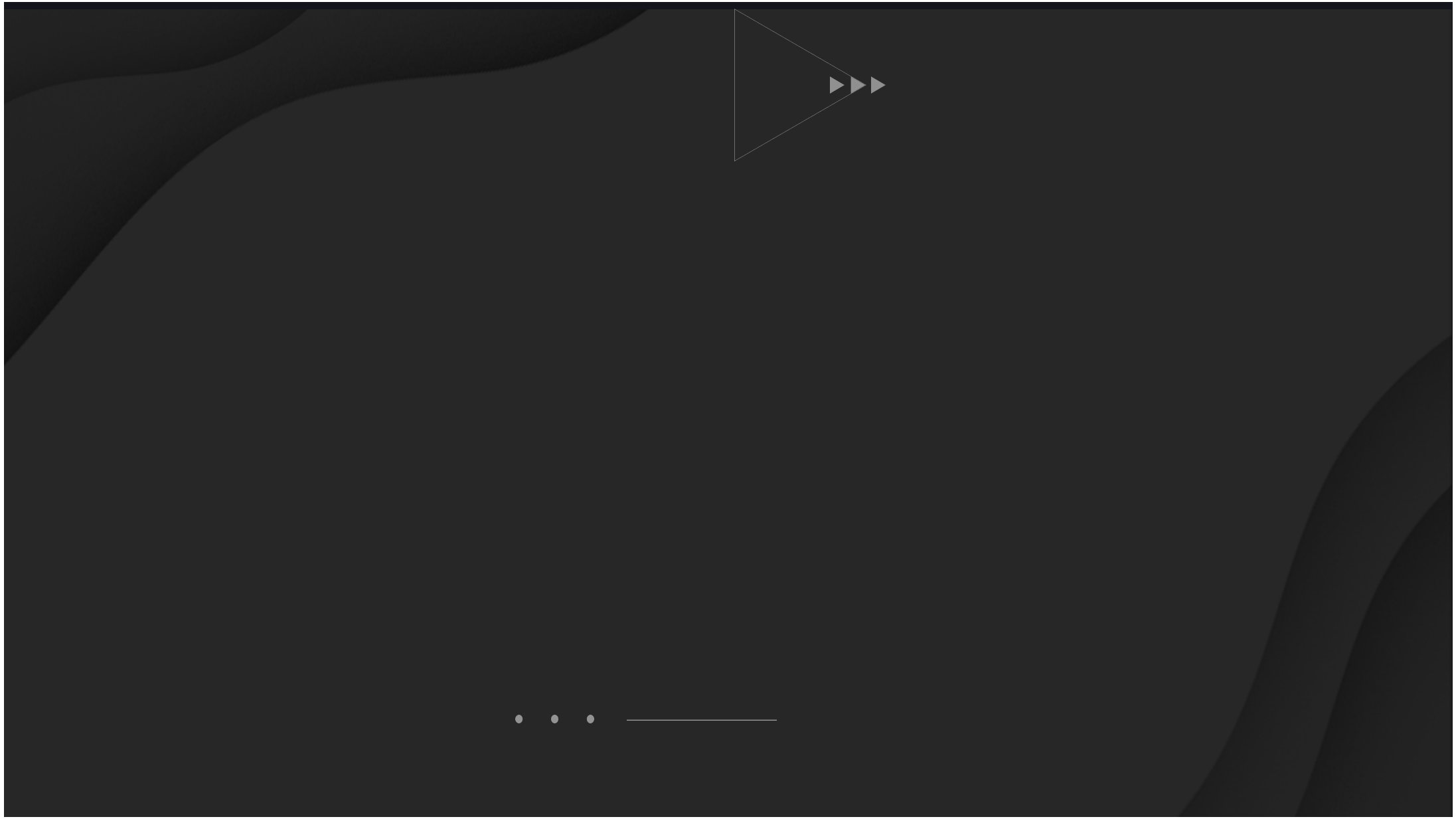
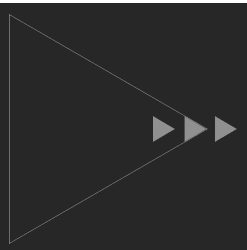
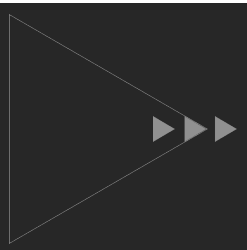


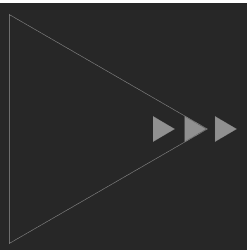

gb.tech



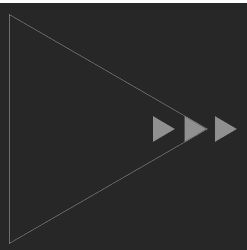
800 sistemas



700 repositórios



Multi Cloud



Times de desenvolvimento

Grafos, Micro serviços, monólitos e integrações

Como conhecer a arquitetura da sua empresa!

Bruno Penso

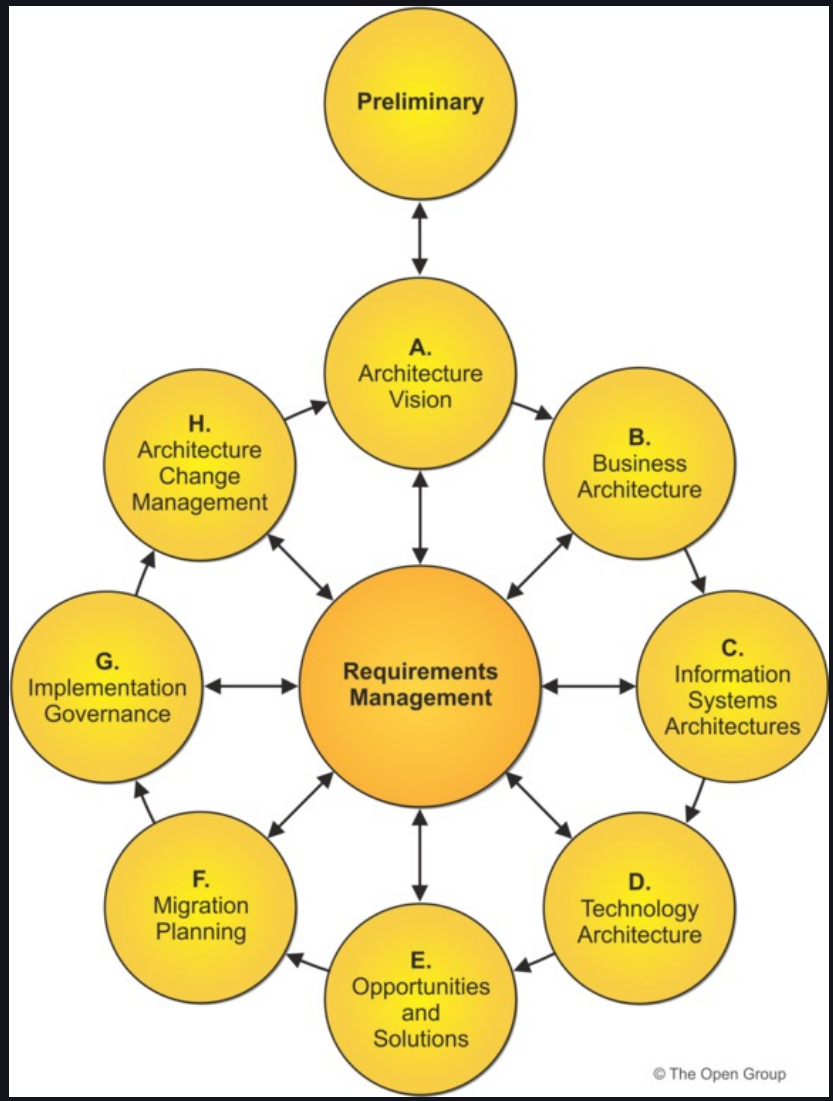
Arquiteto de solução, desenvolvedor e entusiasta de tecnologia.

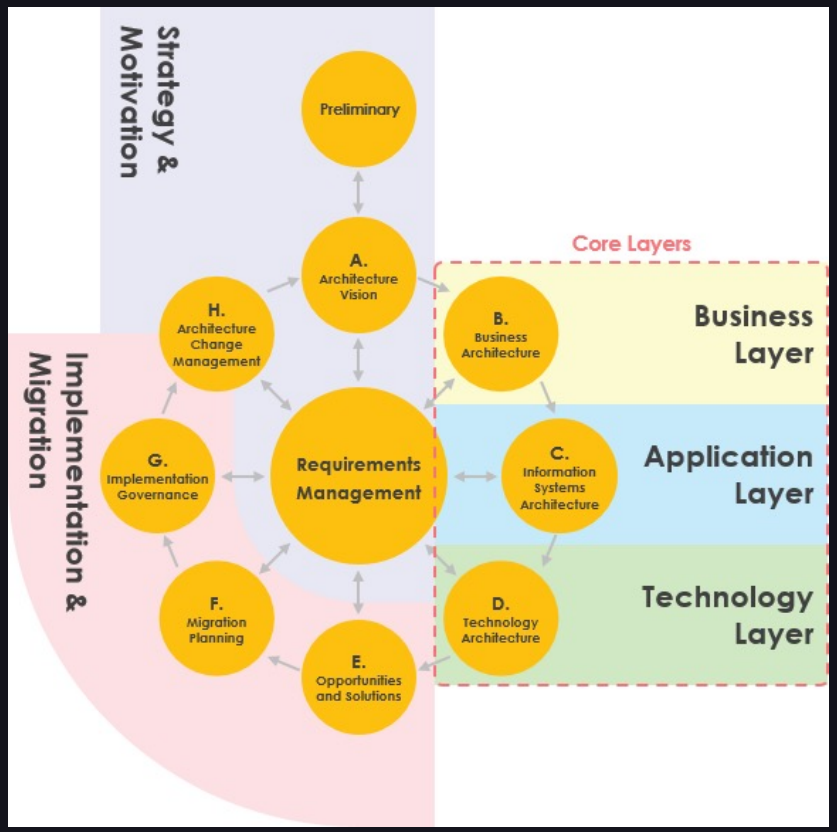
https://linktr.ee/brunopenso

Vivemos na era da informação!

