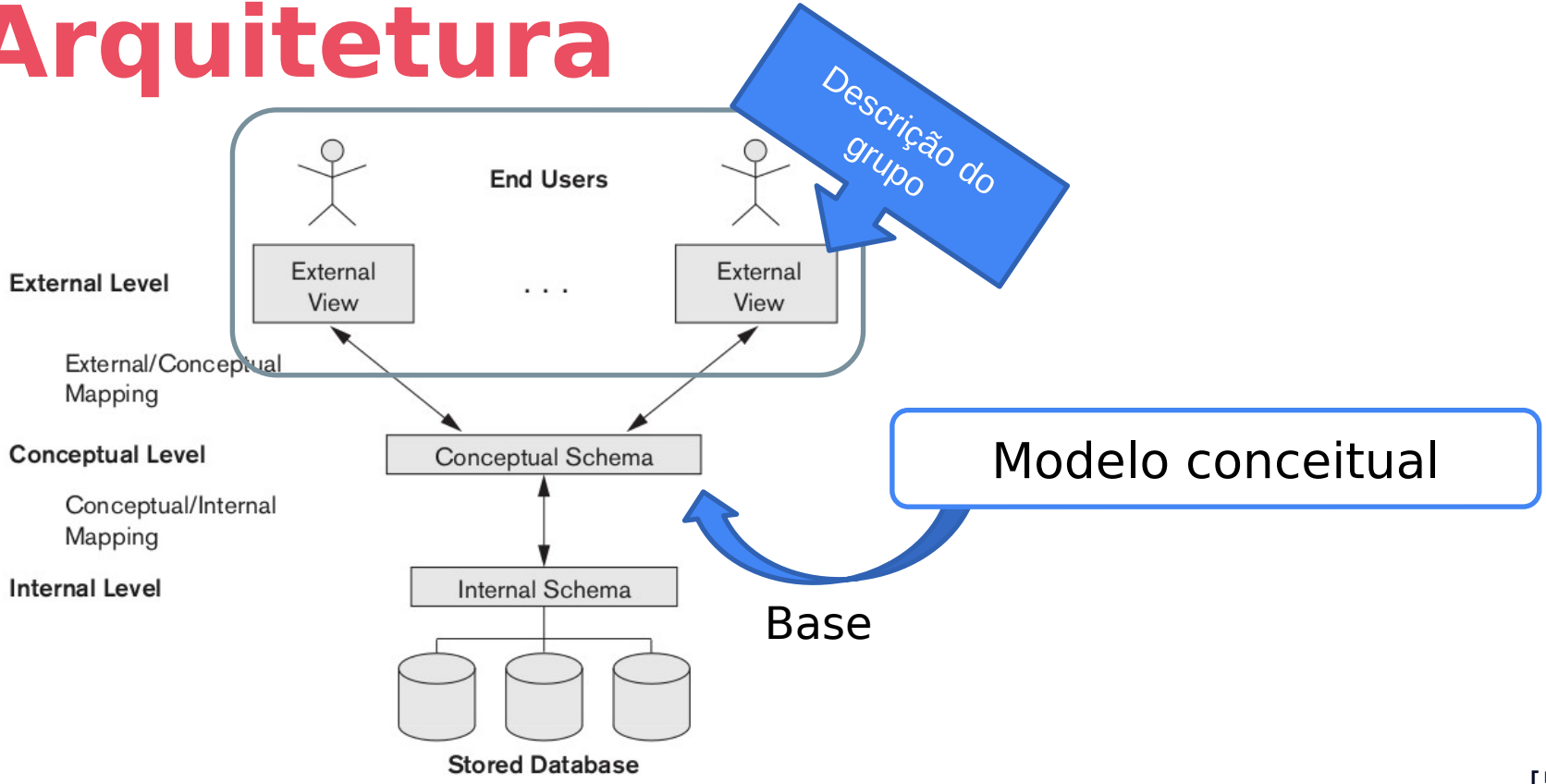
entidades

Operações de usuário

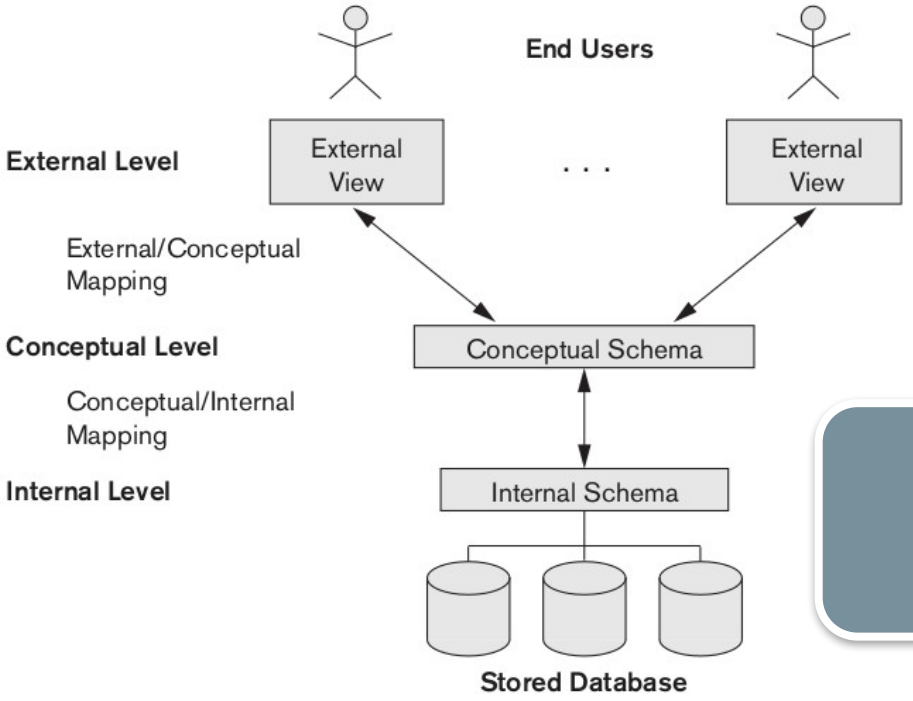
constrains

Relacionamentos

Arquitetura



Arquitetura

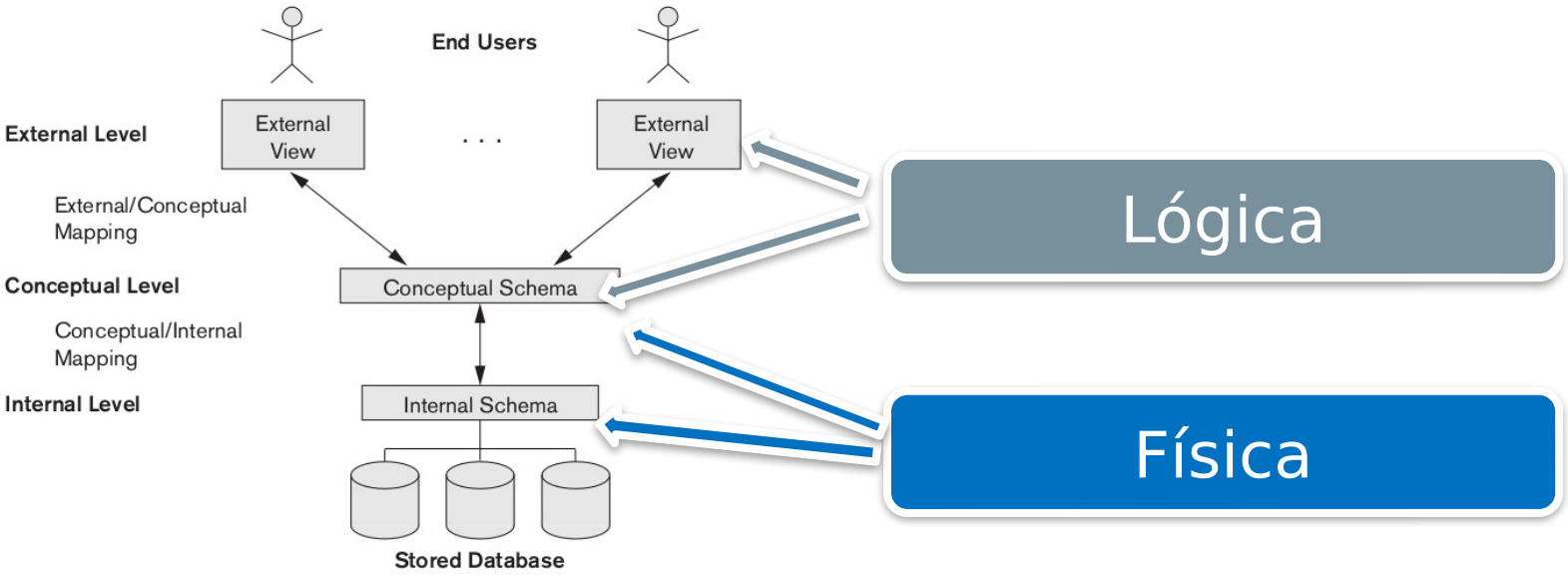


Explicitamente

Completamente

Desenvolvimento e Design do sistema

Independência de dados

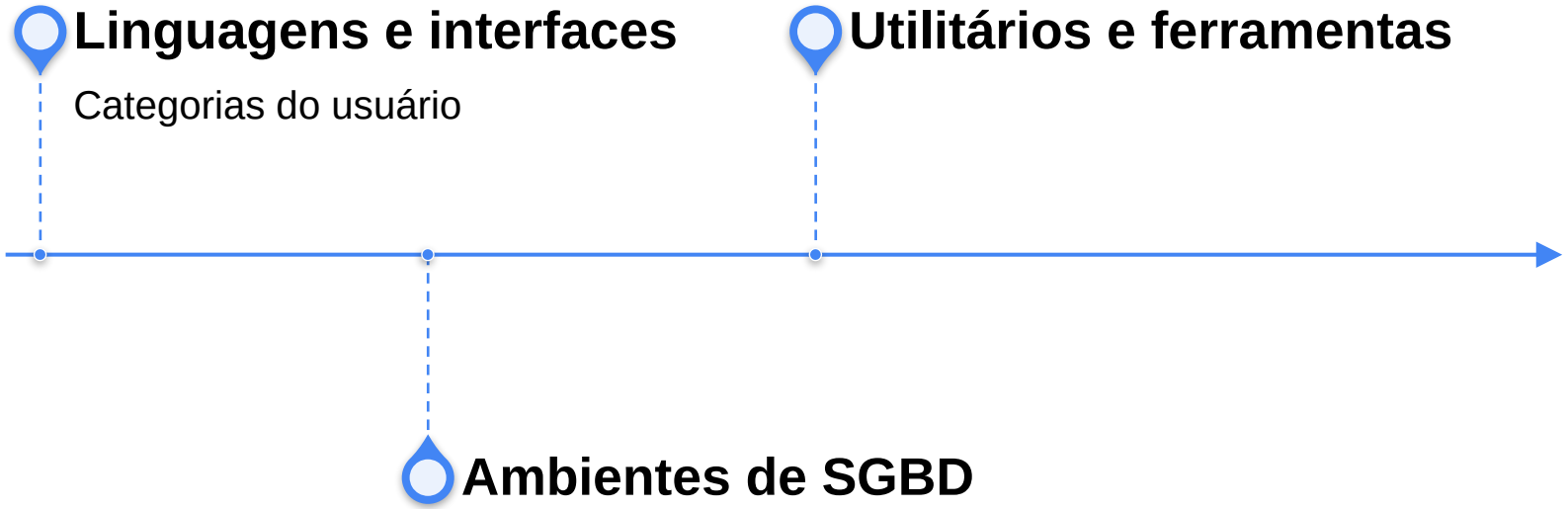


Etapa 9

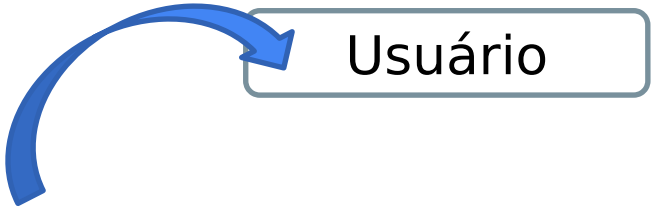
Arquitetura: Linguagem, Interface e Ambiente de SGBDs

// Introdução à Banco de dados

Conversa


Linguagens e interfaces
Categorias do usuário
Utilitários e ferramentas
Ambientes de SGBD

Linguagens



Linguagens e interfaces

DDL – Data Definition Language

Linguagens

STUDENT

Name	Student_number	Class	Major

COURSE

Course_name	Course_number	Credit_hours	Department

PREREQUISITE

Course_number	Prerequisite_number

SECTION

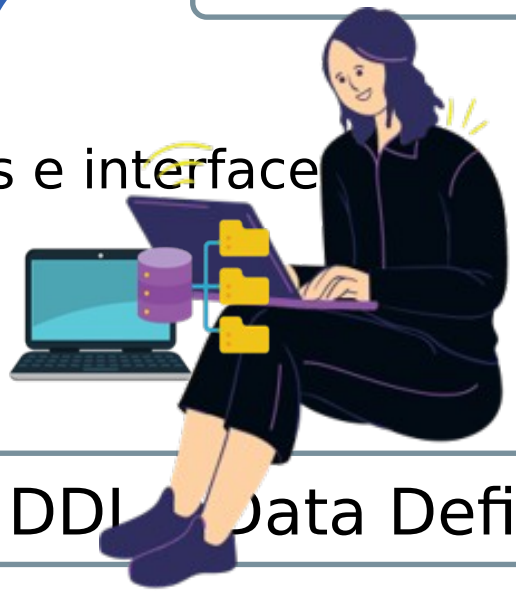
Section_identifier	Course_number	Semester	Year	Instructor