Precisamos além do negócio olhar para Tecnologia

Frameworks de Arquitetura


Preliminary
A.
Architecture
Vision
B.
Business
Architecture
C.
Information
Systems
Architectures
D.
Technology
Architecture
E.
Opportunities
and
Solutions
F.
Migration
Planning
G.
Implementation
Governance
H.
Architecture
Change
Management
Requirements
Management
© The Open Group


Strategy & Motivation
Implementation & Migration
Preliminary
A. Architecture Vision
B. Business Architecture
C. Information Systems Architecture
D. Technology Architecture
E. Opportunities and Solutions
F. Migration Planning
G. Implementation Governance
H. Architecture Change Management
Requirements Management
Core Layers
Business Layer
Application Layer
Technology Layer


SPARX
SYSTEMS


software AG


MEGA
SEE THE BIGGER PICTURE

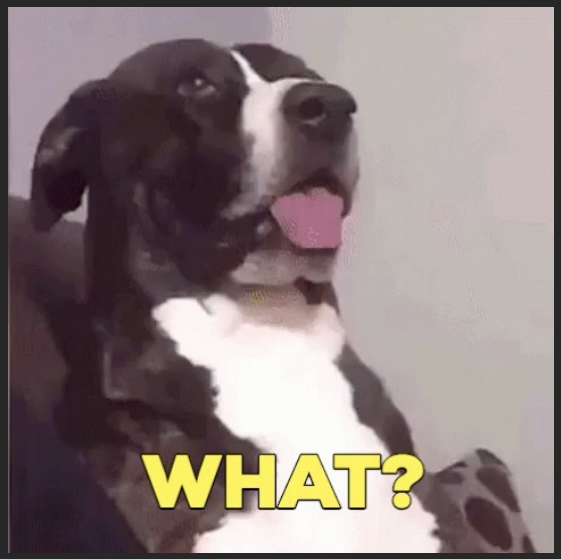

OrbusSoftware

Mas isso é um problema?

Como fazer isso de forma dinâmica e escalável?

Como acompanhar algo que muda todo dia?

Grafos



Grafos?

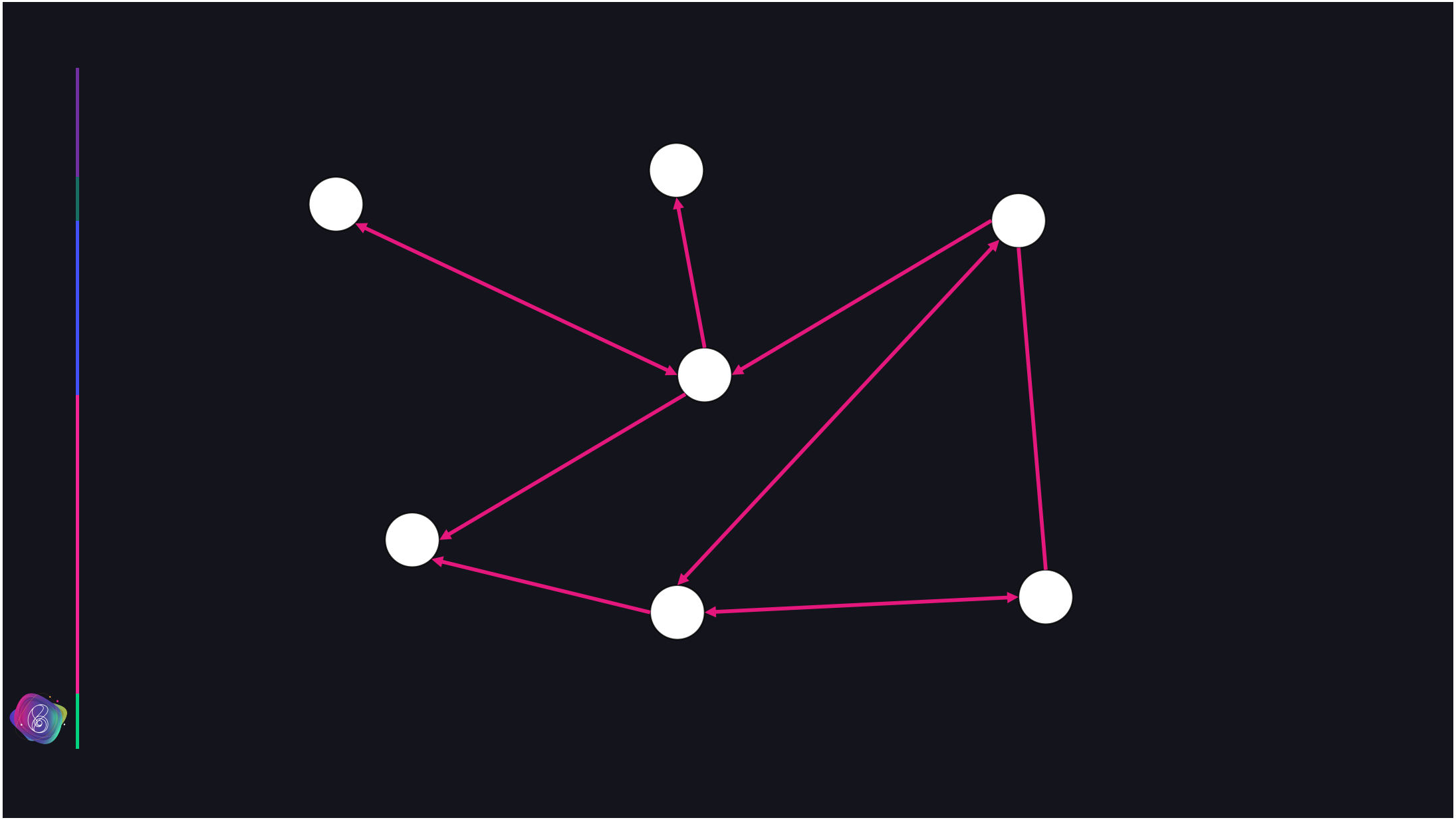
A teoria dos grafos ou de grafos é um ramo da matemática que estuda as relações entre os objetos de um determinado conjunto

VÉRTICES

São um conjunto de nós ou pontos que representam uma determinado objeto

ARESTAS

São as conexões entre os vértices e podem ser direcionais ou não direcionais



Modelagem

C4 Model

Abstração

https://c4model.com - Simon Brown

C4 Model

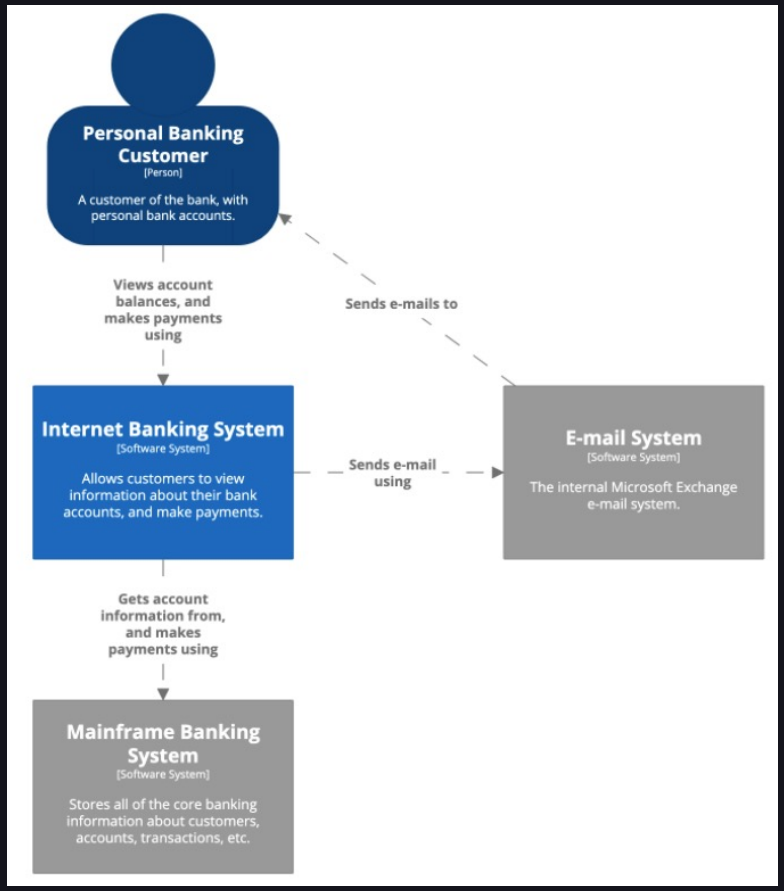
Like source code, Google Street View provides a very low-level and accurate view of a location.

Navigating an unfamiliar environment becomes easier if you zoom out though.

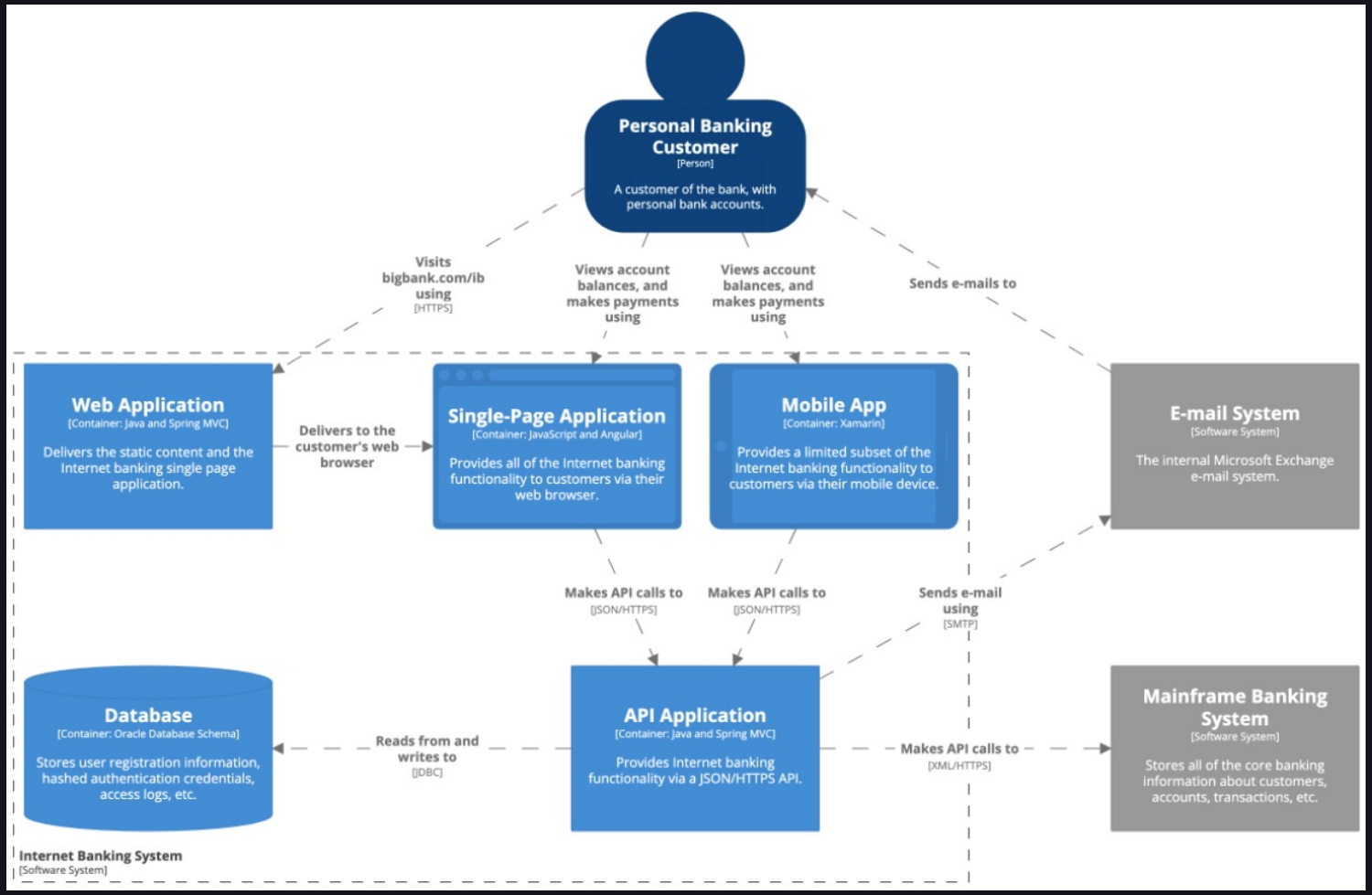
Zooming out further will provide additional context you might not have been aware of.