GRADE_REPORT

Student_number	Section_identifier	Grade

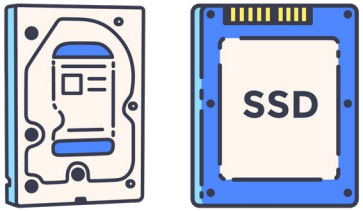
Usuário

Linguagens e interface



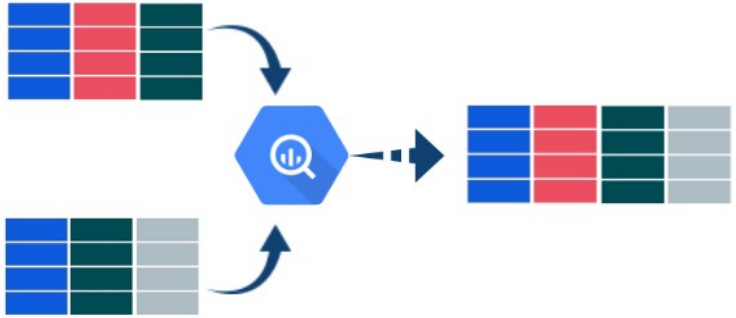
DDL - Data Definition Language

Linguagens



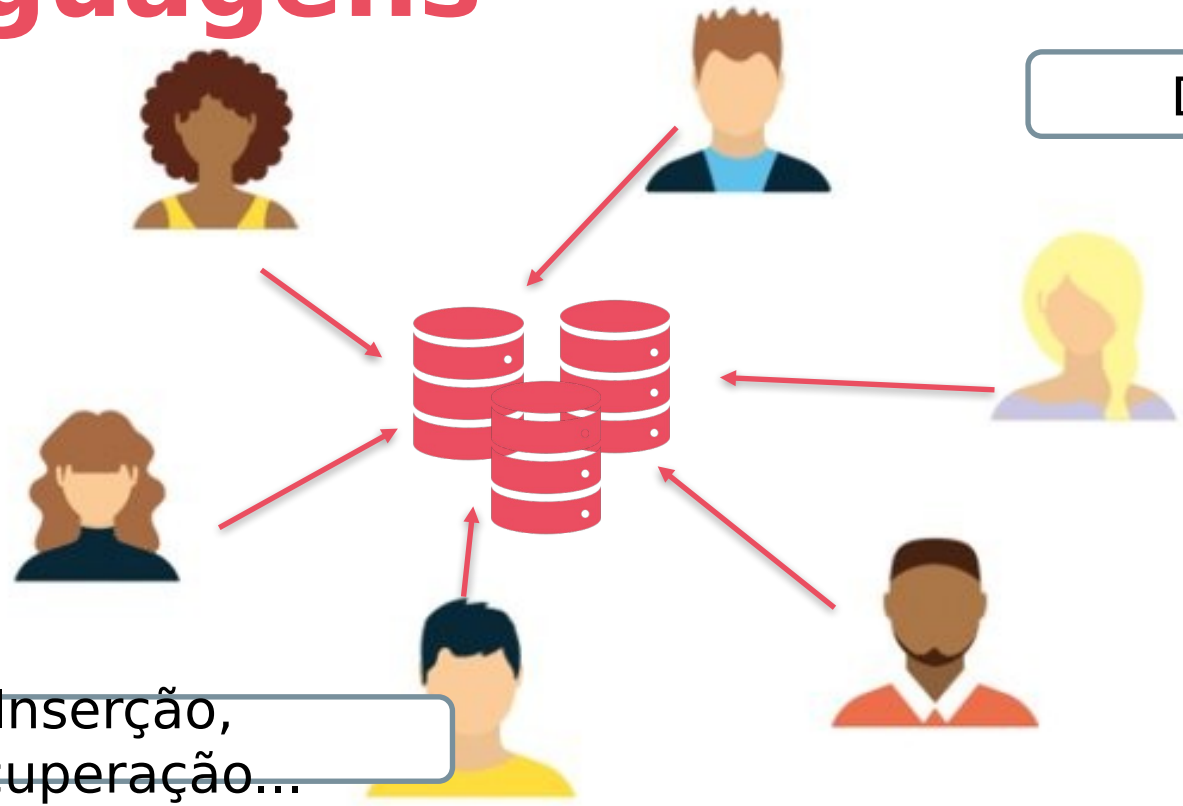
SDL

VDL



Separação explicita

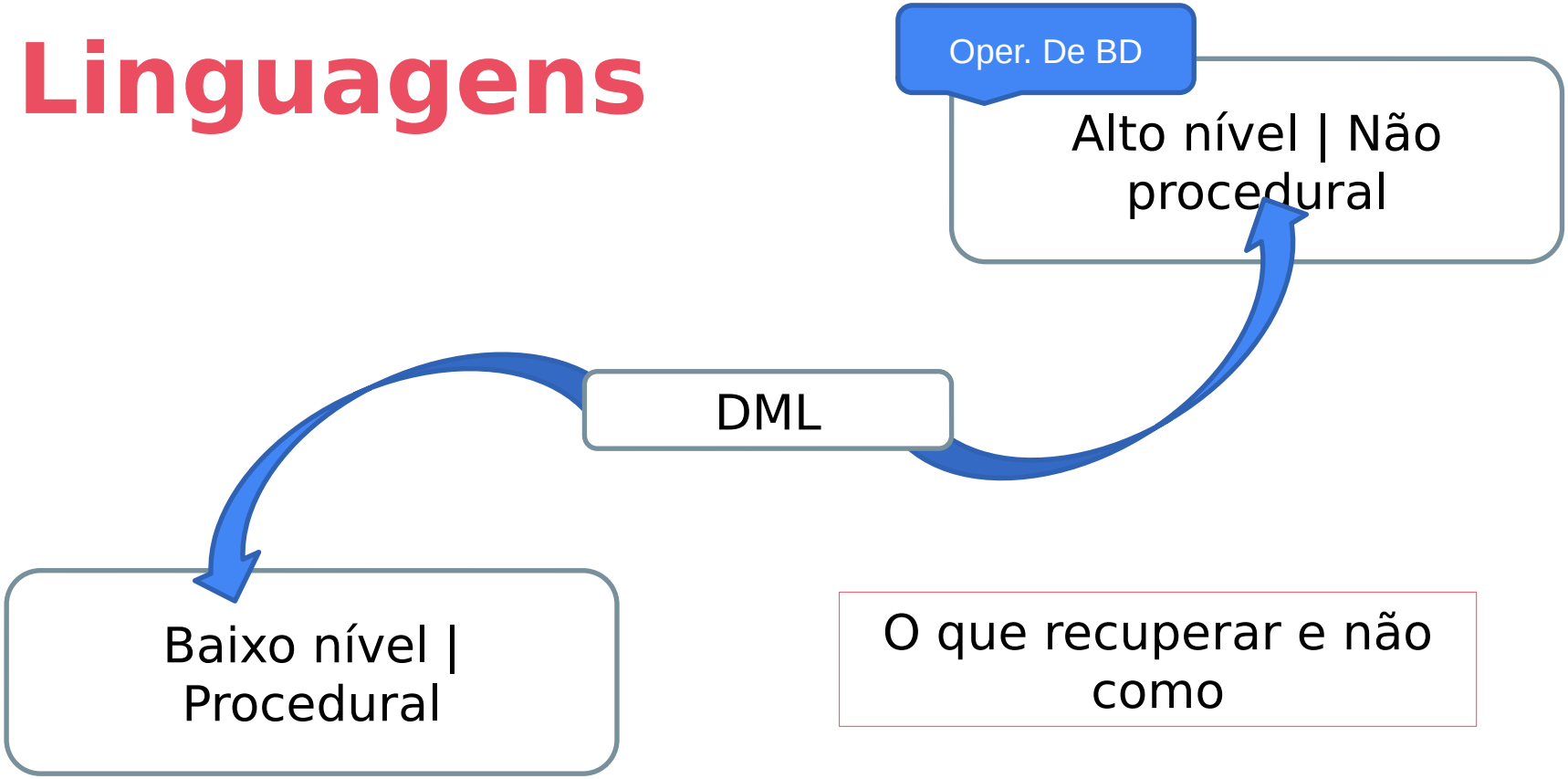
Linguagens



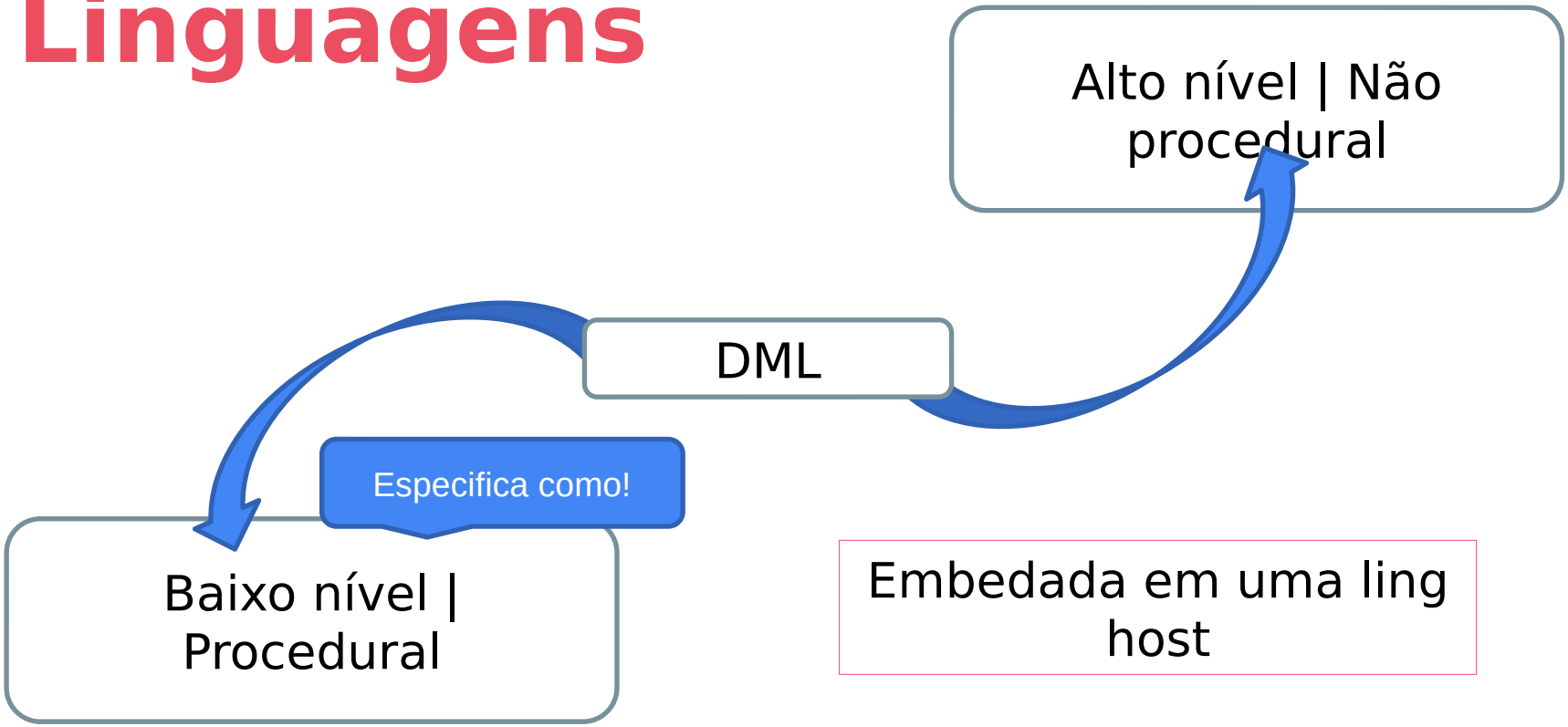
DML

Inserção, recuperação...

Linguagens

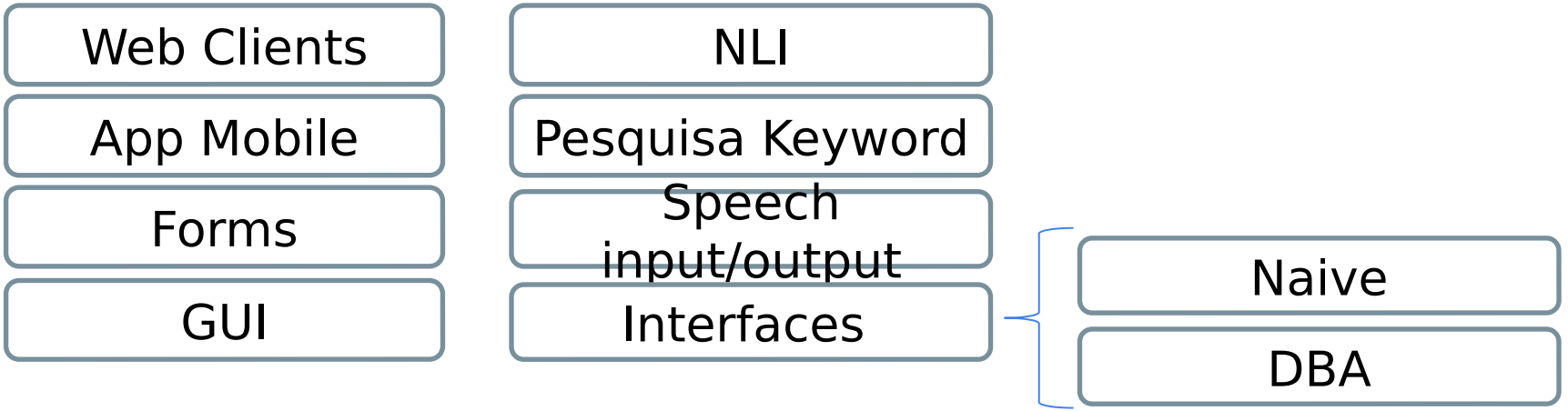

Oper. De BD
Alto nível | Não procedural
DML
Baixo nível | Procedural
O que recuperar e não como

Linguagens

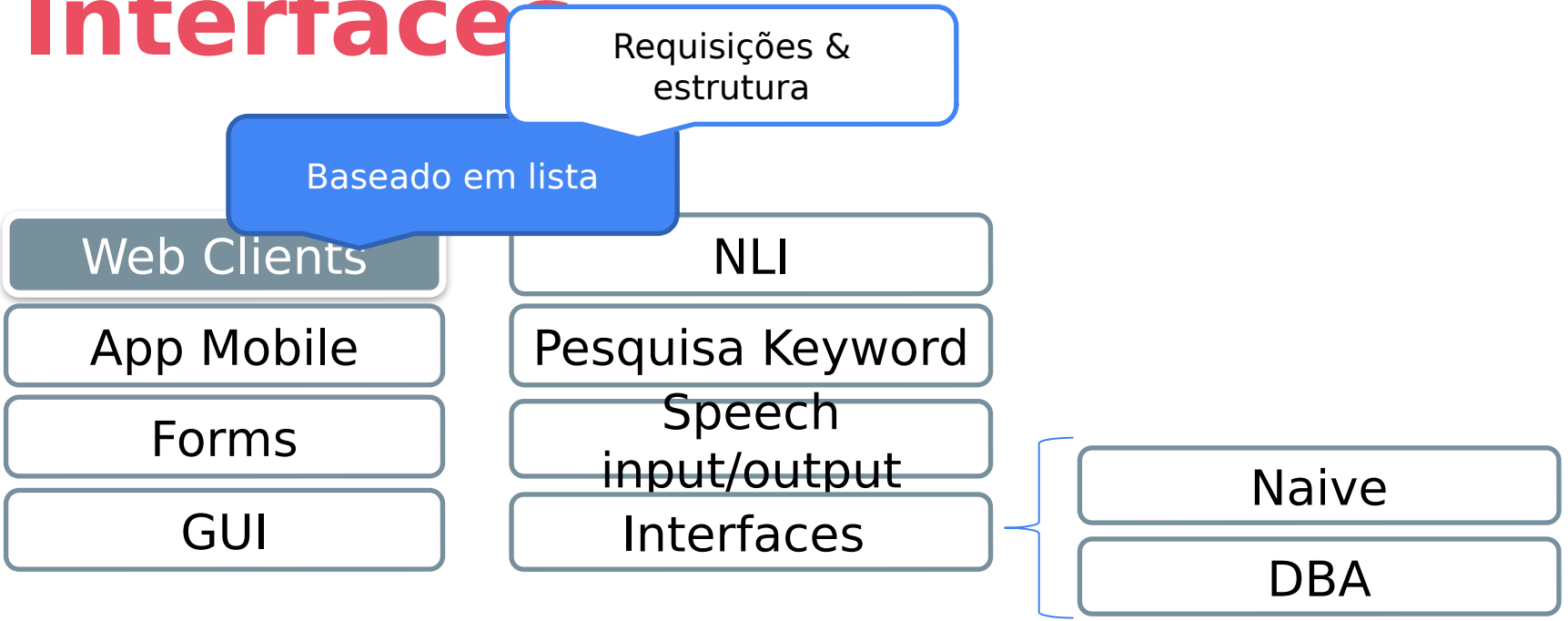

Alto nível | Não procedural
DML
Especifica como!
Baixo nível | Procedural
Embedada em uma ling host

Interfaces

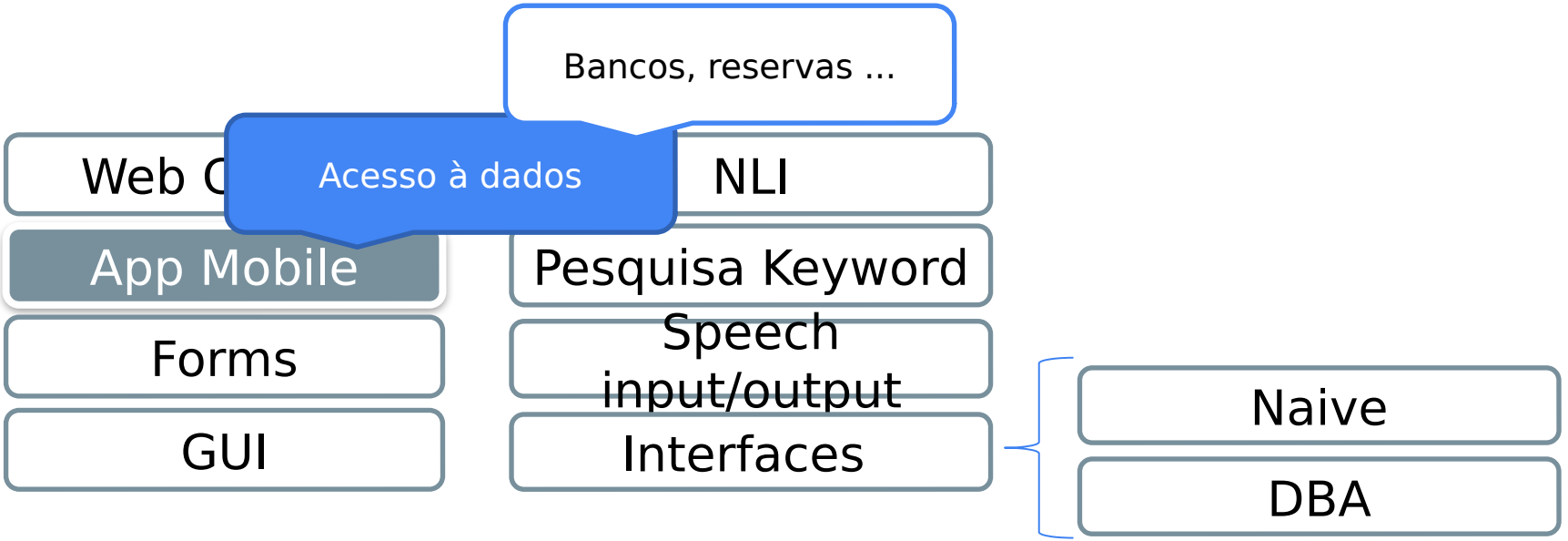
Interfaces


Web Clients
App Mobile
Forms
GUI
NLI
Pesquisa Keyword
Speech input/output
Interfaces
Naive
DBA

Interfaces

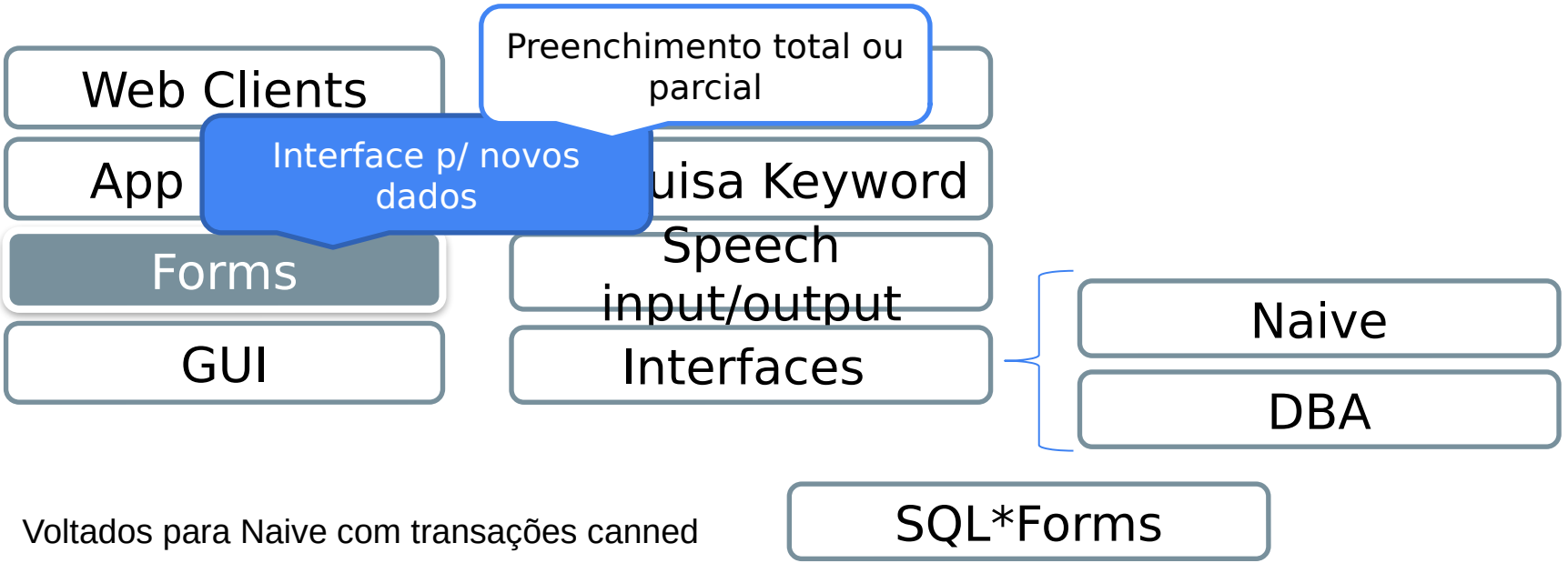

Requisições & estrutura
Baseado em lista
Web Clients
App Mobile
Forms
GUI
NLI
Pesquisa Keyword
Speech input/output
Interfaces
Naive
DBA

Interfaces



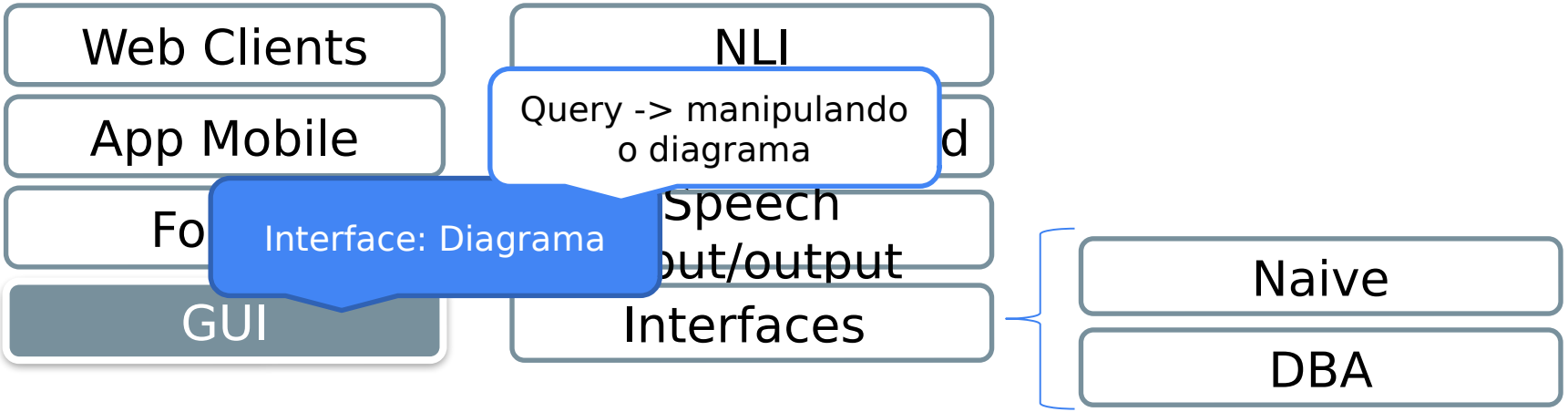
Menu limitado pelo app

Interfaces



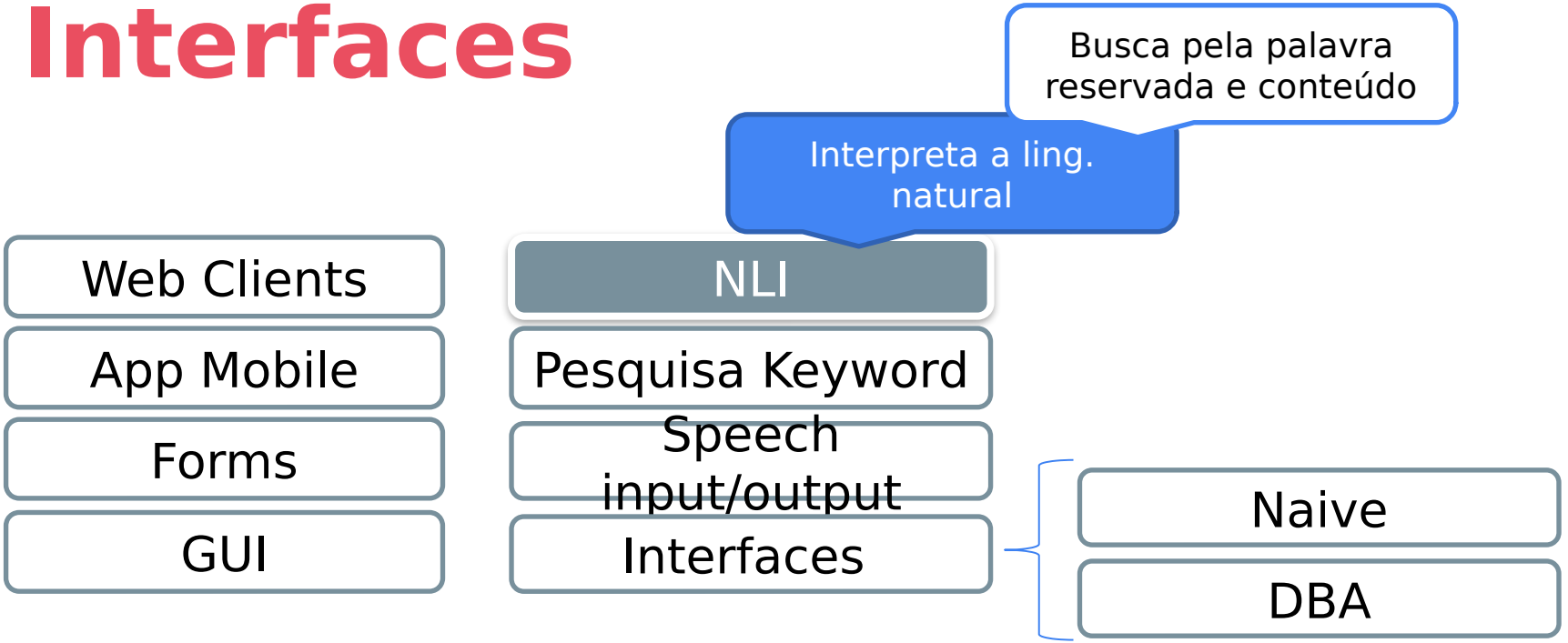
Voltados para Naive com transações canned

Interfaces

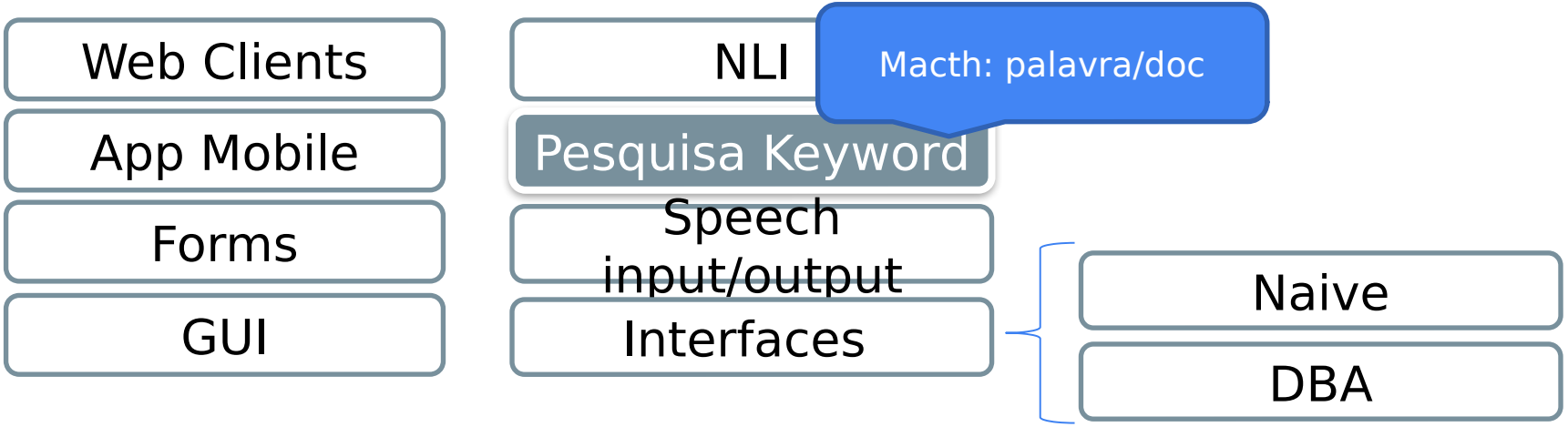


Menus & Forms

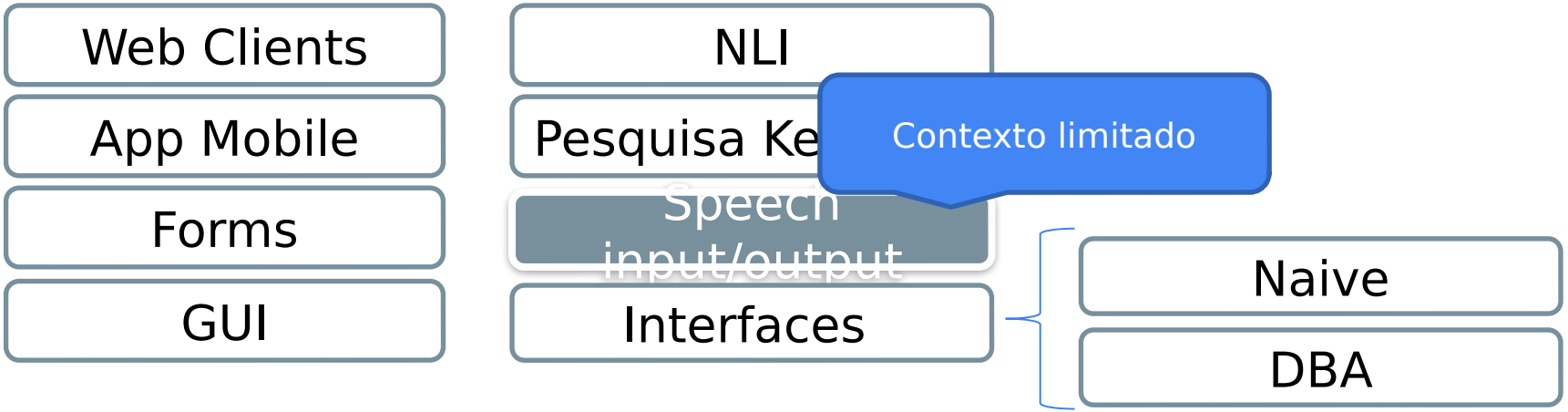
Interfaces


Busca pela palavra reservada e conteúdo
Interpreta a ling. natural
Web Clients
App Mobile
Forms
GUI
NLI
Pesquisa Keyword
Speech input/output
Interfaces
Naive
DBA

Interfaces

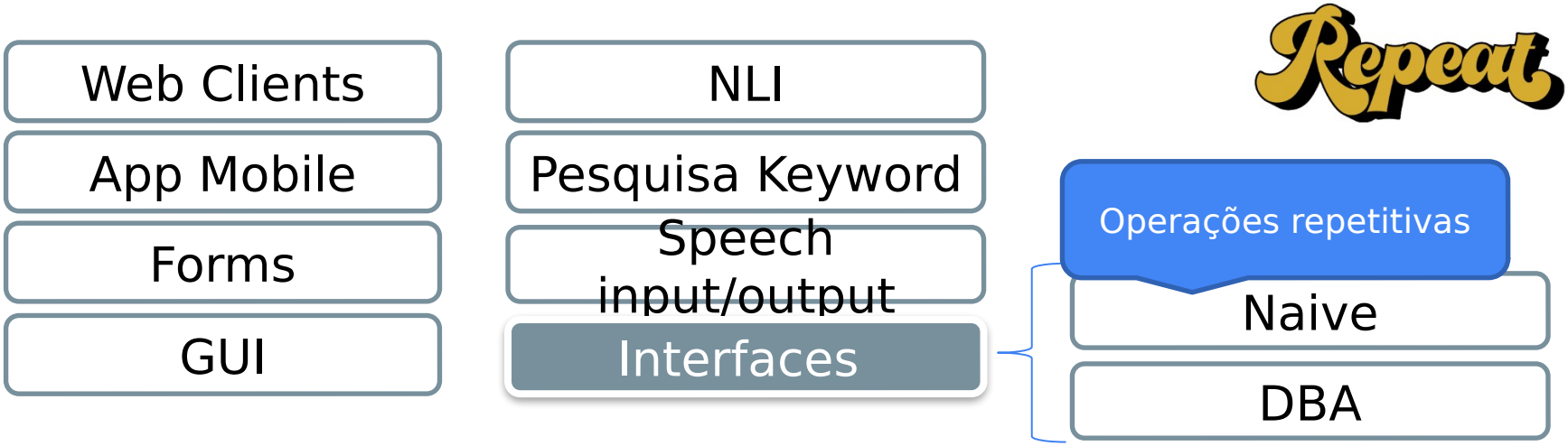

Web Clients
App Mobile
Forms
GUI
NLI
Macth: palavra/doc
Pesquisa Keyword
Speech input/output
Interfaces
Naive
DBA

Interfaces



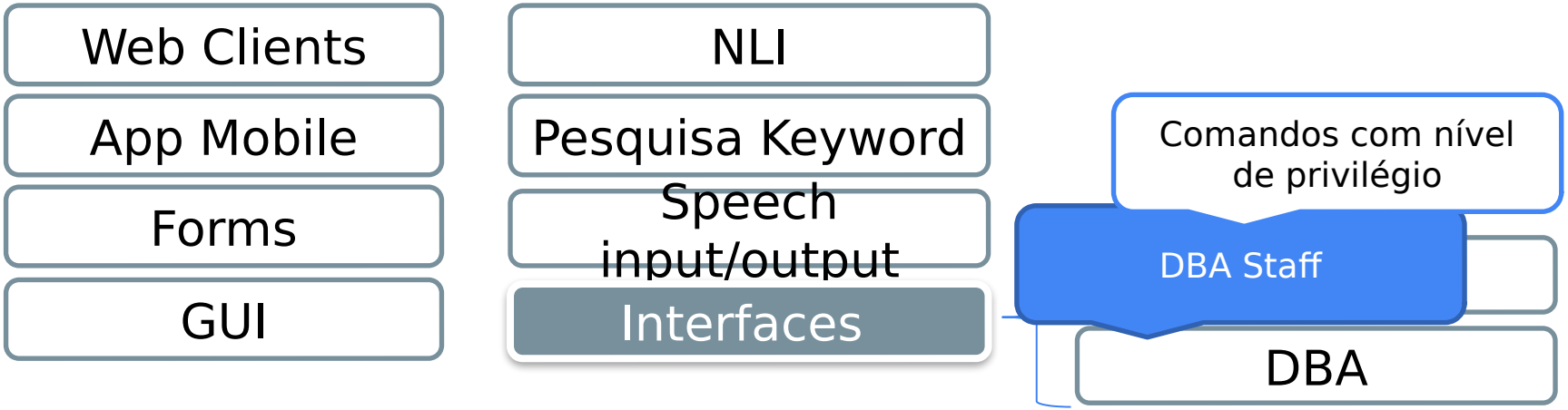
Speech como input e resposta

Interfaces



Transações de rotina e repetitivas - saldo do banco

Interfaces


Web Clients
App Mobile
Forms
GUI
NLI
Pesquisa Keyword
Speech input/output
Interfaces
Comandos com nível de privilégio
DBA Staff
DBA