Different levels of zoom allow you to tell different stories to different audiences.

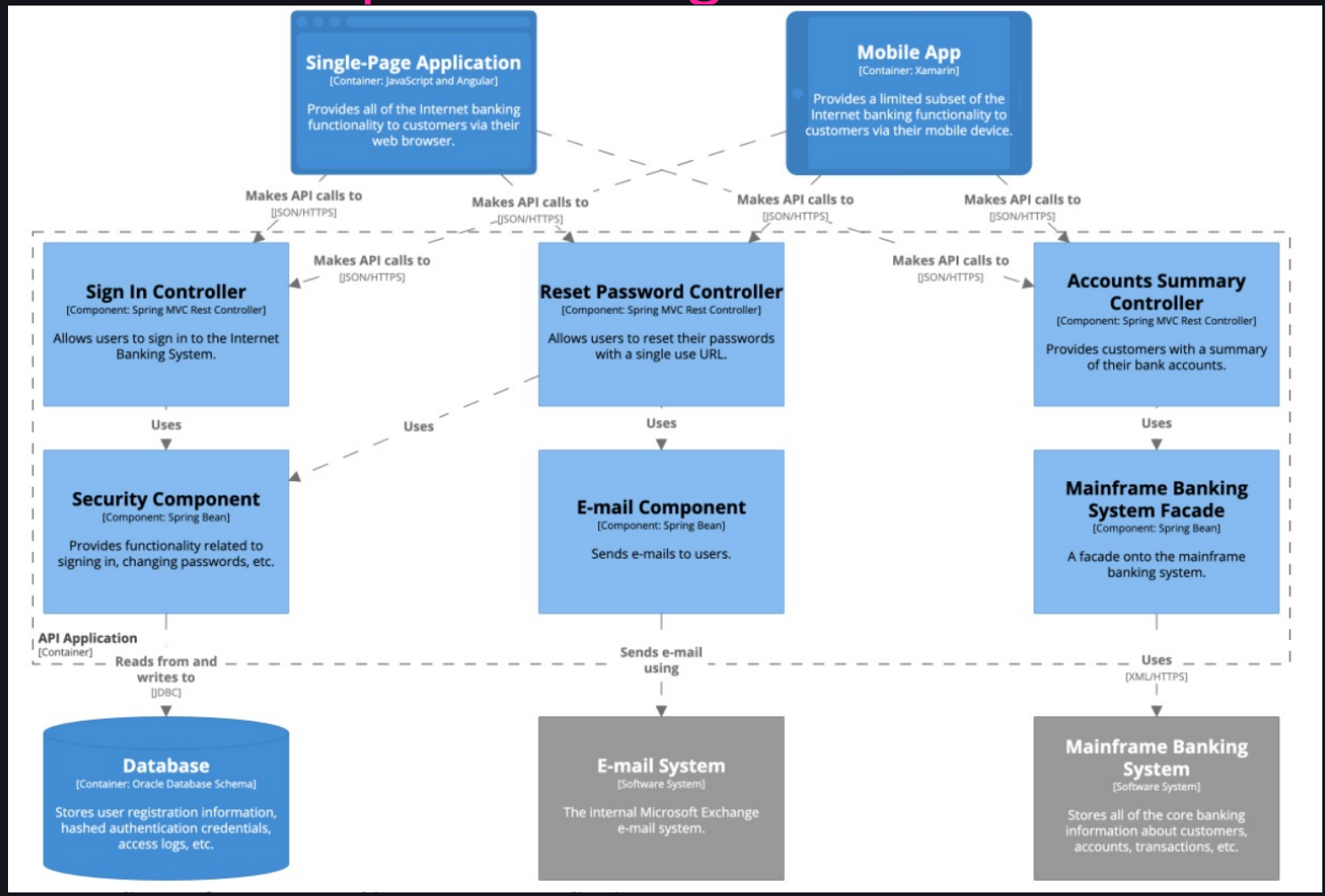
C4 Model – System Context Diagram



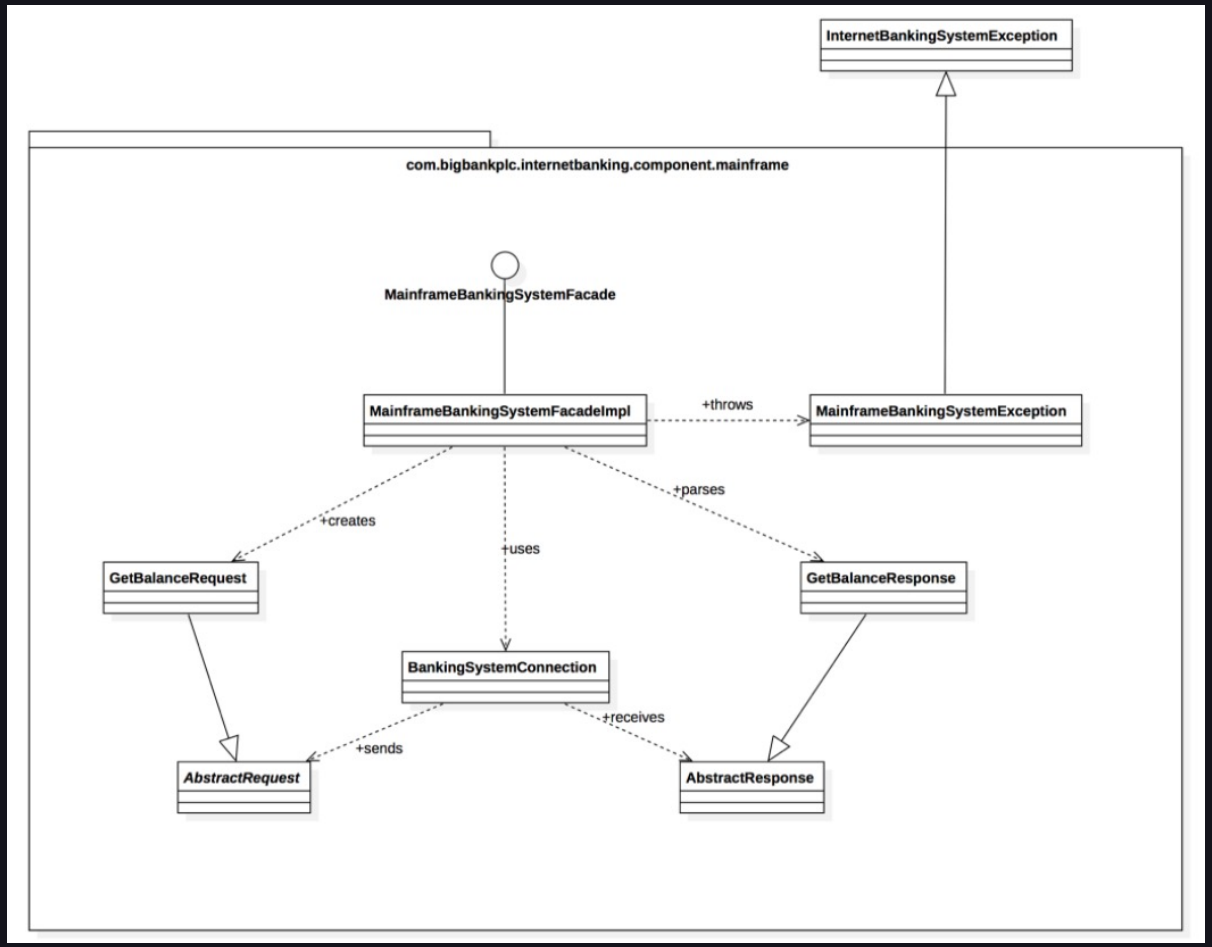
C4 Model – Container Diagram



C4 Model – Component Diagram

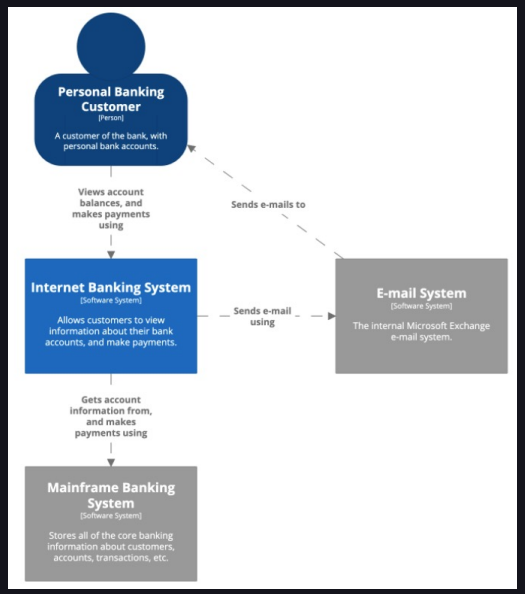


C4 Model – Code Diagram

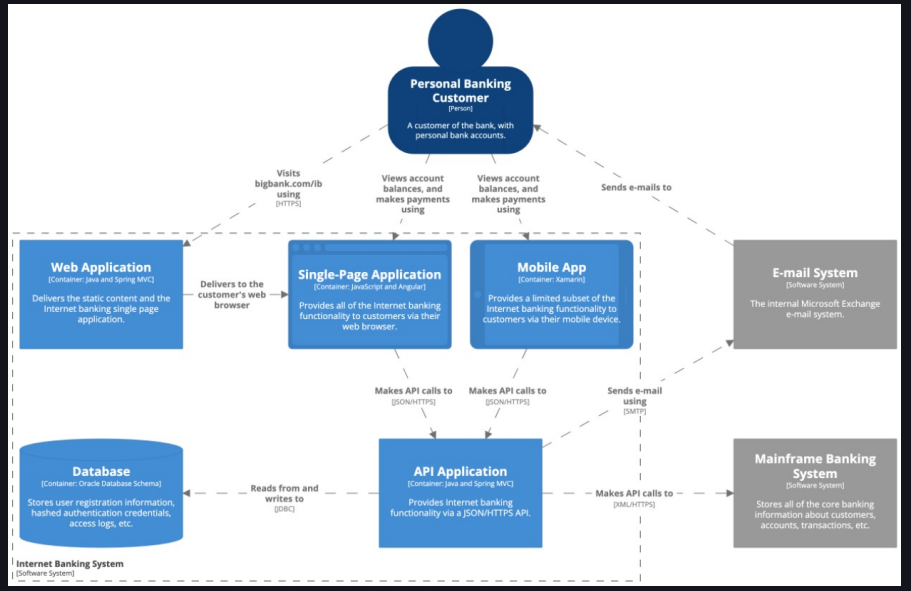


C4 Model – Nossa Escolha

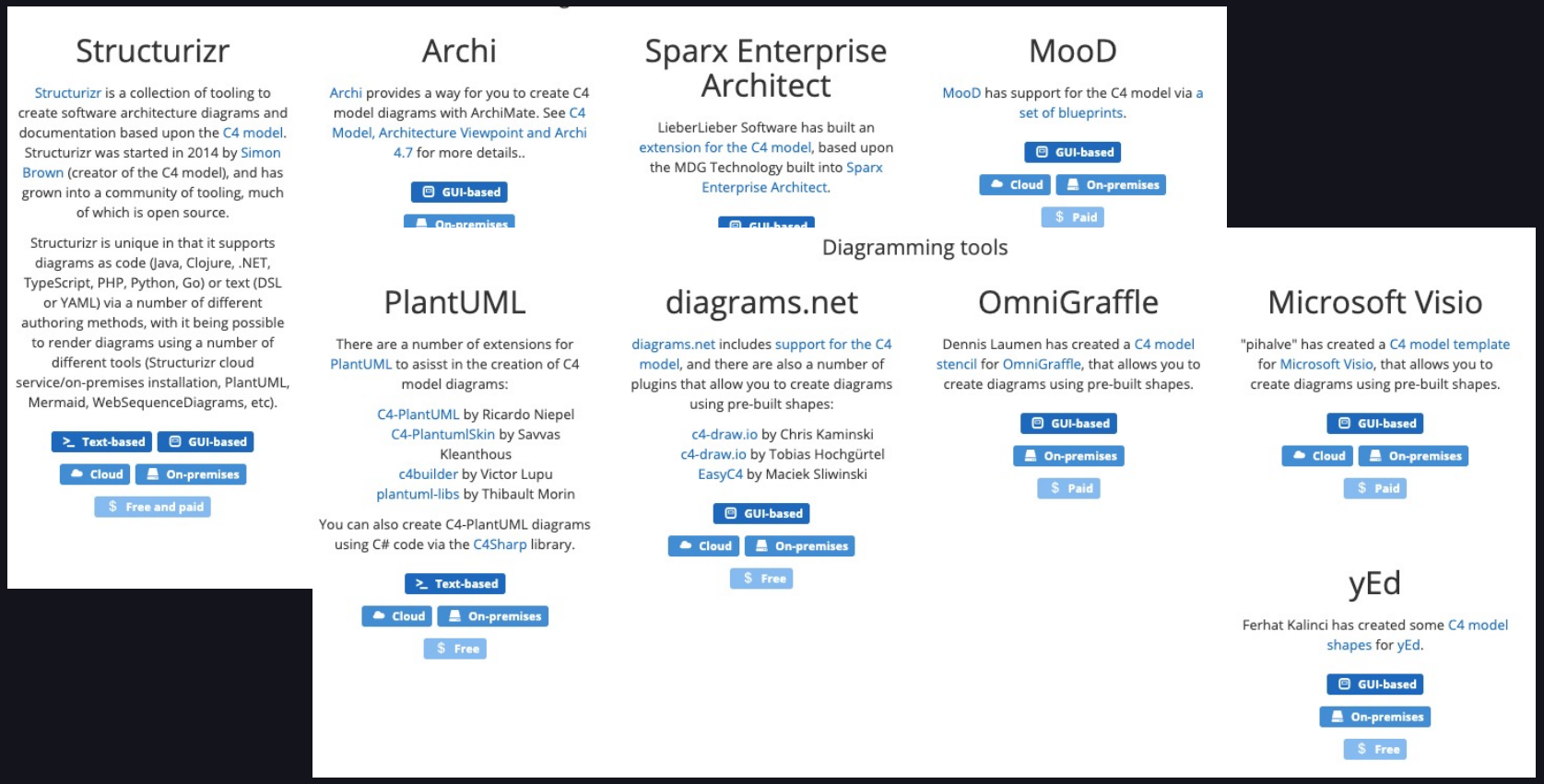
System Context Diagram



Container Diagram



C4 Model – Ferramentas



Structurizr

Structurizr is a collection of tooling to create software architecture diagrams and documentation based upon the C4 model. Structurizr was started in 2014 by Simon Brown (creator of the C4 model), and has grown into a community of tooling, much of which is open source.

Structurizr is unique in that it supports diagrams as code (Java, Clojure, .NET, TypeScript, PHP, Python, Go) or text (DSL or YAML) via a number of different authoring methods, with it being possible to render diagrams using a number of different tools (Structurizr cloud service/on-premises installation, PlantUML, Mermaid, WebSequenceDiagrams, etc).

Text-based · GUI-based · Cloud · On-premises · $ Free and paid

Archi

Archi provides a way for you to create C4 model diagrams with ArchiMate. See C4 Model, Architecture Viewpoint and Archi 4.7 for more details..

GUI-based · On-premises

Sparx Enterprise Architect