Ambiente

Componentes

Software

Modularizado

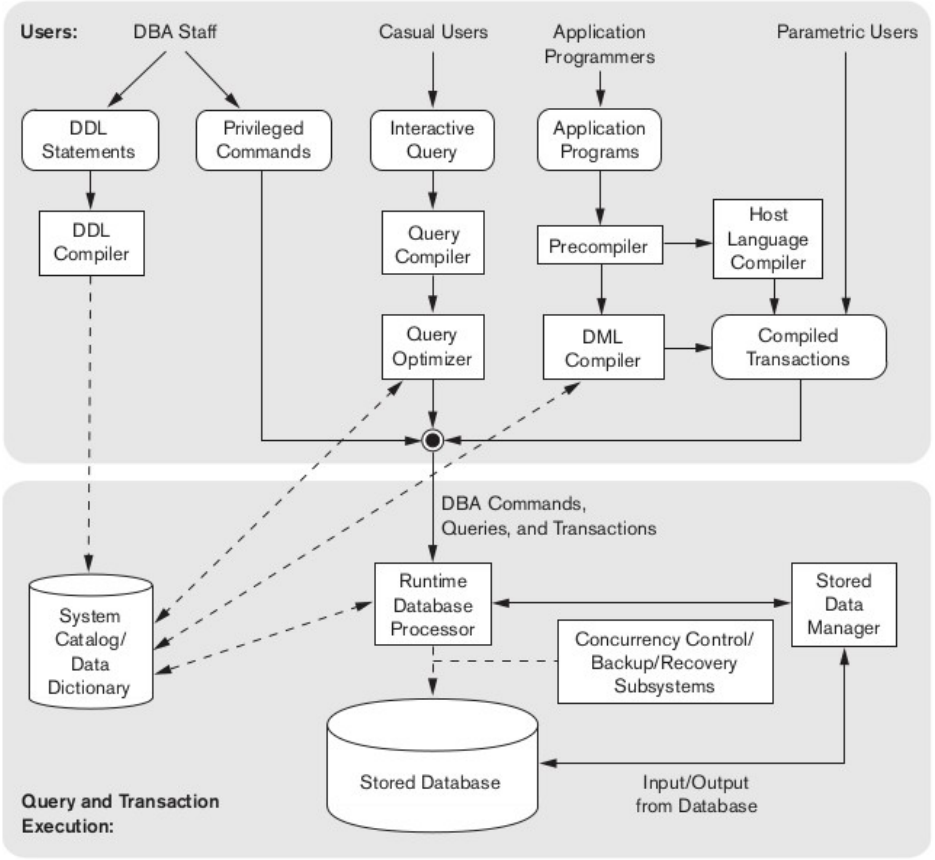


Figure 2.3
Component modules of a DBMS and their interactions.

Componentes

Ambiente de BD

Módulos internos

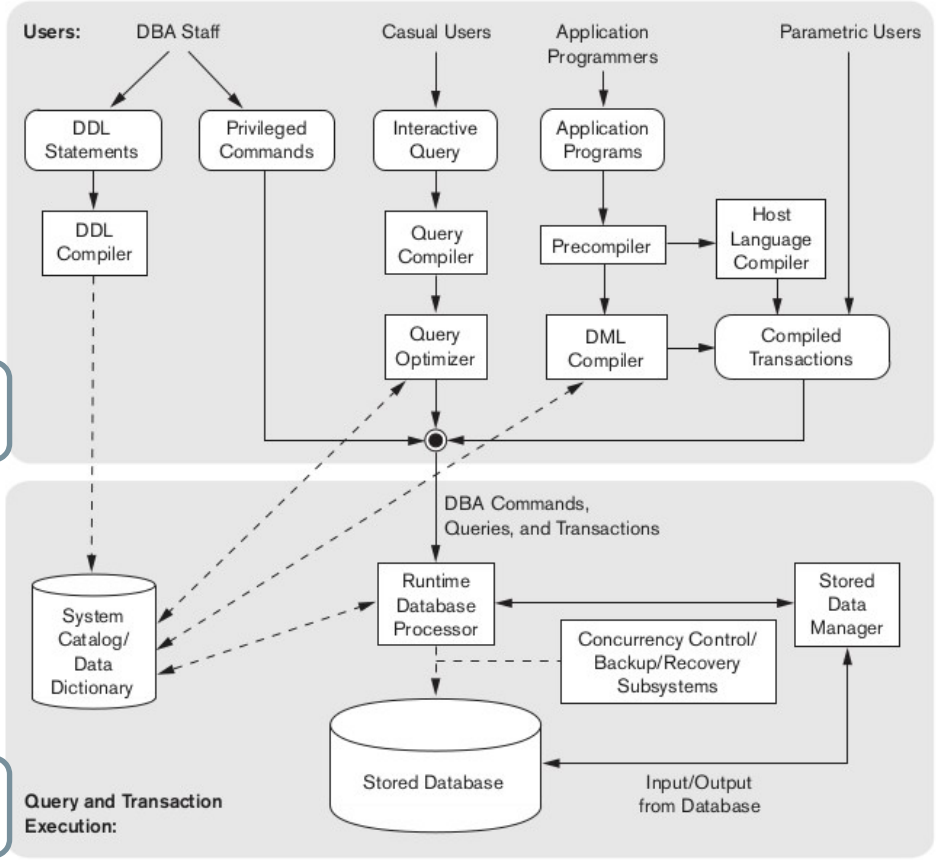


Figure 2.3
Component modules of a DBMS and their interactions.

Componentes

Esquema

Info de módulos

BD

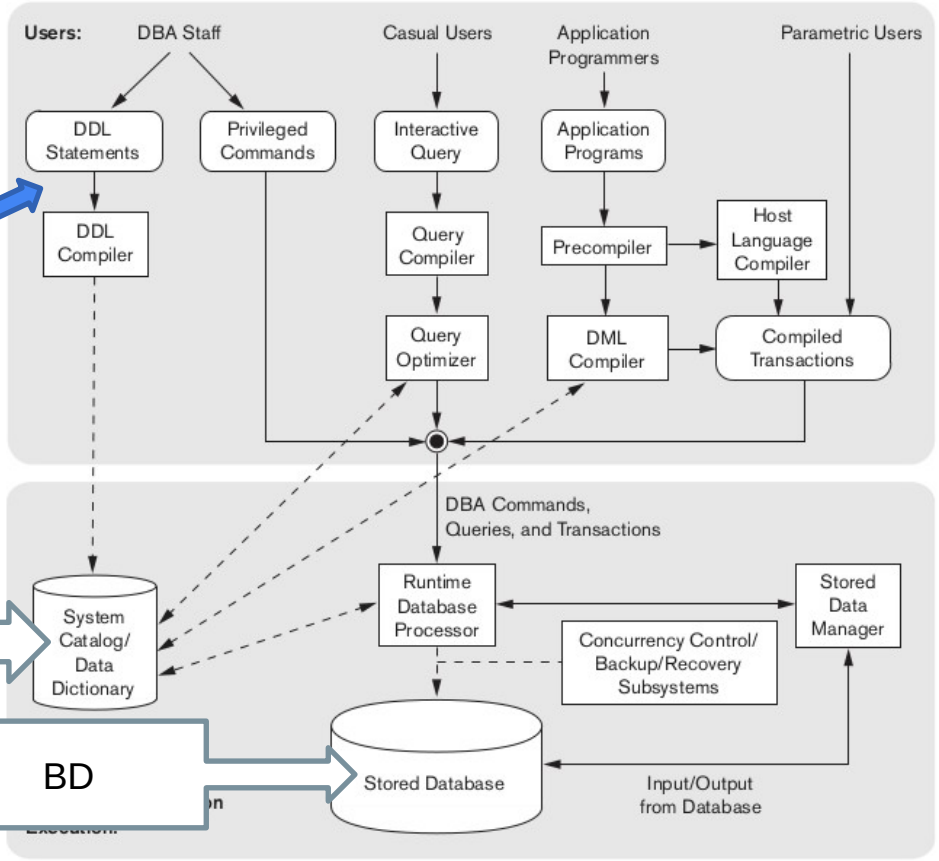


Figure 2.3
Component modules of a DBMS and their interactions.

Componentes

Acesso ocasional

Ex: Reordenação de operações

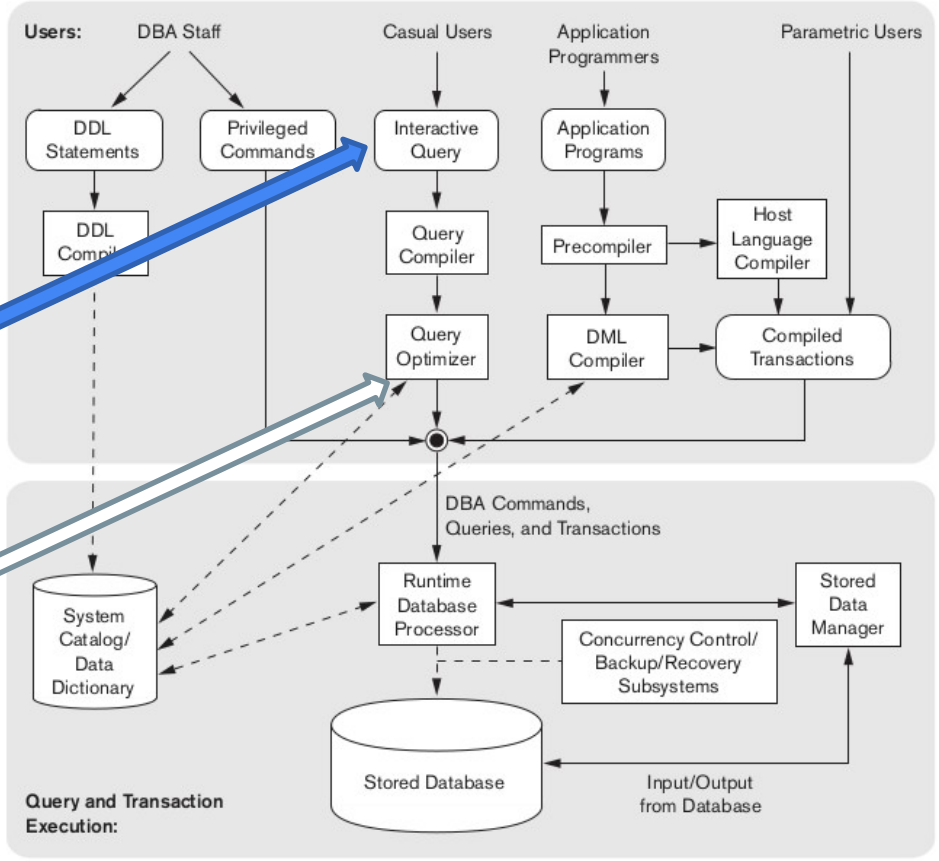
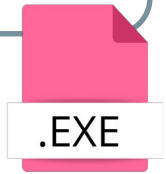


Figure 2.3
Component modules of a DBMS and their interactions.

Componentes

Acesso ocasional

Ex: Reordenação de operações, eliminar redundâncias ....



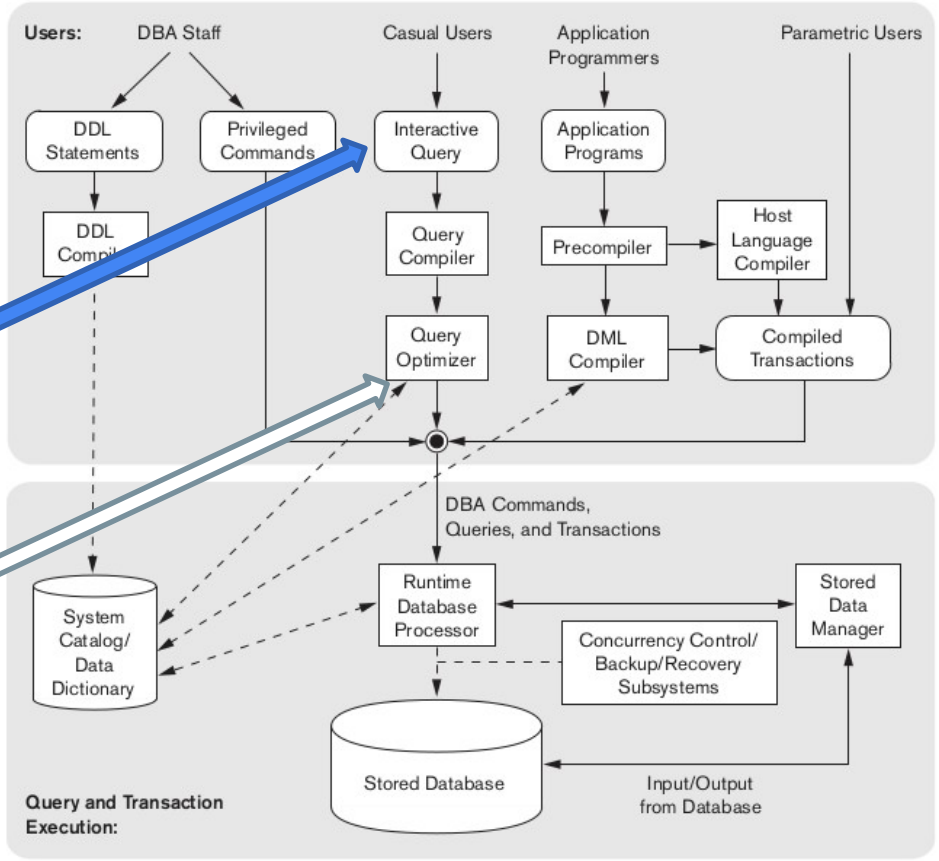


Figure 2.3
Component modules of a DBMS and their interactions.

Componentes

Linguagens de prog.

Extrai DML

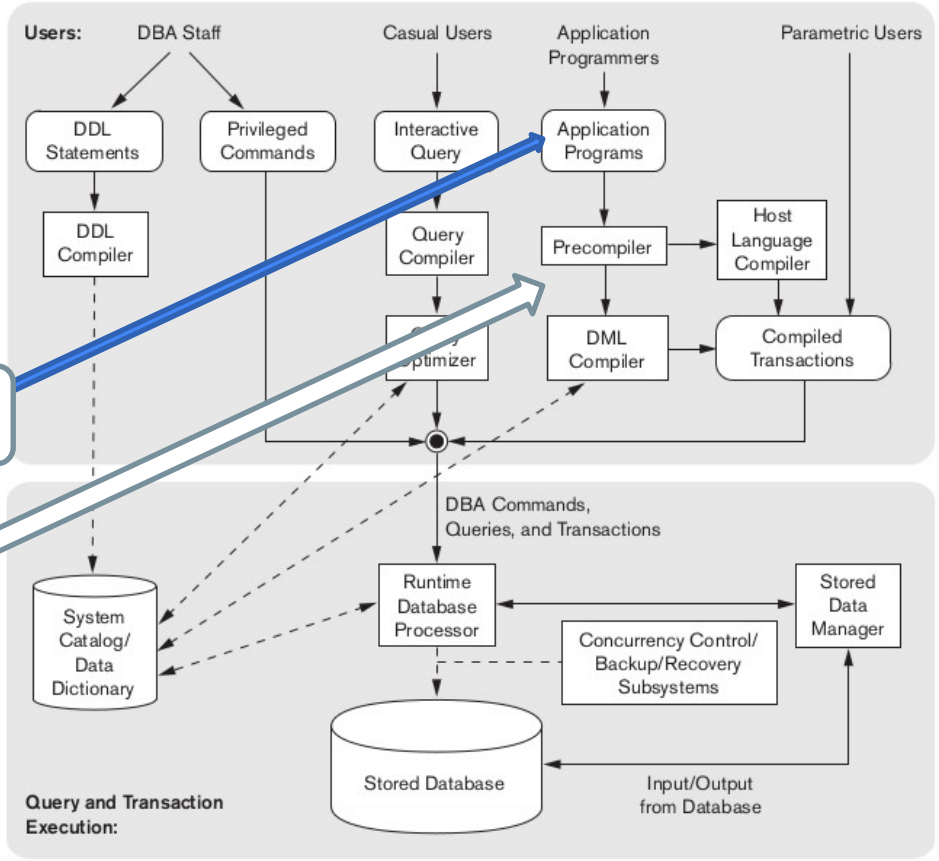


Figure 2.3
Component modules of a DBMS and their interactions.

Componentes

Canned Transaction

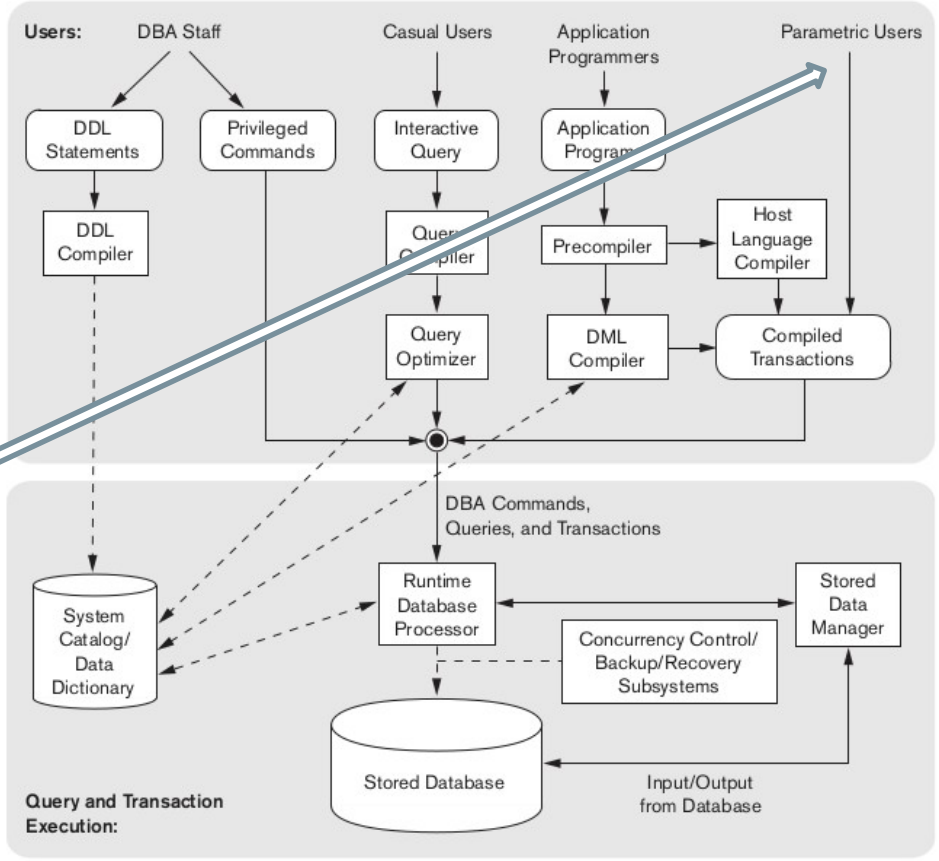


Figure 2.3
Component modules of a DBMS and their interactions.

Componentes

Privileged commands, Query plans, Canned transactions ...

Infos de hd/ram

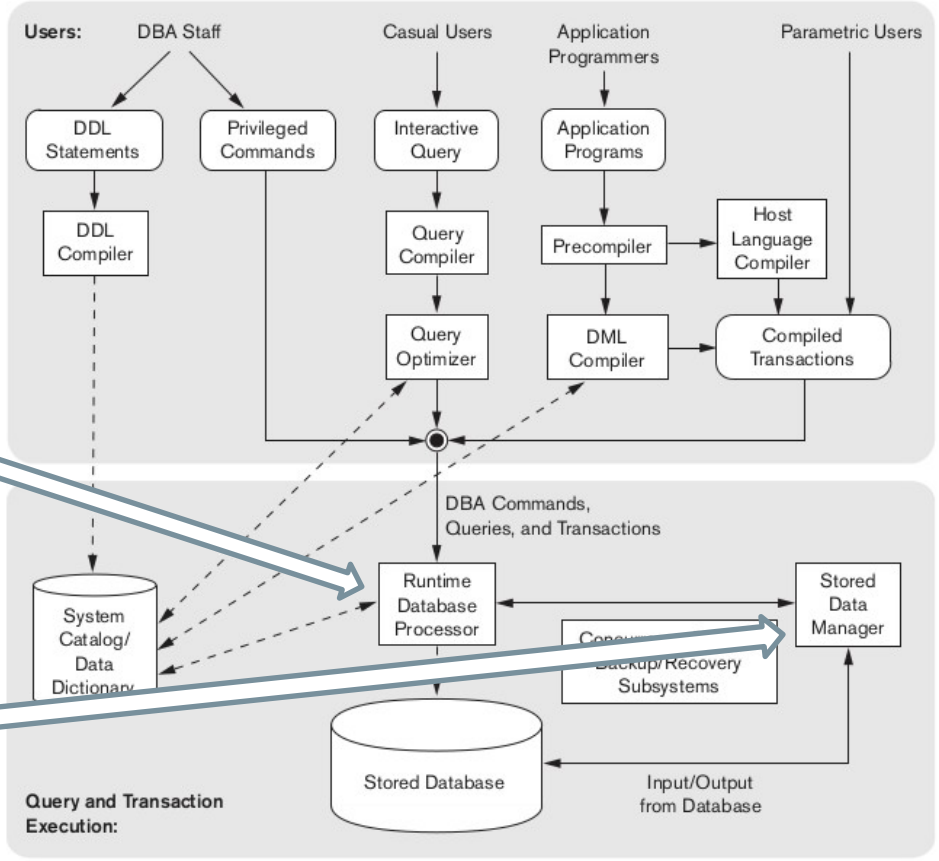
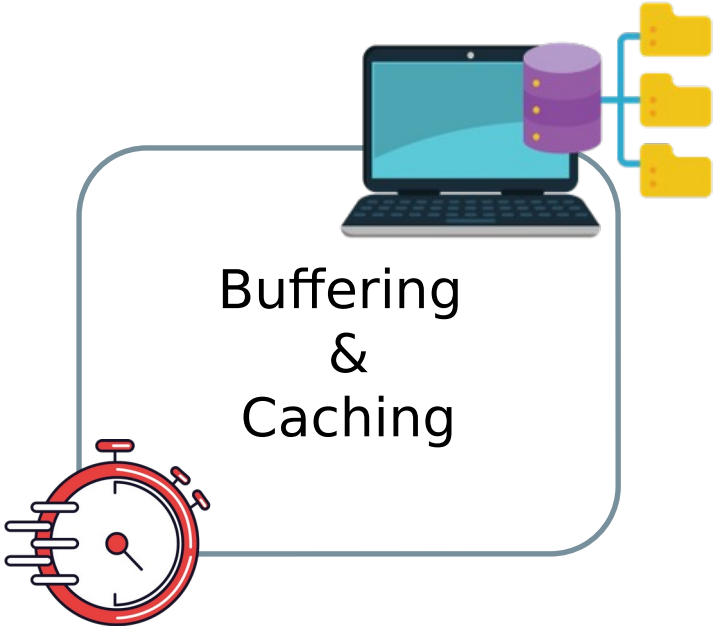


Figure 2.3
Component modules of a DBMS and their interactions.

Componentes



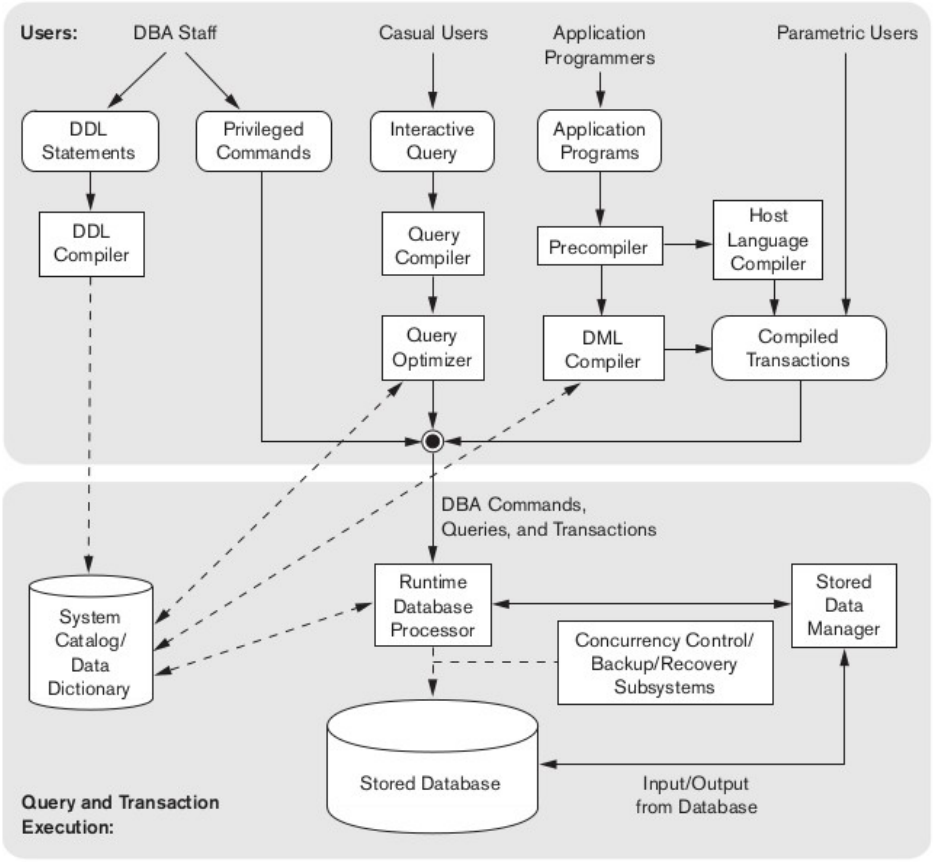
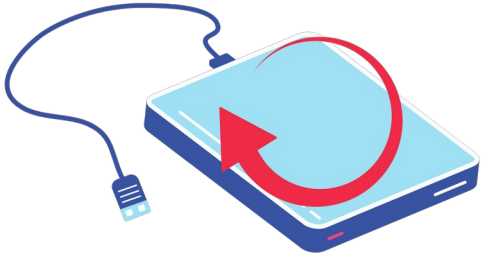


Figure 2.3
Component modules of a DBMS and their interactions.

Utilities – Gerenciamento



Monitoramento

Reorganização do storage

Backup

Loading

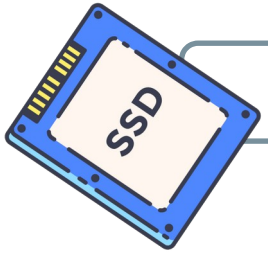
Reformatar os dados

Utilities – Gerenciamento

Monitoramento

Reorganização do storage

Backup



Loading

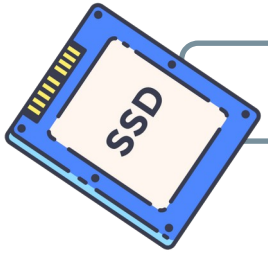
Utilities – Gerenciamento

Monitoramento

Reorganização do storage

Incremental

Backup



Loading

Utilities – Gerenciamento

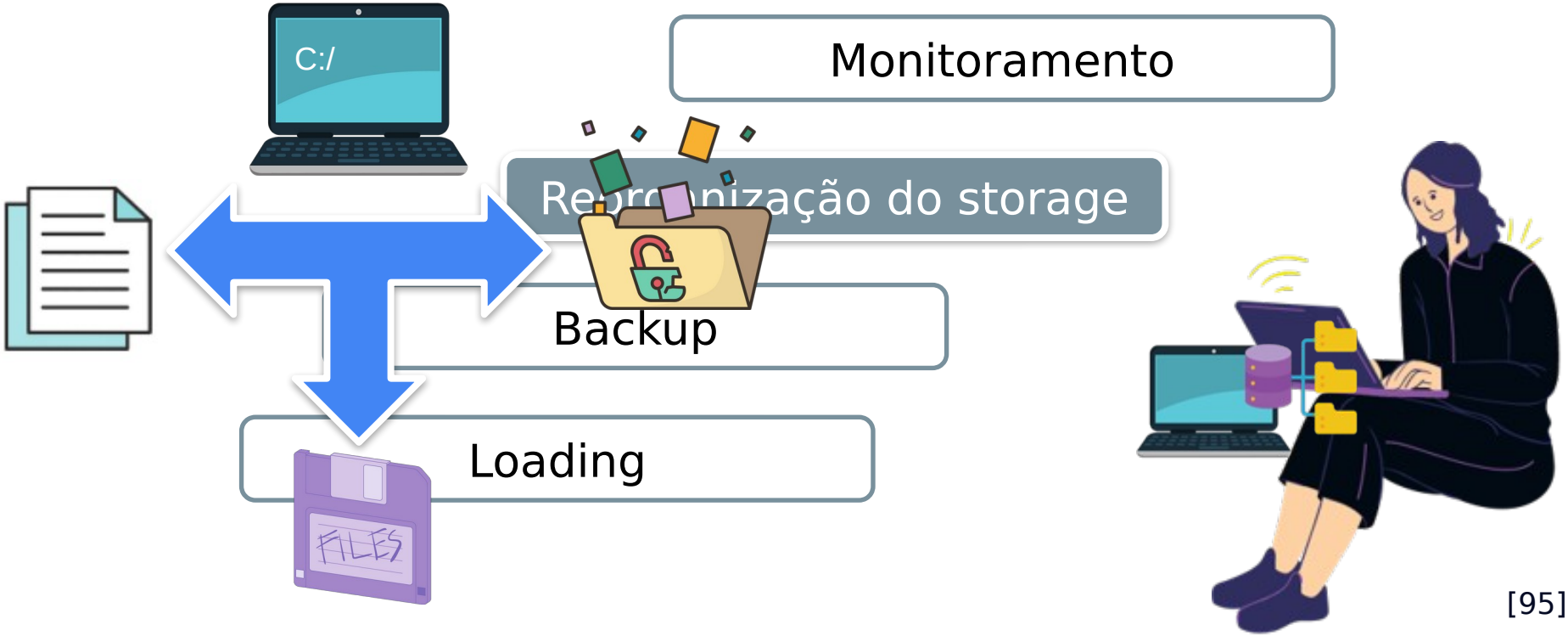
Monitoramento

Reorganização do storage

Backup

Loading

Utilities – Gerenciamento



Utilities – Gerenciament

Monitoramento

Reorganização do storage

Backup

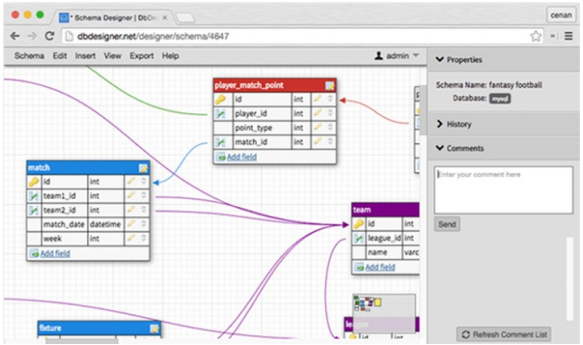
Loading

Estatísticas do BD → Decisões

Ferramentas e aplicações

Data dictionary system

Armazena informações de decisão de design, padrões de utilização, descrição de aplicações