LieberLieber Software has built an extension for the C4 model, based upon the MDG Technology built into Sparx Enterprise Architect.

MooD

MooD has support for the C4 model via a set of blueprints.

GUI-based · Cloud · On-premises · $ Paid

Diagramming tools

PlantUML

There are a number of extensions for PlantUML to asisst in the creation of C4 model diagrams:

C4-PlantUML by Ricardo Niepel
C4-PlantumlSkin by Savvas Kleanthous
c4builder by Victor Lupu
plantuml-libs by Thibault Morin

You can also create C4-PlantUML diagrams using C# code via the C4Sharp library.

Text-based · Cloud · On-premises · $ Free

diagrams.net

diagrams.net includes support for the C4 model, and there are also a number of plugins that allow you to create diagrams using pre-built shapes:

c4-draw.io by Chris Kaminski
c4-draw.io by Tobias Hochgürtel
EasyC4 by Maciek Sliwinski

GUI-based · Cloud · On-premises · $ Free

OmniGraffle

Dennis Laumen has created a C4 model stencil for OmniGraffle, that allows you to create diagrams using pre-built shapes.

GUI-based · On-premises · $ Paid

Microsoft Visio

"pihalve" has created a C4 model template for Microsoft Visio, that allows you to create diagrams using pre-built shapes.

GUI-based · Cloud · On-premises · $ Paid

yEd

Ferhat Kalinci has created some C4 model shapes for yEd.

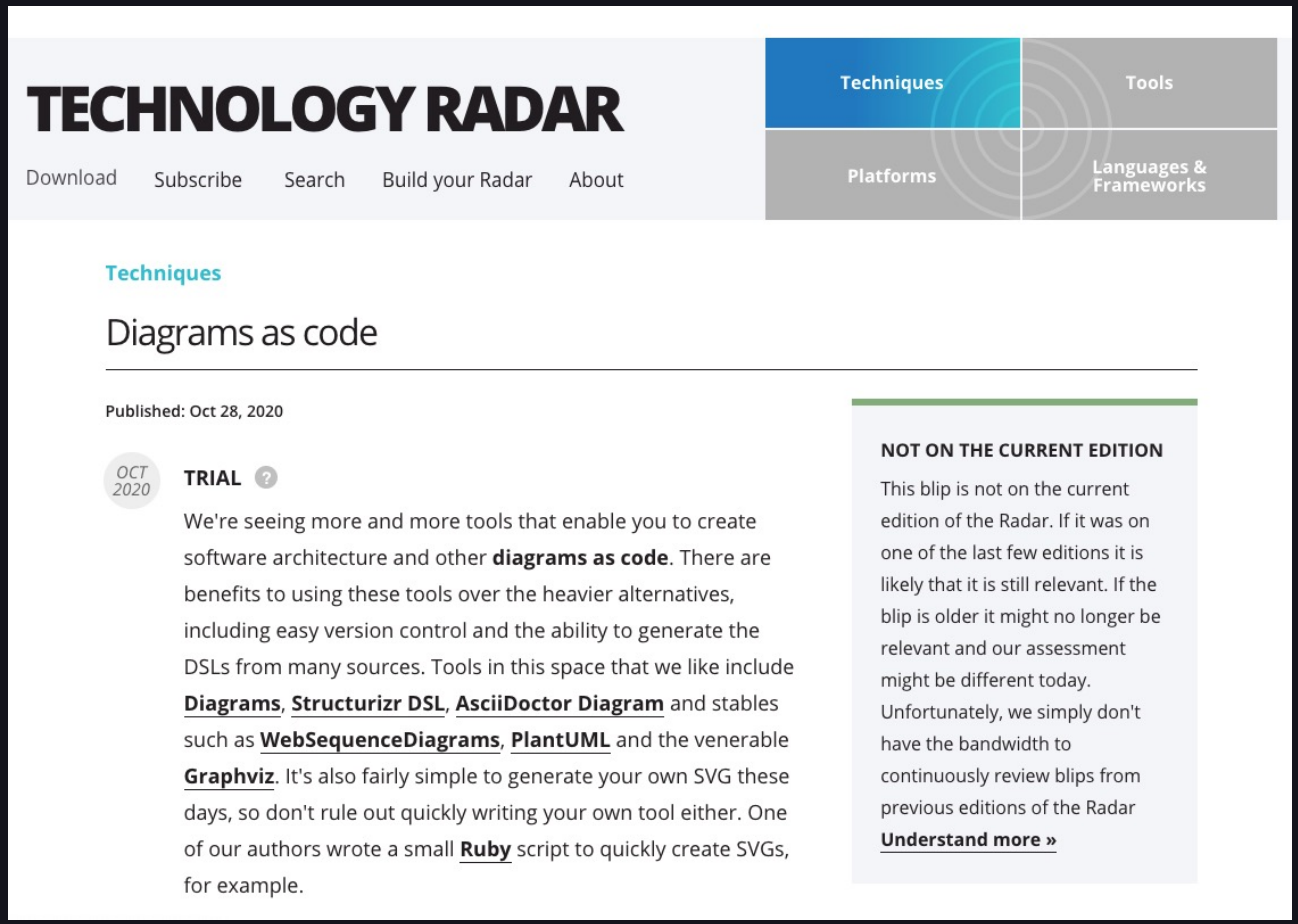
GUI-based · On-premises · $ Free

C4 Model

The C4 model has been referenced in the following places.