Terminal, workstations, PCs

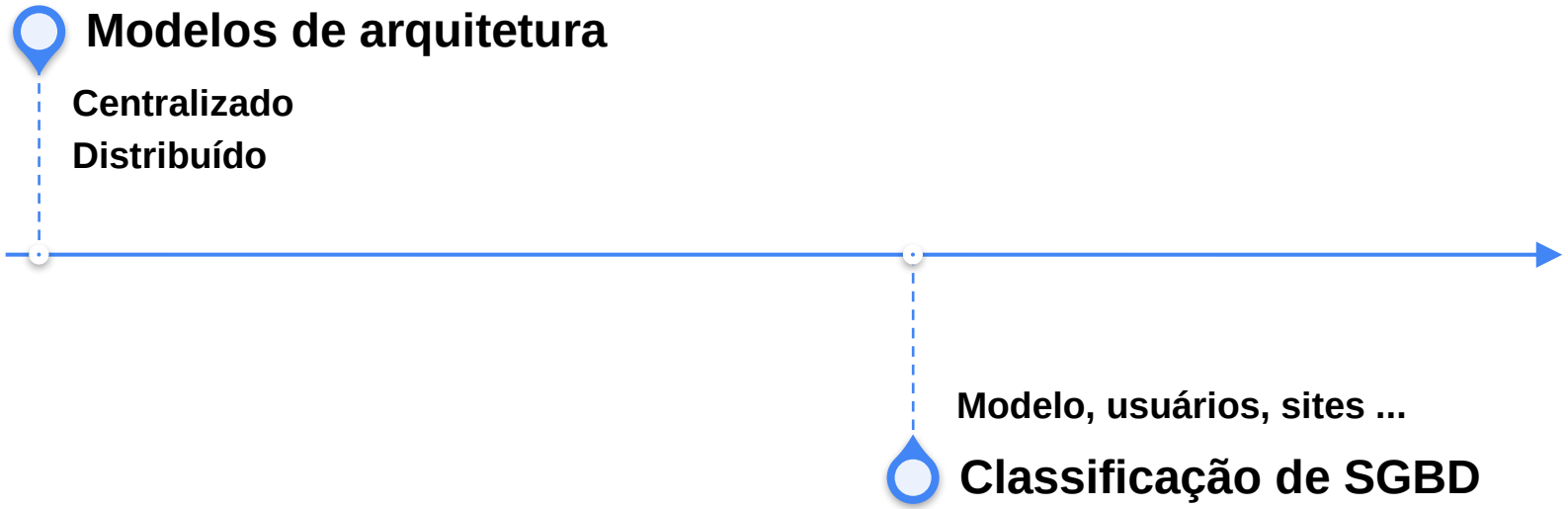
Software de comunicação

Etapa 10

Arquitetura: Modelo Cliente-servidor e Classificação de SGBDs

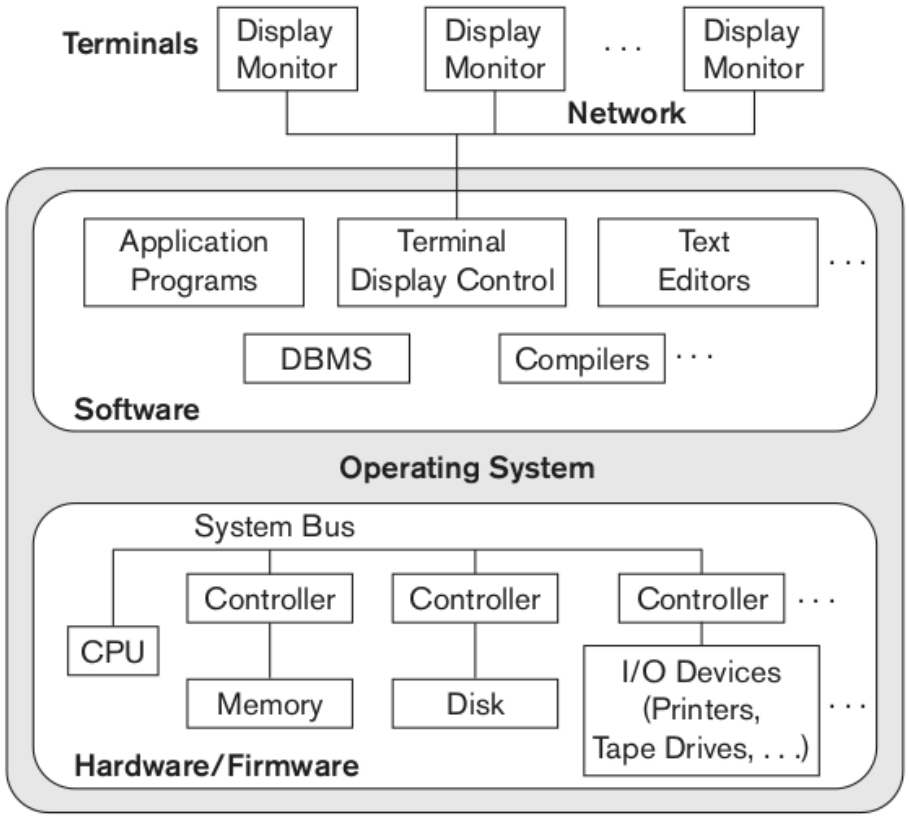
// Introdução à Banco de dados

Conversa


Modelos de arquitetura
Centralizado
Distribuído
Modelo, usuários, sites ...
Classificação de SGBD