- Open Agile Architecture™, a Standard of The Open Group
- Agile Architecture Modeling using the ArchiMate® Language
- Fundamentals of Software Architecture (Mark Richards and Neal Ford)
- Design It! (Michael Keeling)
- Wikipedia

C4 Model



TECHNOLOGY RADAR

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Techniques

Diagrams as code

Published: Oct 28, 2020

OCT 2020

TRIAL

We're seeing more and more tools that enable you to create software architecture and other **diagrams as code**. There are benefits to using these tools over the heavier alternatives, including easy version control and the ability to generate the DSLs from many sources. Tools in this space that we like include **Diagrams**, **Structurizr DSL**, **AsciiDoctor Diagram** and stables such as **WebSequenceDiagrams**, **PlantUML** and the venerable **Graphviz**. It's also fairly simple to generate your own SVG these days, so don't rule out quickly writing your own tool either. One of our authors wrote a small **Ruby** script to quickly create SVGs, for example.

NOT ON THE CURRENT EDITION

This blip is not on the current edition of the Radar. If it was on one of the last few editions it is likely that it is still relevant. If the blip is older it might no longer be relevant and our assessment might be different today. Unfortunately, we simply don't have the bandwidth to continuously review blips from previous editions of the Radar

Understand more »

Como fazer isso através de código fonte e dinâmicamente?

Git Oriented

Software desenvolvido

Software Adquirido

DSL

DSL – Structurizr

Orientado a texto
Versionado no github

DSL – Structurizr

https://structurizr.org/

https://github.com/structurizr/dsl/blob/master/docs/language-reference.md

DSL – Language Reference

```
workspace "Big Bank plc" "This is an example workspace to illustrate the key features of Structurizr, via the DSL, based around

    model {
        customer = person "Personal Banking Customer" "A customer of the bank, with personal bank accounts."

        enterprise "Big Bank plc" {
            supportStaff = person "Customer Service Staff" "Customer service staff within the bank." "Bank Staff"
            backoffice = person "Back Office Staff" "Administration and support staff within the bank." "Bank Staff"

            mainframe = softwaresystem "Mainframe Banking System" "Stores all of the core banking information about customers,
            email = softwaresystem "E-mail System" "The internal Microsoft Exchange e-mail system" "Existing System"
            atm = softwaresystem "ATM" "Allows customers to withdraw cash." "Existing System"

            internetBankingSystem = softwaresystem "Internet Banking System" "Allows customers to view information about their
                singlePageApplication = container "Single-Page Application" "Provides all of the Internet banking functionality
                mobileApp = container "Mobile App" "Provides a limited subset of the Internet banking functionality to customer
                webApplication = container "Web Application" "Delivers the static content and the Internet banking single page
                apiApplication = container "API Application" "Provides Internet banking functionality via a JSON/HTTPS API." "J
                    signinController = component "Sign In Controller" "Allows users to sign in to the Internet Banking System."
                    accountsSummaryController = component "Accounts Summary Controller" "Provides customers with a summary of t
                    resetPasswordController = component "Reset Password Controller" "Allows users to reset their passwords with
                    securityComponent = component "Security Component" "Provides functionality related to signing in, changing
                    mainframeBankingSystemFacade = component "Mainframe Banking System Facade" "A facade onto the mainframe ban
                    emailComponent = component "E-mail Component" "Sends e-mails to users." "Spring Bean"
                }
                database = container "Database" "Stores user registration information, hashed authentication credentials, acces
            }

        }
```

DSL – Language Reference

```
# relationships between people and software systems
customer -> internetBankingSystem "Views account balances, and makes payments using"
internetBankingSystem -> mainframe "Gets account information from, and makes payments using"
internetBankingSystem -> email "Sends e-mail using"
email -> customer "Sends e-mails to"
customer -> supportStaff "Asks questions to" "Telephone"
supportStaff -> mainframe "Uses"
customer -> atm "Withdraws cash using"
atm -> mainframe "Uses"
backoffice -> mainframe "Uses"

# relationships to/from containers
customer -> webApplication "Visits bigbank.com/ib using" "HTTPS"
customer -> singlePageApplication "Views account balances, and makes payments using"
customer -> mobileApp "Views account balances, and makes payments using"
webApplication -> singlePageApplication "Delivers to the customer's web browser"

# relationships to/from components
singlePageApplication -> signinController "Makes API calls to" "JSON/HTTPS"
singlePageApplication -> accountsSummaryController "Makes API calls to" "JSON/HTTPS"
singlePageApplication -> resetPasswordController "Makes API calls to" "JSON/HTTPS"
mobileApp -> signinController "Makes API calls to" "JSON/HTTPS"
mobileApp -> accountsSummaryController "Makes API calls to" "JSON/HTTPS"
mobileApp -> resetPasswordController "Makes API calls to" "JSON/HTTPS"
signinController -> securityComponent "Uses"
```

DSL – Language Reference

```
views {
    systemlandscape "SystemLandscape" {
        include *
        autoLayout
    }

    systemcontext internetBankingSystem "SystemContext" {
        include *
        animation {
            internetBankingSystem
            customer
            mainframe
            email
        }
        autoLayout
    }
```

DSL – Structurizer CLI

https://github.com/structurizr/cli

Structurizr command line interface (CLI)

This GitHub repository contains the Structurizr CLI - a command line utility for Structurizr, designed to be used in conjunction with the Structurizr DSL, and supports the following commands/functionality:

- **push** content to the Structurizr cloud service/on-premises installation
- **pull** workspace content as JSON
- **lock** a workspace
- **unlock** a workspace
- **export** diagrams to PlantUML, Mermaid, WebSequenceDiagrams, DOT, and Ilograph
- **validate** a JSON/DSL workspace definition

E cadê o grafo?

Metamodelo

System

Represents: The software it self

Integration

Represents: Any technology like ApiGee, Middleware, Data Service, etc

Interface

Represents: APIs, WebServices, FTP, ETL, etc

Person

Represents: any type of user

Tech deps

Represents: S3, RDS, Kubernets

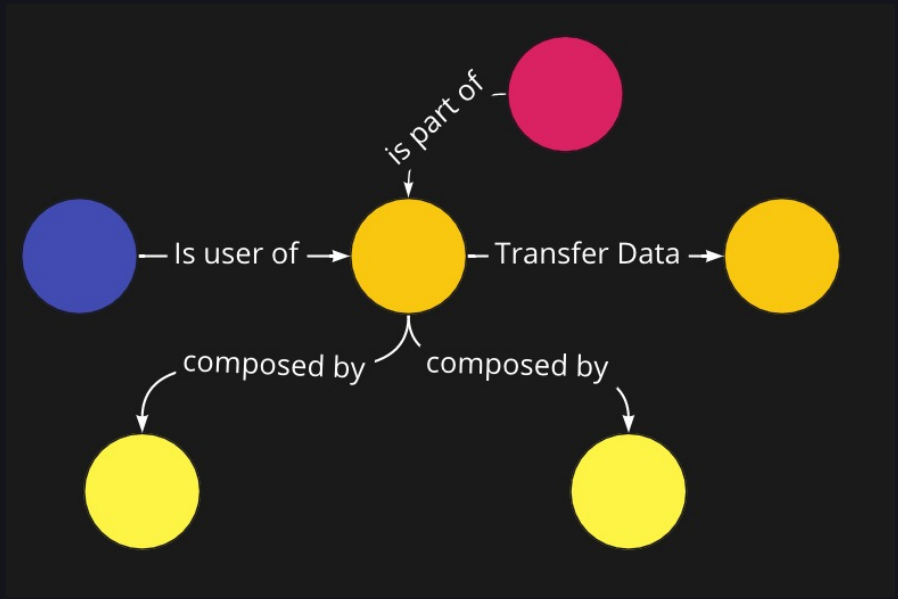
SubSystem

Represents: decomposition of the System (SPA, Backend 1, Backend 2)

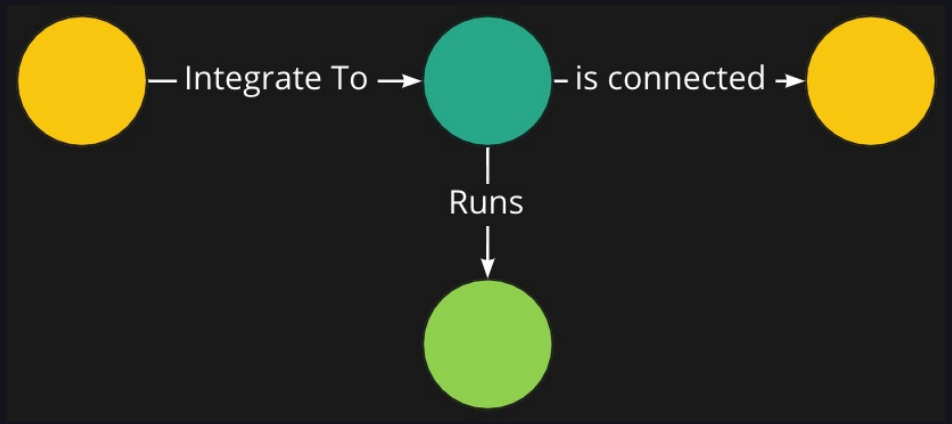
Capabilities

Represents: classify software according to business capabilities

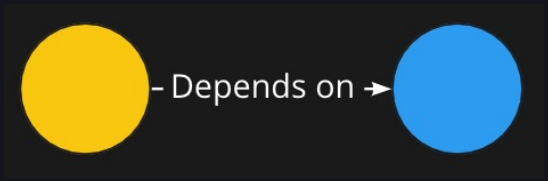
Metamodelo

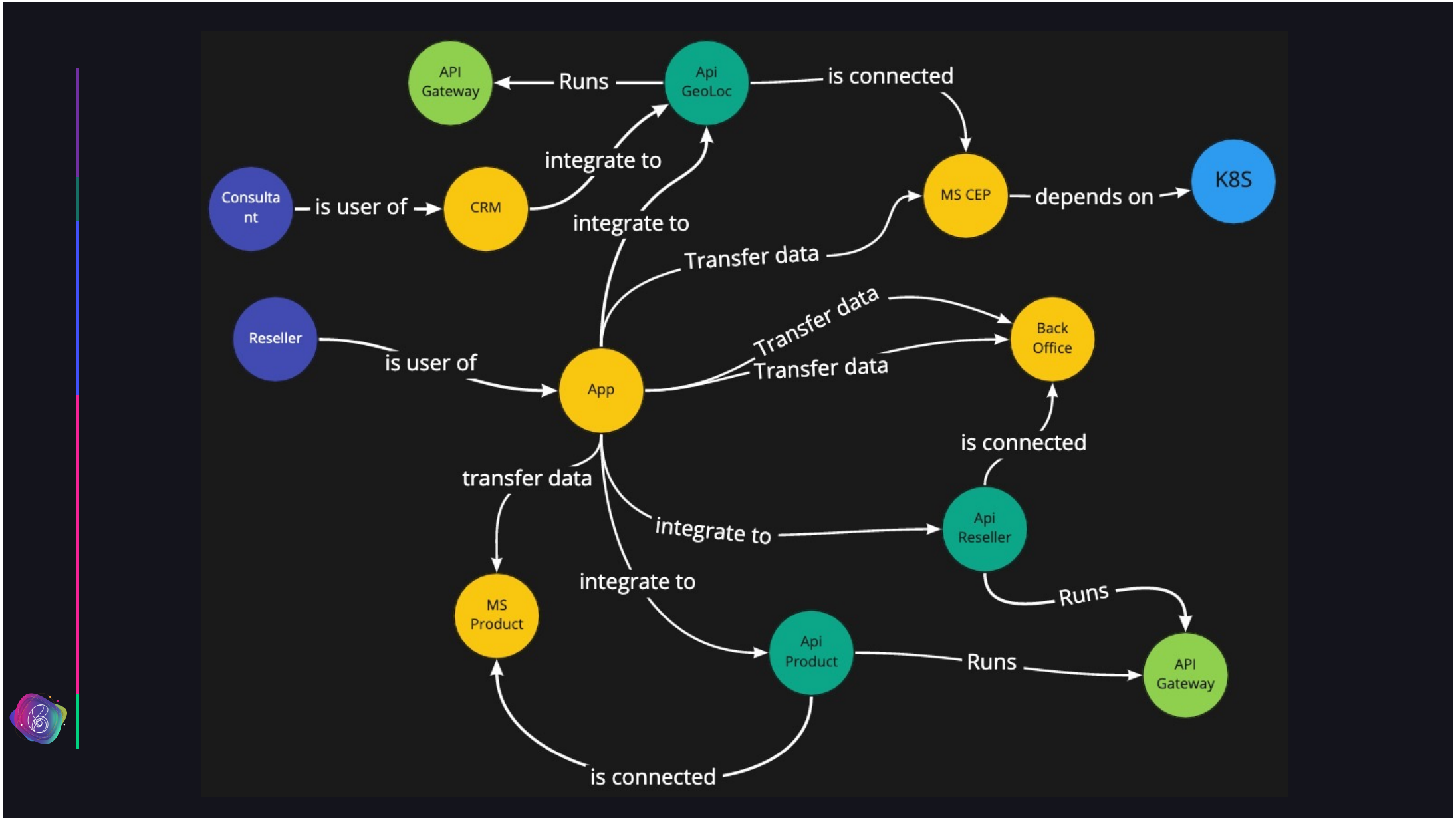


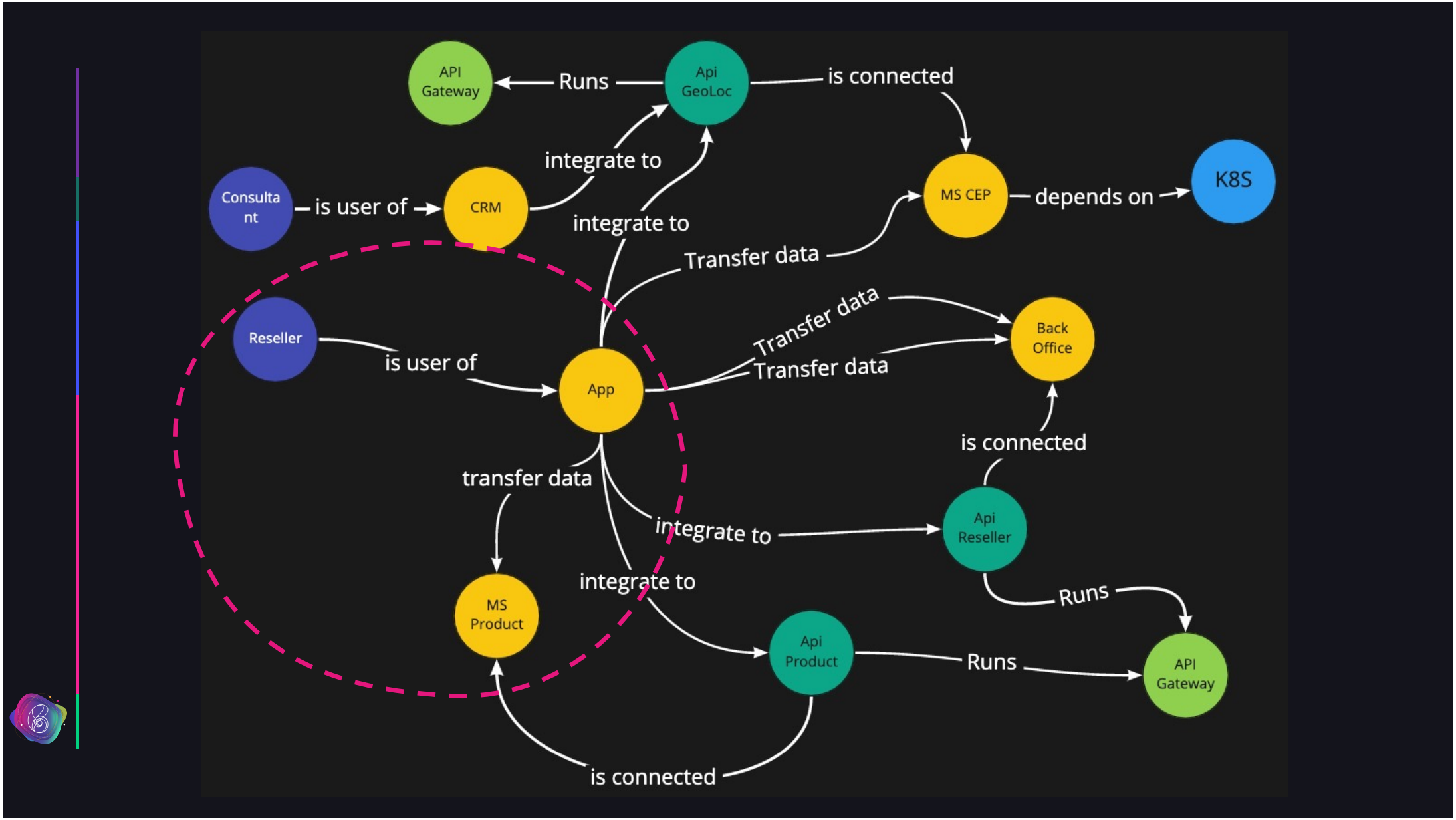
Metamodelo



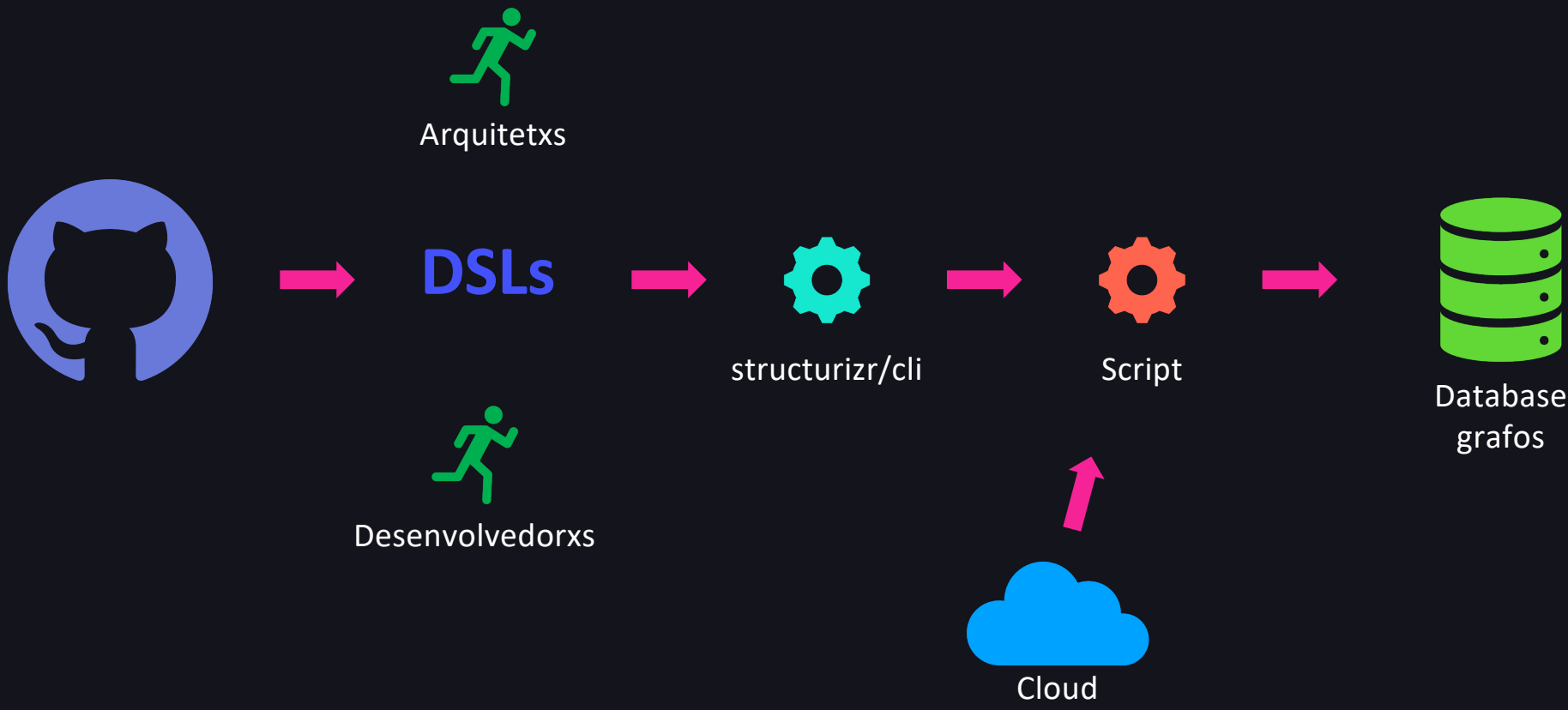
Metamodelo




API Gateway
Runs
Api GeoLoc
is connected
integrate to
Consulta nt
is user of
CRM
integrate to
MS CEP
depends on
K8S
Transfer data
Reseller
is user of
App
Transfer data
Transfer data
Back Office
is connected
transfer data
integrate to
Api Reseller
integrate to
MS Product
Runs
Api Product
Runs
API Gateway
is connected