Arquitetura

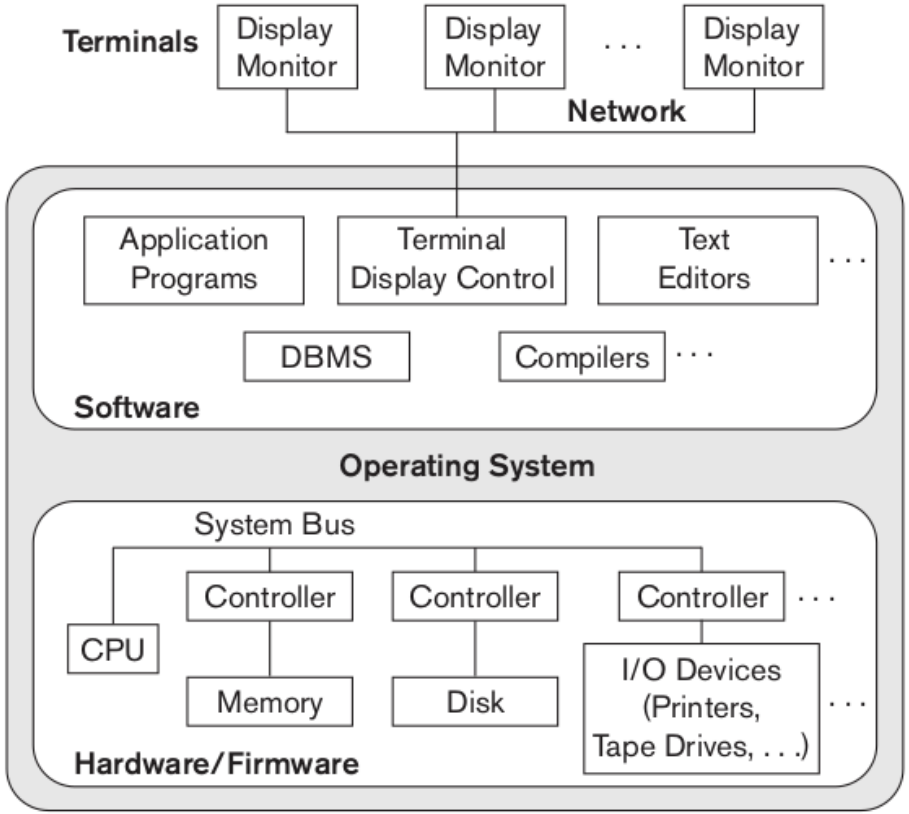
Arquitetura Física Centralizada



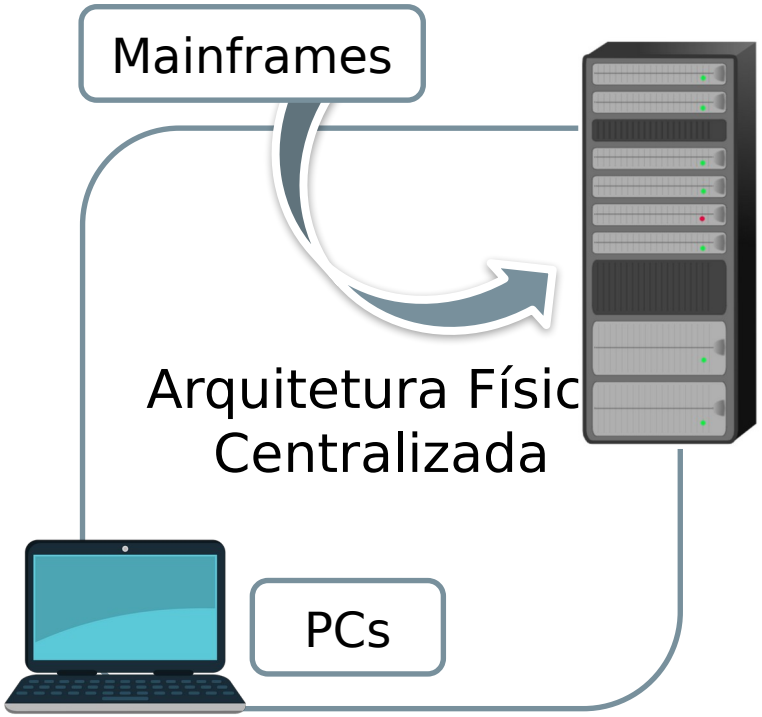
Arquitetura

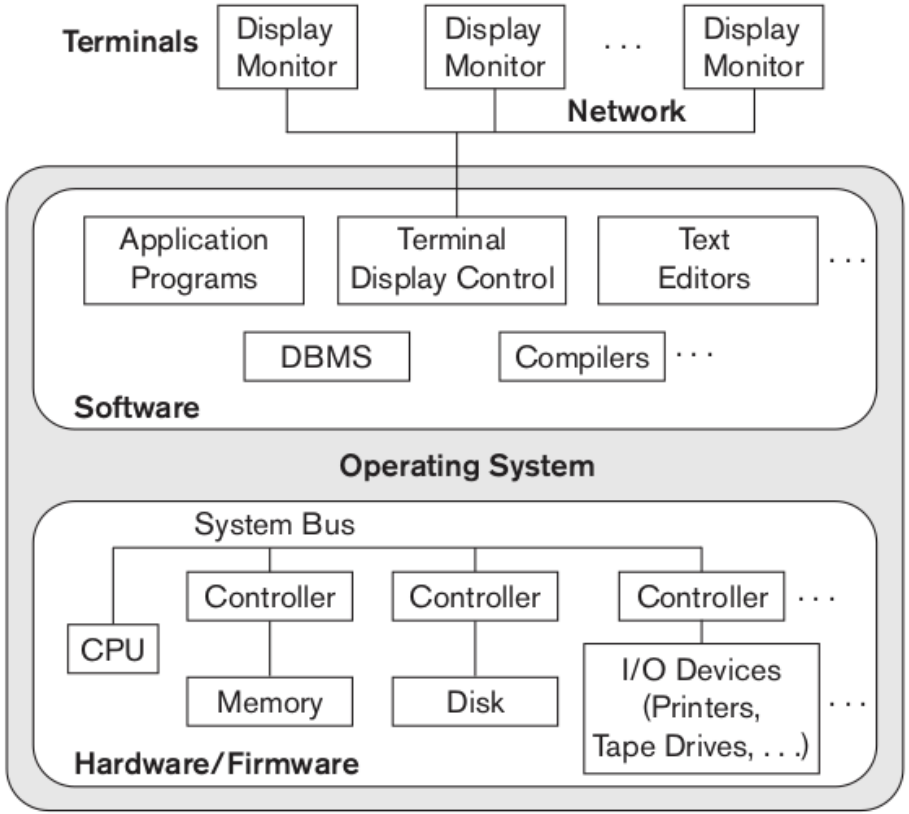
Mainframes

Arquitetura Físic
Centralizada

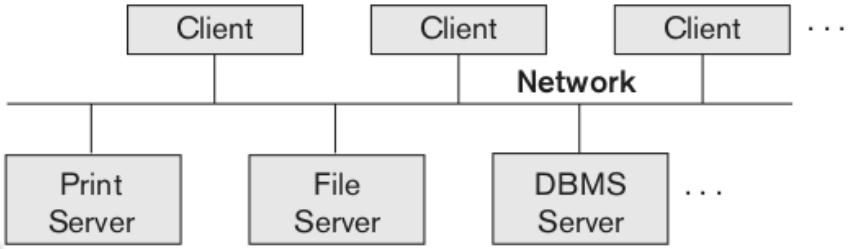


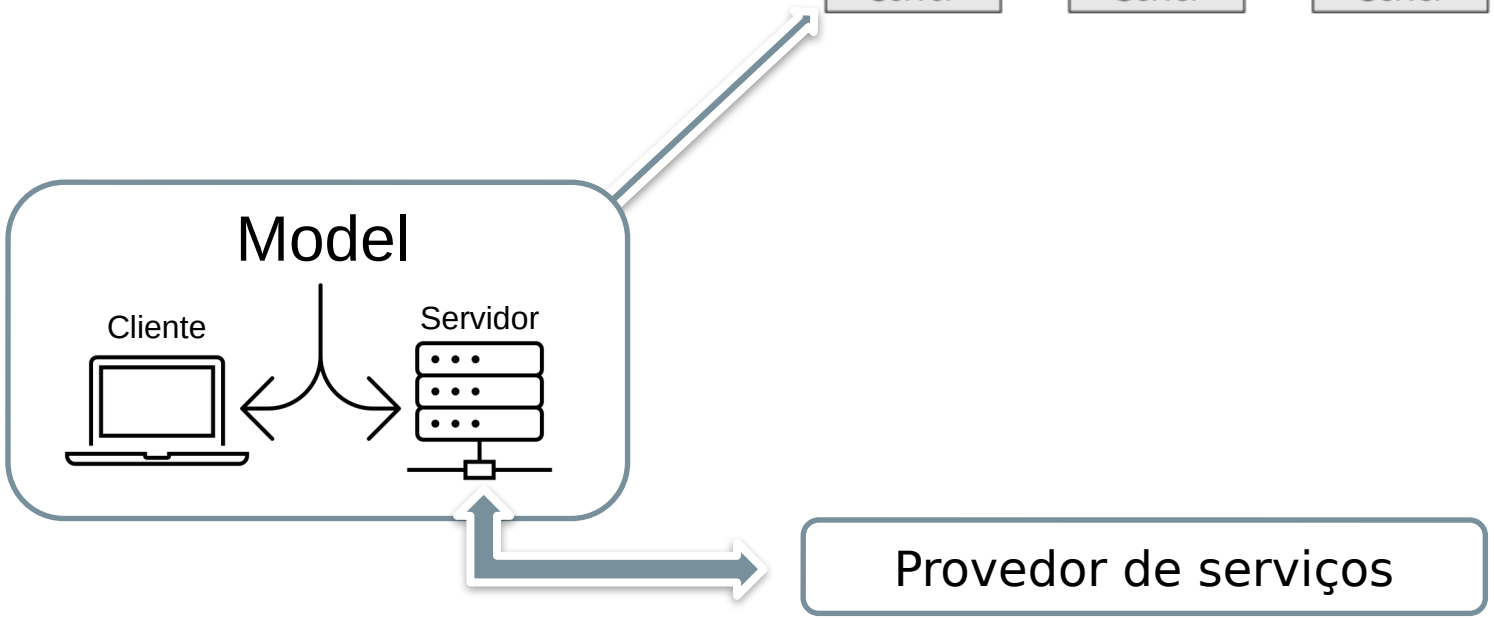
Arquitetura





Arquitetura





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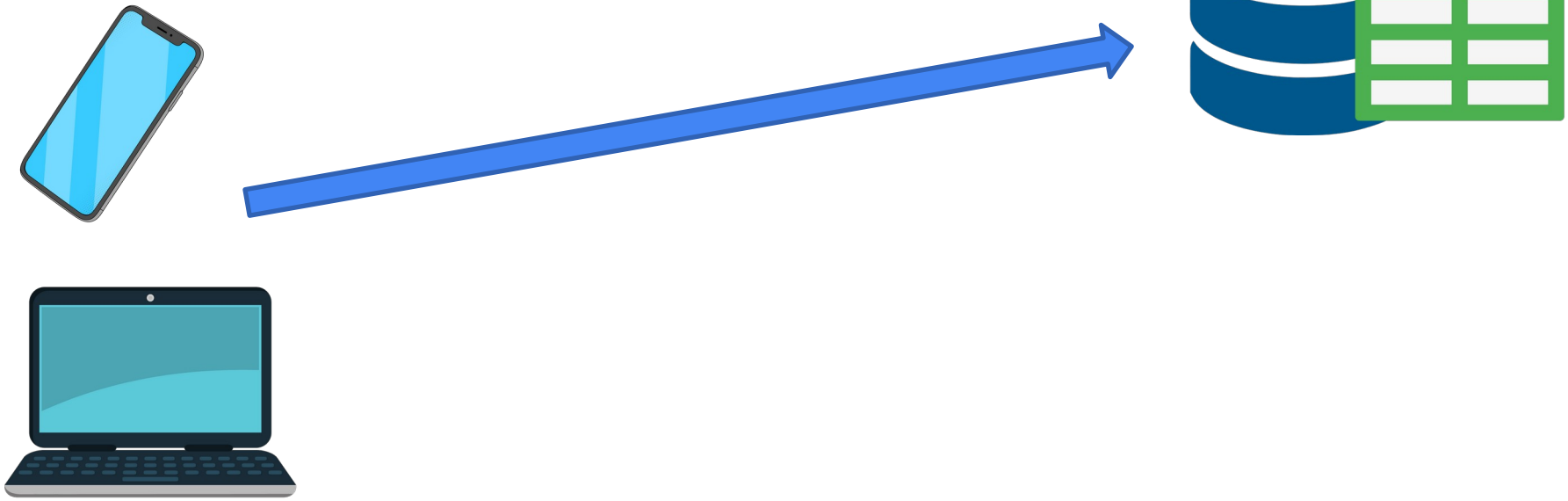
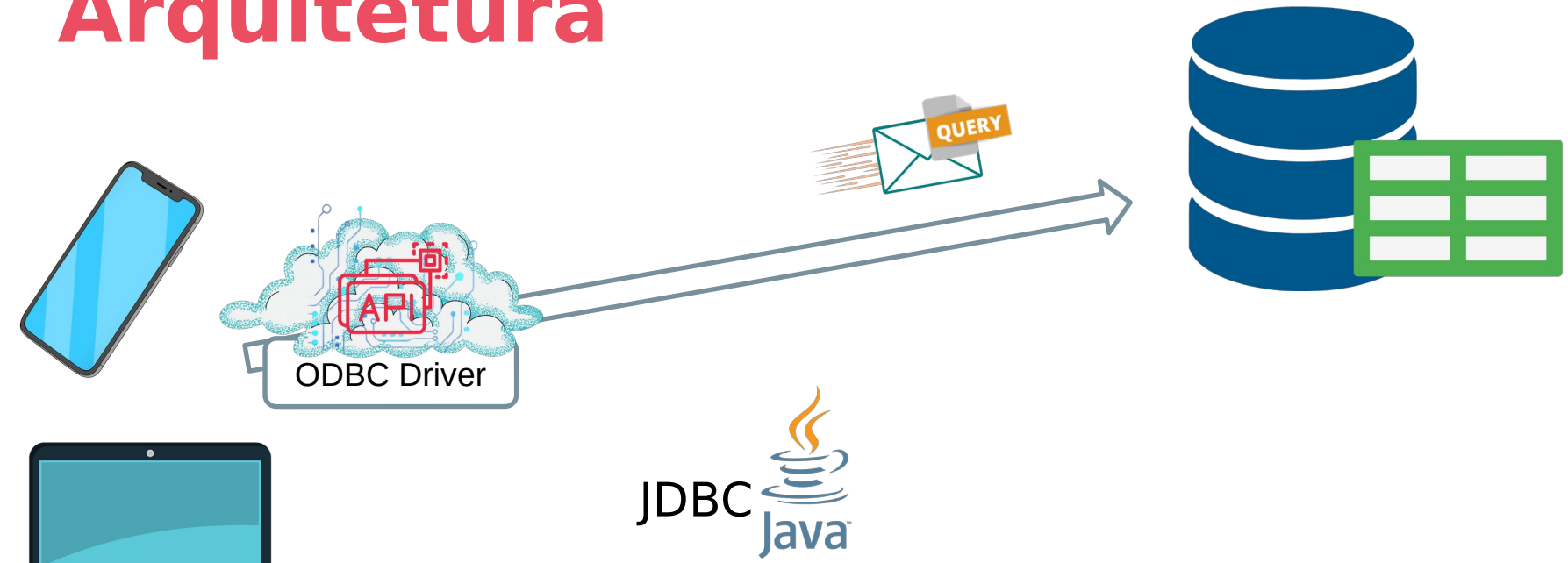
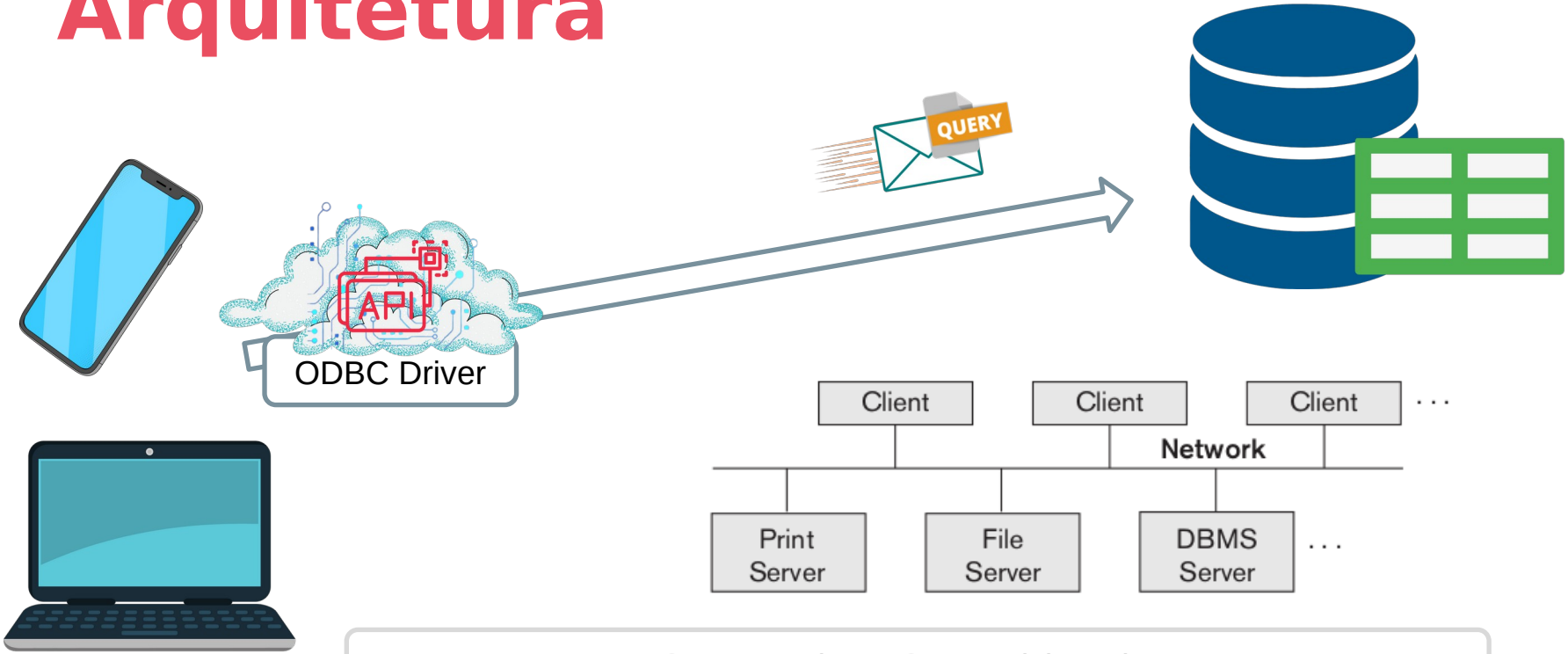


Arquitetura



Open Database Connectivity Driver

Arquitetura

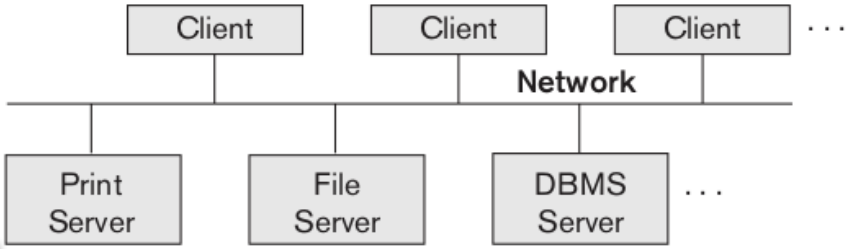


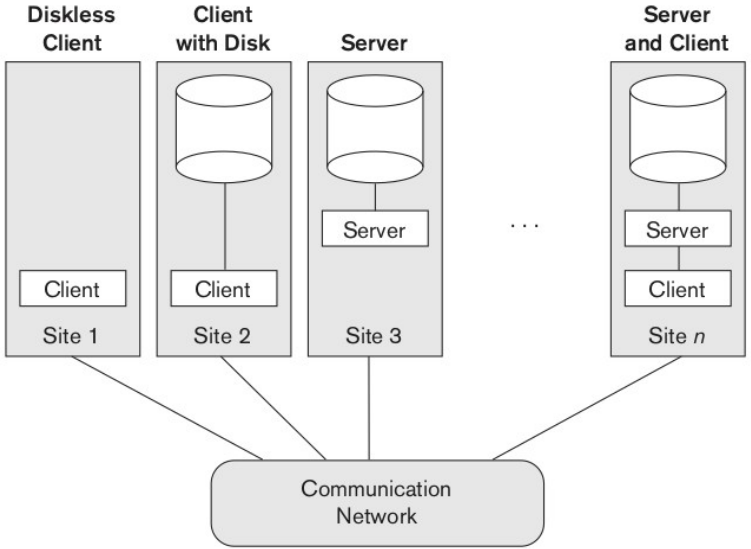
Open Database Connectivity Driver

Arquitetura

Arquitetura Lógica e Física cliente/servidor

Two-tier



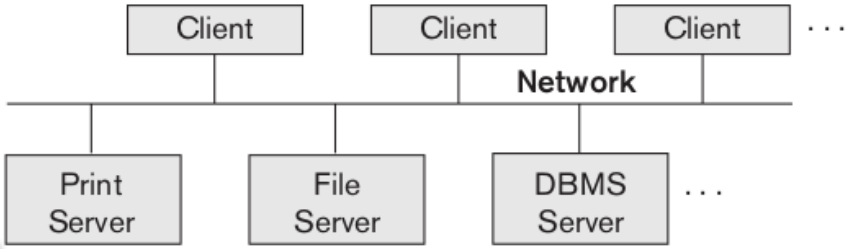


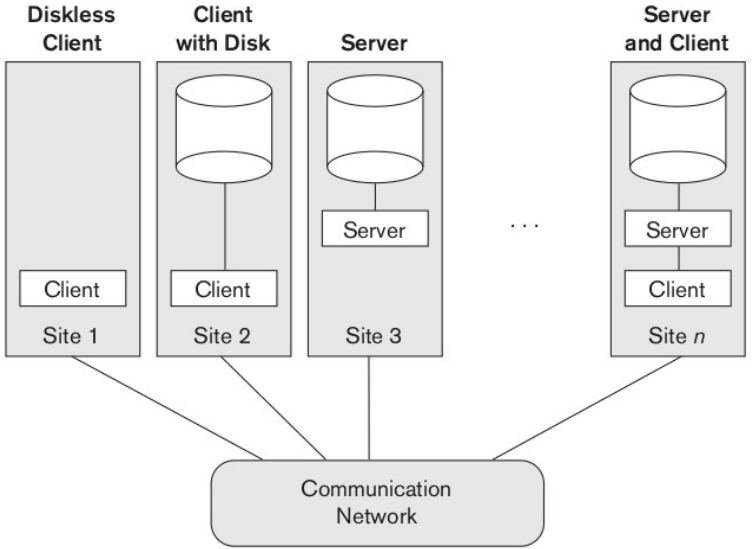
Arquitetura

Simplicidade & Compatibilidade

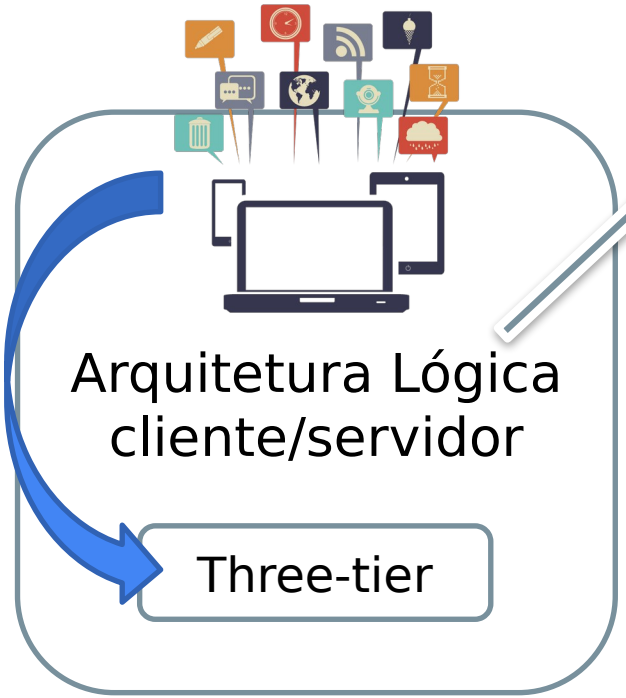
Arquitetura Lógica e Física cliente/servidor