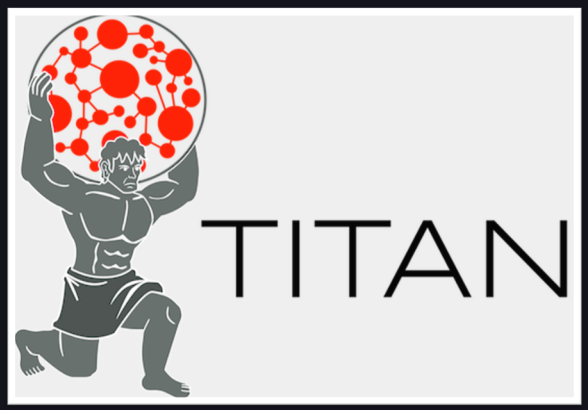

API Gateway
Runs
Api GeoLoc
is connected
integrate to
Consulta nt
is user of
CRM
integrate to
MS CEP
depends on
K8S
Transfer data
Reseller
is user of
App
Transfer data
Transfer data
Back Office
is connected
transfer data
integrate to
Api Reseller
integrate to
MS Product
Runs
Api Product
Runs
API Gateway
is connected

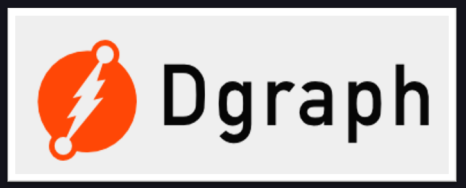
Processo


Arquitetxs
DSLs
Desenvolvedorxs
structurizr/cli
Script
Database
grafos
Cloud

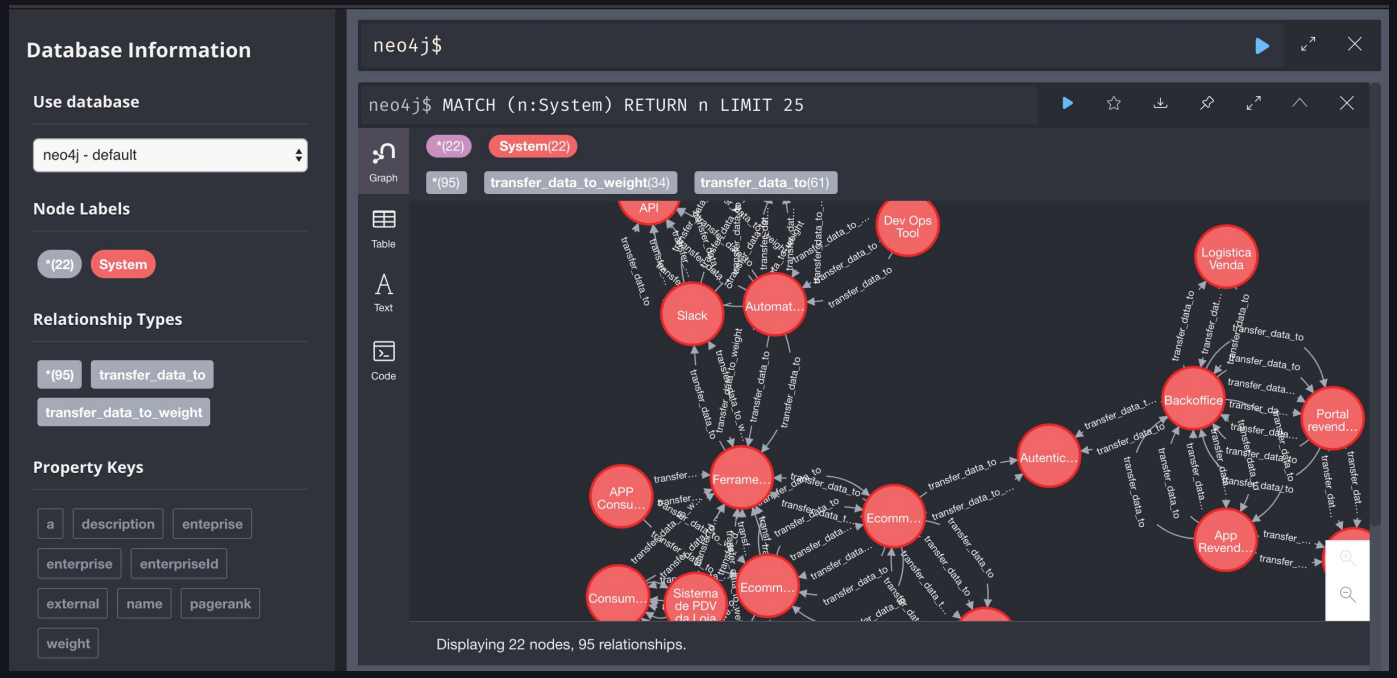
Database de Grafos

Database





Neo4j



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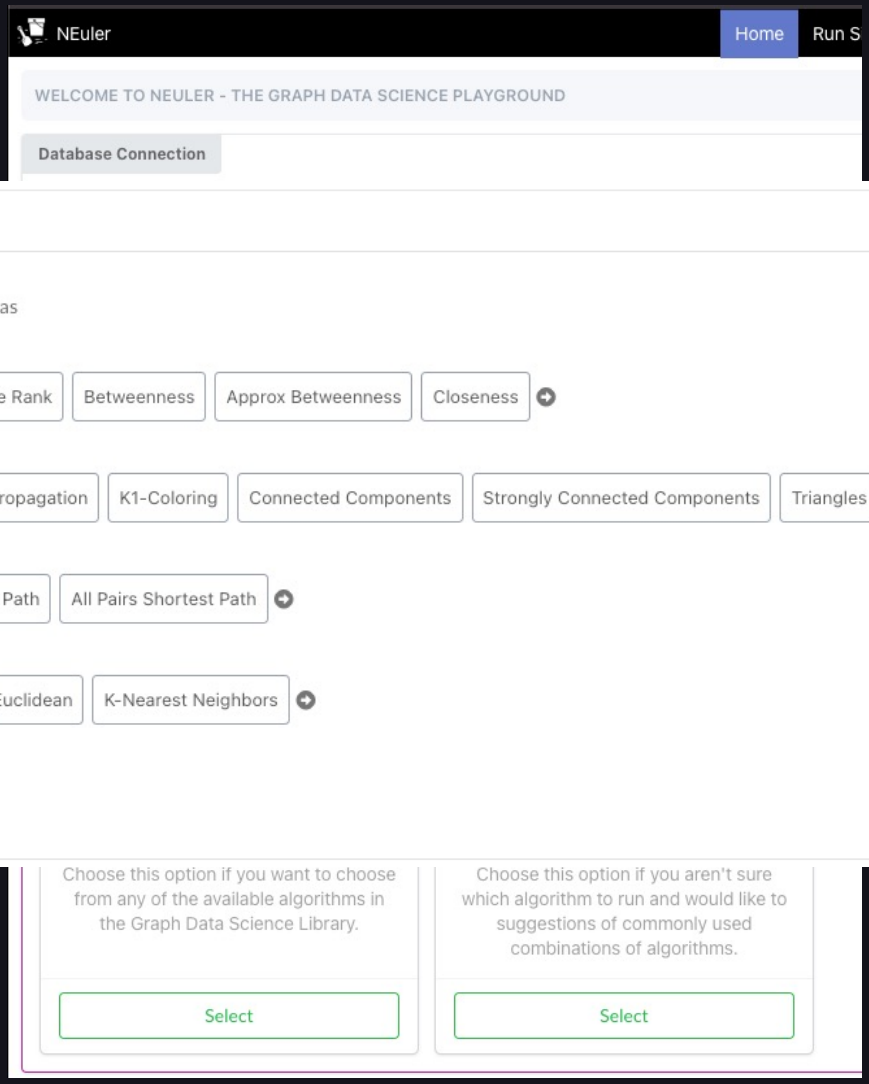
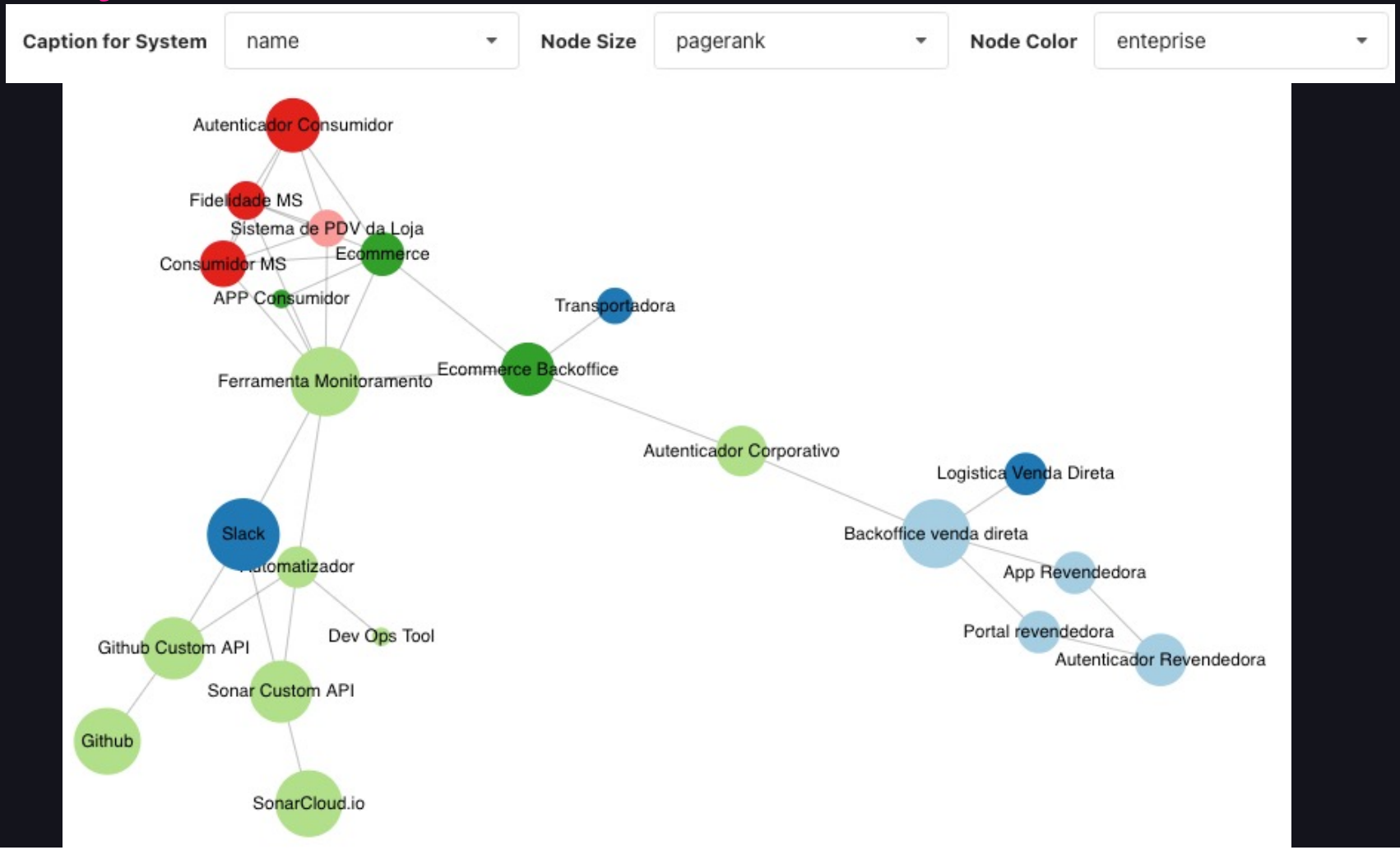
transfer_data_to <id>: 7 description: Cria projeto

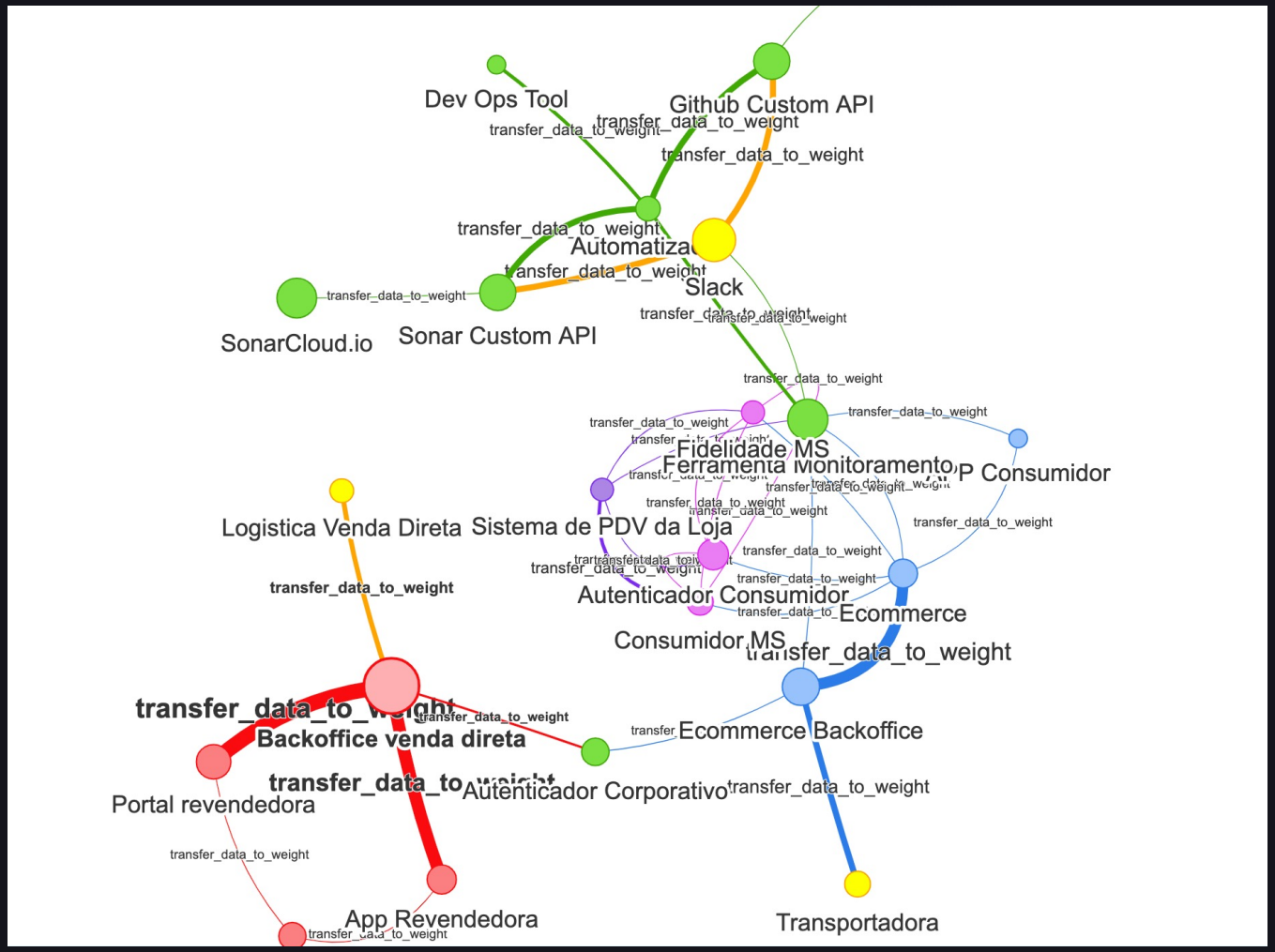
Neo4j


NEuler
Home
Run S
WELCOME TO NEULER - THE GRAPH DATA SCIENCE PLAYGROUND
Database Connection
Algorithm
Degree
detects the number of direct connections a node has
Centralities
Degree
Eigenvector
Page Rank
Article Rank
Betweenness
Approx Betweenness
Closeness
Community Detection
Louvain
Modularity Optimization
Label Propagation
K1-Coloring
Connected Components
Strongly Connected Components
Triangles
Triangle Count
Local Clustering Coefficient
Path Finding
Shortest Path
A*
Single Source Shortest Path
All Pairs Shortest Path
Similarity
Jaccard
Overlap
Cosine
Pearson
Euclidean
K-Nearest Neighbors
Graph Embeddings
Node2Vec
FastRP
Choose this option if you want to choose from any of the available algorithms in the Graph Data Science Library.
Choose this option if you aren't sure which algorithm to run and would like to suggestions of commonly used combinations of algorithms.
Select
Select

Neo4j


Caption for System
name
Node Size
pagerank
Node Color
enteprise
Autenticador Consumidor
Fidelidade MS
Sistema de PDV da Loja
Ecommerce
Consumidor MS
APP Consumidor
Transportadora
Ferramenta Monitoramento
Ecommerce Backoffice
Autenticador Corporativo
Logistica Venda Direta
Backoffice venda direta
App Revendedora
Portal revendedora
Autenticador Revendedora
Slack
Dev Ops Tool
Github Custom API
Sonar Custom API
Github
SonarCloud.io

Neo4j


Dev Ops Tool
Github Custom API
transfer_data_to_weight
transfer_data_to_weight
transfer_data_to_weight
transfer_data_to_weight
Slack
transfer_data_to_weight
SonarCloud.io
Sonar Custom API
transfer_data_to_weight
transfer_data_to_weight
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transfer_data_to_weight
Fidelidade MS
Ferramenta Monitoramento
P Consumidor
transfer_data_to_weight
transfer_data_to_weight
transfer_data_to_weight
Logistica Venda Direta
Sistema de PDV da Loja
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Autenticador Consumidor
Ecommerce
Consumidor MS
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Backoffice venda direta
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Ecommerce Backoffice
Portal revendedora
Autenticador Corporativo
transfer_data_to_weight
transfer_data_to_weight
App Revendedora
Transportadora

Neo4j – Cálculo do peso

```
MATCH (n:System)-[r:transfer_data_to]->(n1:System)
WITH id(n) as na, id(n1) as nb, count(r) as total
WITH COLLECT({ na:na, nb:nb, total:total}) as list
UNWIND list as item
MATCH (a:System), (b:System) WHERE id(a) = item.na  AND id(b) = item.nb
MERGE (a)-[r1:transfer_data_to_weight]-(b)
ON CREATE SET r1.weight= item.total
ON MATCH SET r1.weight= (r1.weight+ item.total)
```

Neo4j – Tamanho do nó

```
:param limit => ( 42);
:param config => ({
  nodeProjection: 'System',
  relationshipProjection: {
    relType: {
      type: 'transfer_data_to',
      orientation: 'NATURAL',
      properties: {}
    }
  },
  relationshipWeightProperty: null,
  dampingFactor: 0.85,
  maxIterations: 20,
  writeProperty: 'pagerank'
});
:param communityNodeLimit => ( 10);
CALL gds.pageRank.write($config);
```

Neo4j – Áreas da empresa

```
:param text => " !\"#$%&'()*+,-
./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\\]^_`abcdefghijklmnopqrstuvwxyz{|}~";

MATCH (n:System)
where size(n.enterprise) > 0
SET n.enterpriseId=(reduce(acc=5381, c  in split(n.enterprise,"") | (acc*33 +
size(split($text,c)[0]))%toInteger(2^32)))
return n
```

Neo4j – Gist

https://gist.github.com/brunopenso/ebd50e597fc2ca773657edf6c1105ef0

Futuro

Novas perguntas

Caminhos críticos?

Quais sistemas criam ou alteram dados?

Automação

Onde rodam nossas integrações?

Como estão os pontos de monitoramento?

Qual o grau de dependência entre as aplicações?

Como está o tempo de resposta?

Pontos de falha?

?

Obrigadx!

https://linktr.ee/brunopenso

GrupoBoticário

gb.tech