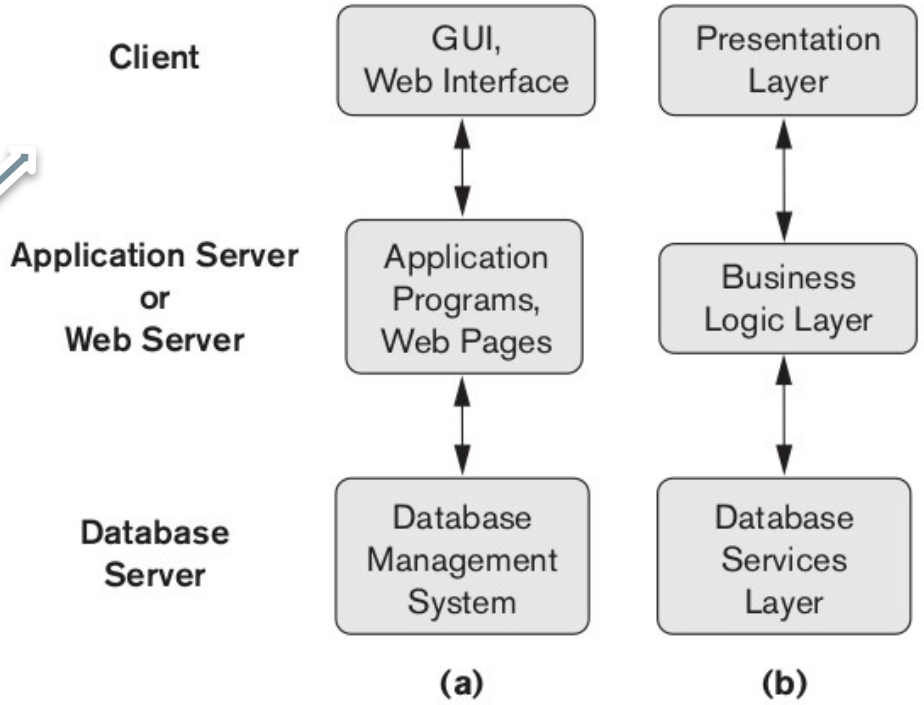
Two-tier



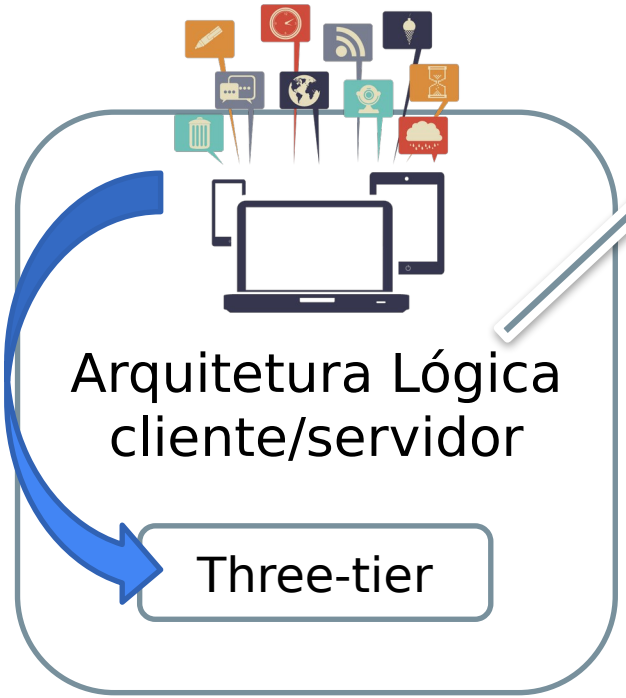


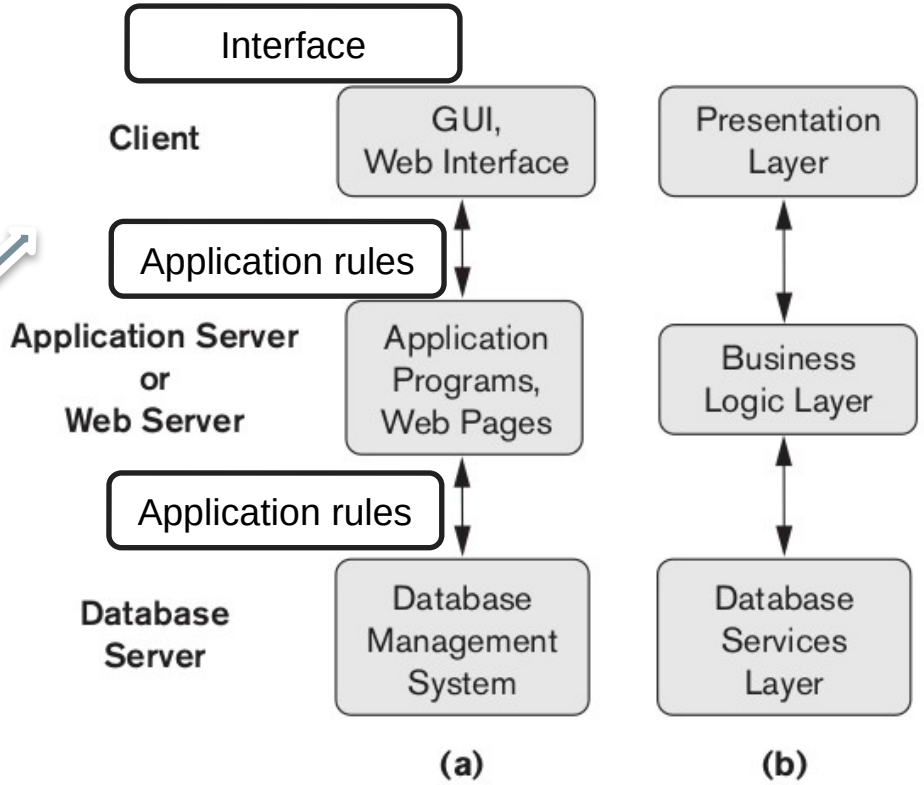
Arquitetura





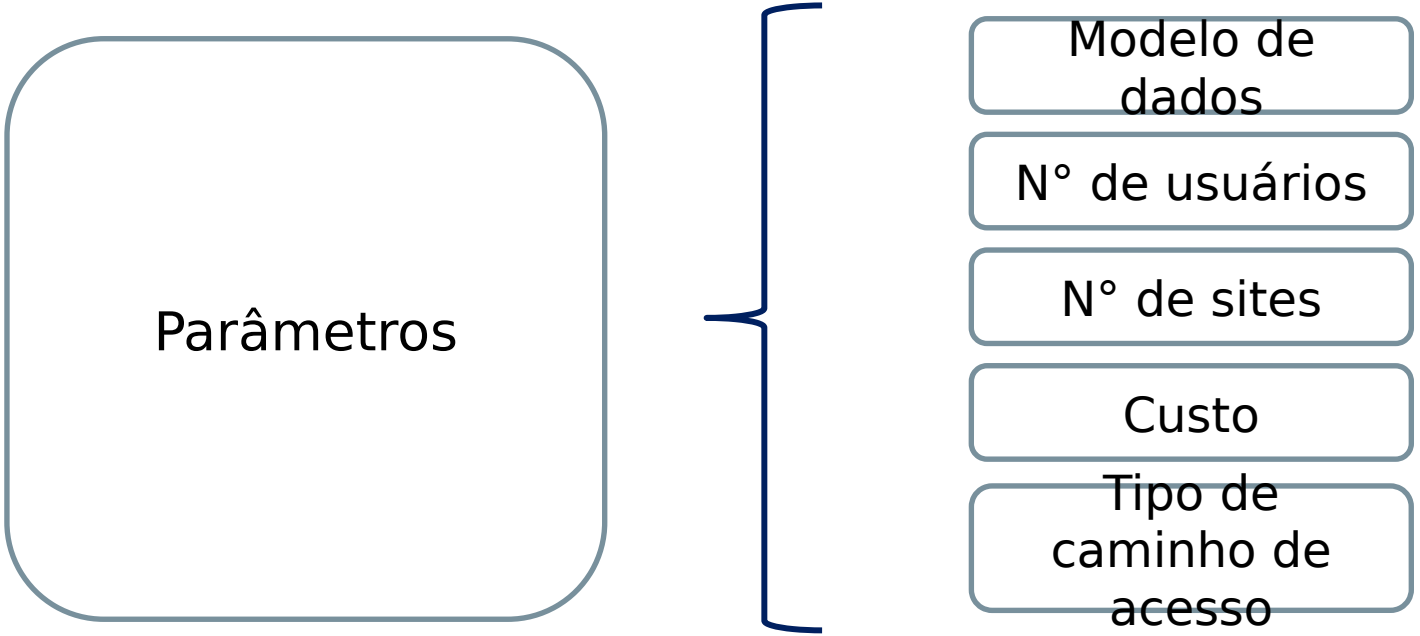
Arquitetura



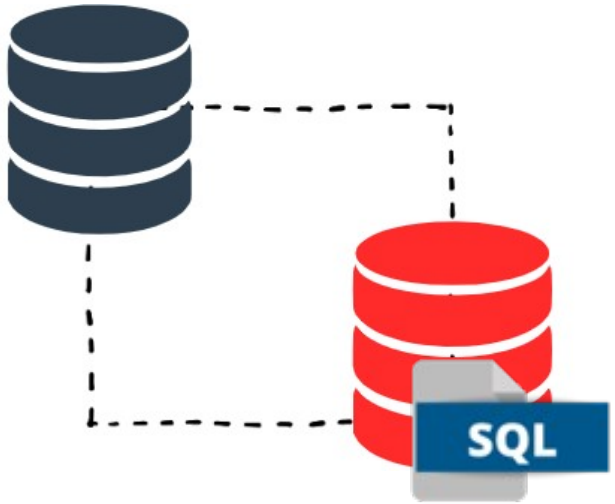


Classificação de SGBDs

Classificação



Classificação



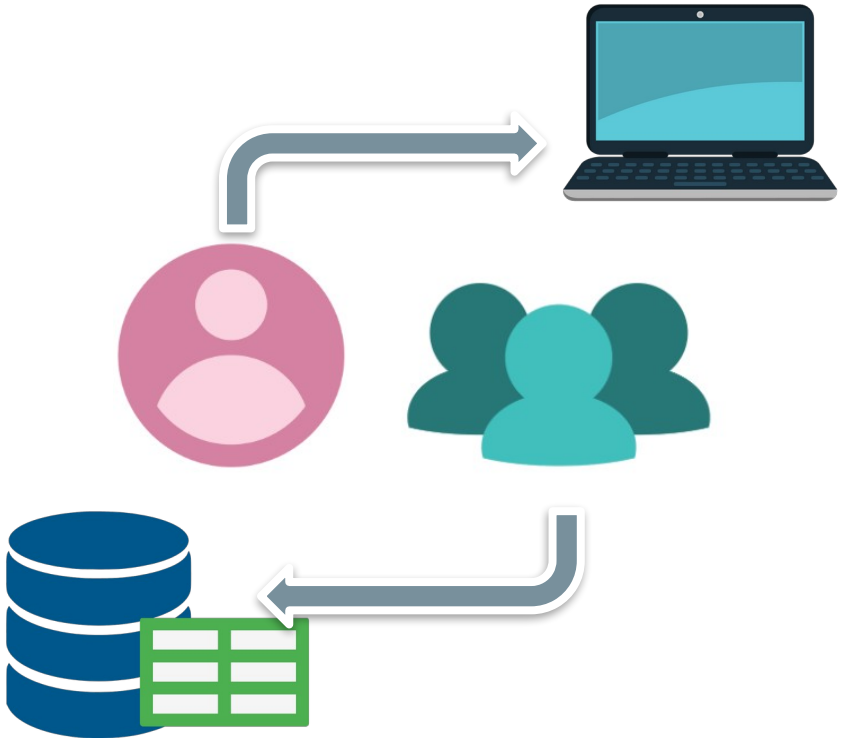
- Modelo de dados
- N° de usuários
- N° de sites
- Custo
- Tipo de caminho de acesso

Classificação

cassandra

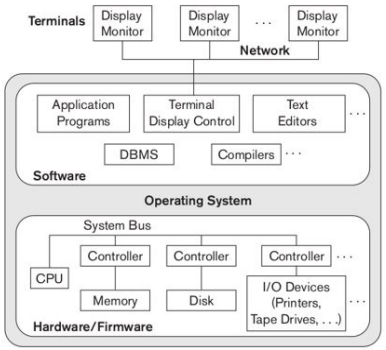
- Modelo de dados
- N° de usuários
- N° de sites
- Custo
- Tipo de caminho de acesso

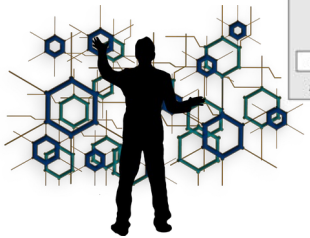
Classificação

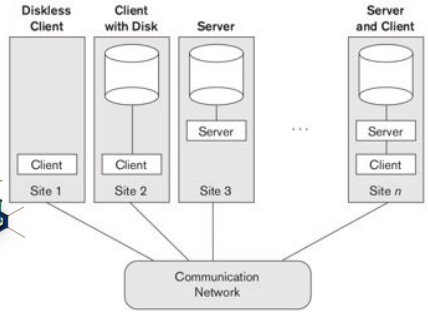


- Modelo de dados
- **N° de usuários**
- N° de sites
- Custo
- Tipo de caminho de acesso

Classificação







- Modelo de dados
- N° de usuários
- **N° de sites**
- Custo
- Tipo de caminho de acesso

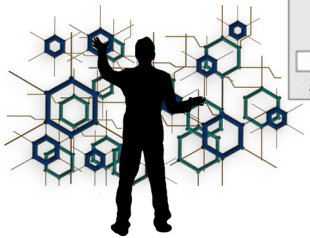
Classificação

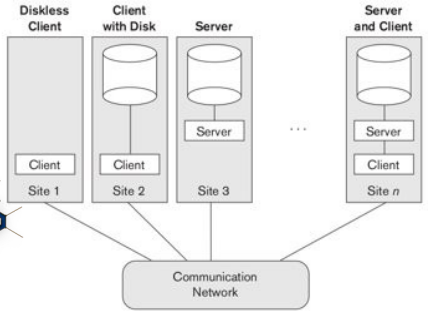
Big data

Replicação

DB federado

Heterogeneidade





- Modelo de dados
- N° de usuários
- N° de sites
- Custo
- Tipo de caminho de acesso

Classificação

User licences

Módulos: replicação, paralelismo ....

- Modelo de dados
- N° de usuários
- N° de sites
- **Custo**
- Tipo de caminho de acesso

Classificação

SGBD de estrutura de arquivos invertida

Nome file

Armazenamento de arquivos

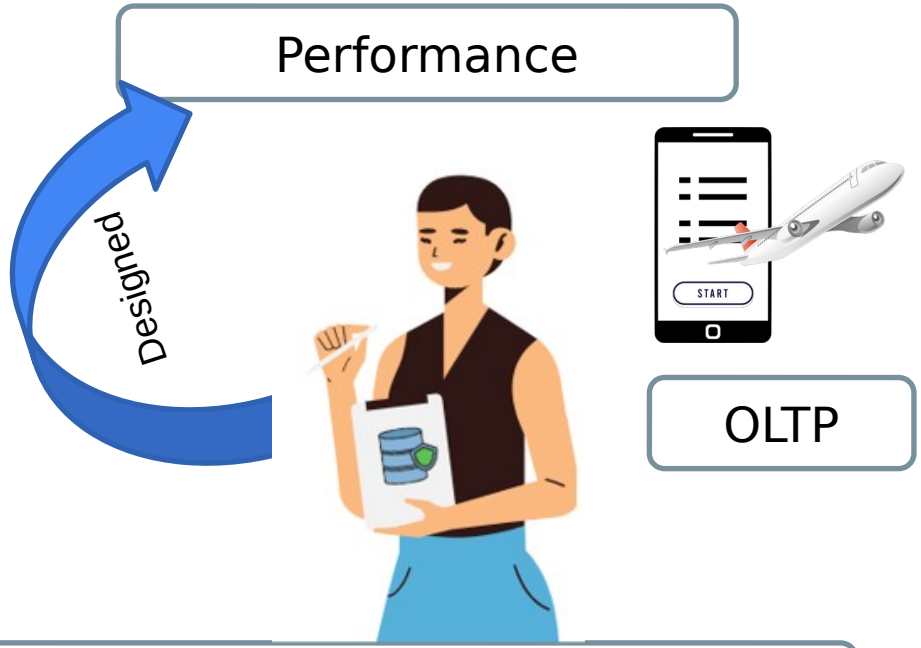
- Modelo de dados
- N° de usuários
- N° de sites
- Custo
- Tipo de caminho de acesso

Classificação

Performance

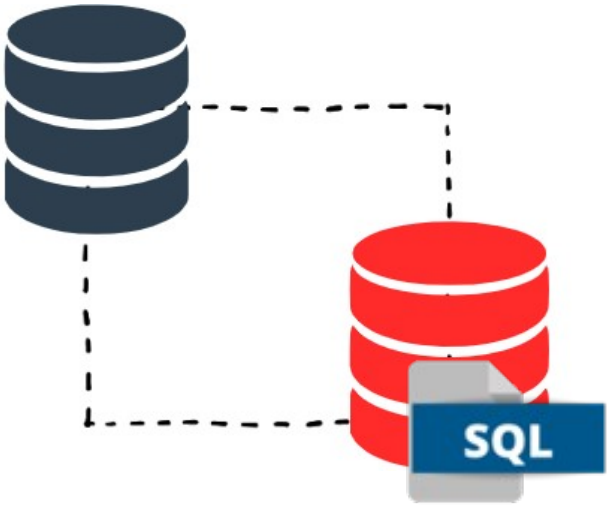
SGBD de Propósito Geral

Classificação



SGBD de Propósito Geral

Classificação - Relacional



Coleções de tabelas

Tabela → File

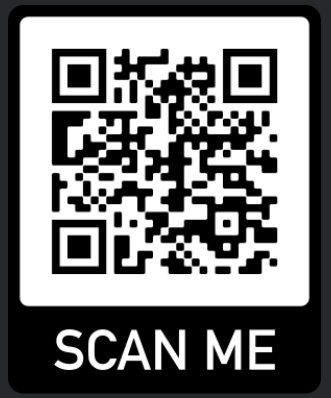
Alto Nível

View → User

Dúvidas?

> Fórum/Artigos

> Comunidade Online (Discord)



Para saber mais

Referências principais:

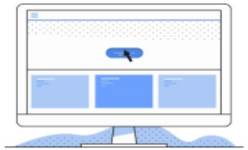
- Referência bibliográfica: Fundamentals of Database Systems – Navathe, 7° edição editora: Pearson

- Projeto de banco de dados: Uma visão prática - Edição revisada e ampliada - Machado 17° edição, editora: Saraiva

Para saber mais

Outras referências:

https://www.ime.usp.br/~andrers/aulas/bd2005-1/aula3
https://www.devmedia.com.br/a-historia-dos-banco-de-dados/1678
https://db-engines.com/en/ranking
https://www.opservices.com.br/banco-de-dados/
https://www.quora.com/What-is-a-canned-transaction

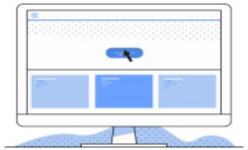


Para saber mais

Outras referências:

https://www.geeksforgeeks.org/impedance-mismatch-in-dbms/#:~:text=Impedance%20mismatch%20is%20the%20term,Attributes%20and%20their%20data%20types

https://www.oreilly.com/library/view/mysql-reference-manual/0596002653/ch03s05.html



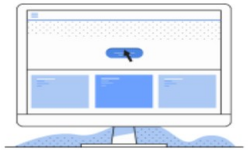
Para saber mais

Outras referências:

https://docs.oracle.com/pt-br/solutions/deploy-lustre-fs/index.html#:~:text=Lustre%20%C3%A9%20um%20sistema%20de,do%20Linux%20e%20do%20cluster

.

https://stackoverflow.com/questions/1075074/opinions-on-netcdf-vs-hdf5-for-storing-scientific-data#:~:text=NetCDF%2C%20starting%20with%20version%204.0,a%20much%20wider%20tool%20base



Para saber mais

Empresas e SGBDs:

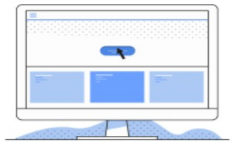
https://www.quora.com/What-are-all-the-DBMS-that-are-being-used-by-Google-Facebook-and-Twitter-1

https://introbigdata.org/

https://www.mongodb.com/big-data-explained/examples

https://intellipaat.com/blog/10-big-data-examples-application-of-big-data-in-real-life/

https://instagram-engineering.com/instagration-pt-2-scaling-our-infrastructure-to-multiple-data-centers-5745cbad7834



Para saber mais

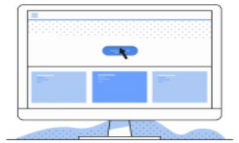
Empresas e SGBDs:

https://blog.twitter.com/engineering/en_us/topics/infrastructure/2017/the-infrastructure-behind-twitter-scale#:~:text=Twitter%20was%20built%20on%20MySQL,eventually%20many%20large%20database%20clusters

.

https://www.mysql.com/customers/view/?id=757

https://engineering.linkedin.com/espresso/introducing-espresso-linkedins-hot-new-distributed-document-store#:~:text=To%20meet%20the%20needs%20of,both%20serving%20different%20use%20cases

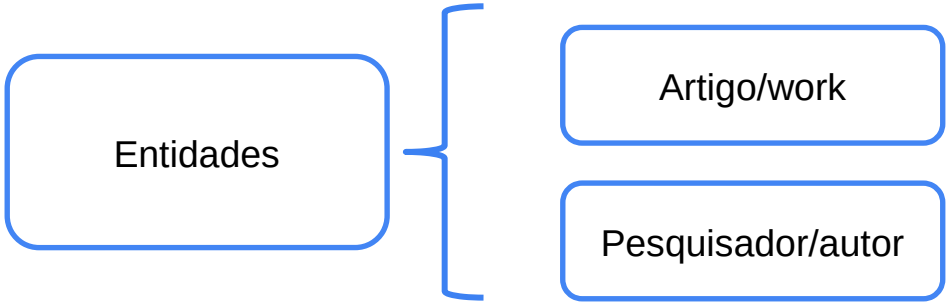


Desafio textual

Defina!

- Dados e banco de dados
- SGBD, Sistema de Banco de Dados e Catálago de BD
- Independência program/data, user view
- DBA, transações canned, metadados e aplicação de processamento de transação

Desafio


Entidades
Artigo/work
Pesquisador/autor


nome
Periódicos
Publicado-por
Editoras
nome
issn
país