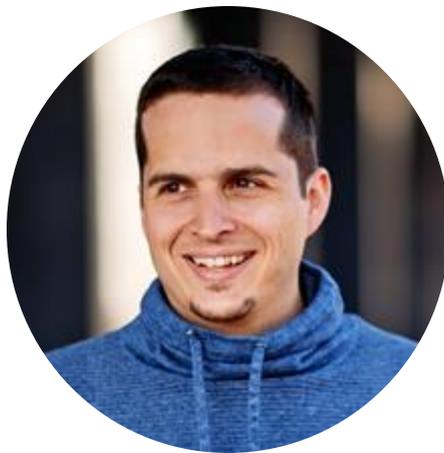


Communicate efficiently with Software Architecture Diagrams

Simon Lasselsberger



SIMON LASSELSBERGER

Software Architect and Development Expert
Helping companies build scalable systems

[@lassim](#)





One cannot not communicate

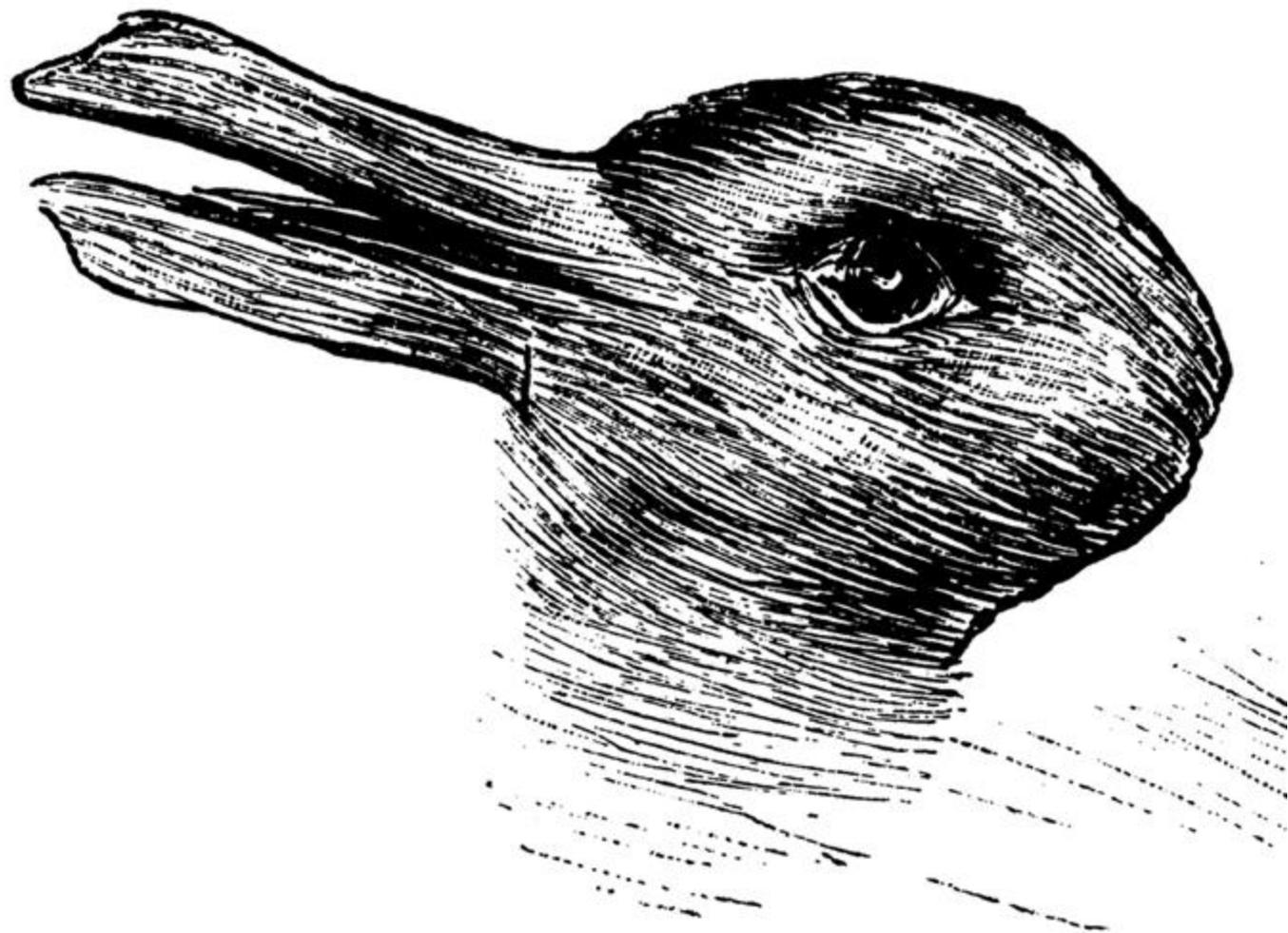
Paul Watzlawick



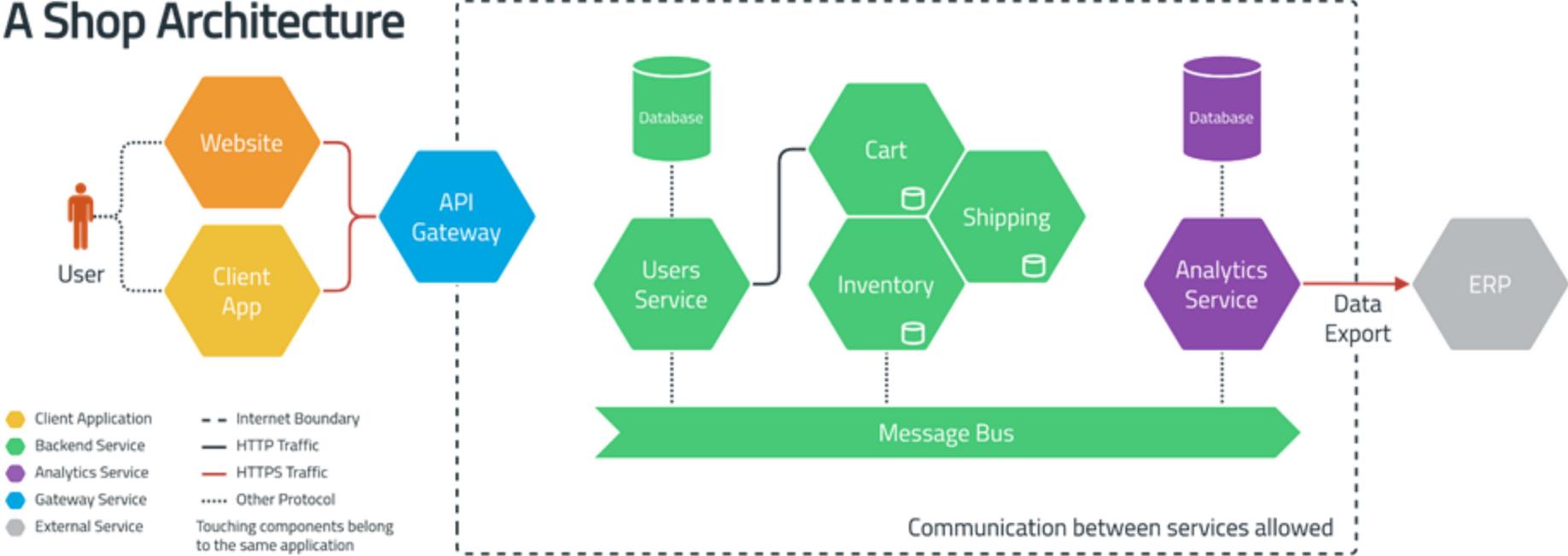
**No matter how it looks at first,
it's always a people problem**

Gerald Weinberg





A Shop Architecture



A striking characteristic of human memory is that pictures are remembered better than words.

From an evolutionary perspective, the ability to remember various aspects of one's visual environment must be vital for survival, so it is not surprising that memory for pictorial material is particularly well-developed.

Neural correlates of the episodic encoding of pictures and words

Cheryl L. Grady, Anthony R. McIntosh, M. Natasha Rajah, Fergus I. M. Craik

Proceedings of the National Academy of Sciences Mar 1998, 95 (5) 2703-2708; DOI:

10.1073/pnas.95.5.2703

**Can you recall the quote from
Gerald Weinberg?**

**Was the boat in the first slide on a
lake or the ocean?**

Home

What's happening?

Show 11 Tweets

Computer programming · See more

Levi Hochstein **Kat** @michellekate · 2h
You're not a real programmer unless your primary editor is one that you write yourself, running on an operating system that you wrote yourself, running on a CPU that you designed yourself.

Computer programming · See more

Pratham @Pratham · 2h
Just created a new Twitter header using CSS. Take a look. 🙌

Florian Krüger · See more

Eric Topol **MD** @EricTopol · 2h
4th issue of mRNA vaccine: good neutralizing antibody response, minimal adverse T cell response, but lack of efficacy in Chinese infants in broad assessment of over 1,000 health care workers with contacts
medrxiv.org/content/10.1101/2020.03.11.20011010v4

Show 10 Tweets

ahel @ahelmaquid · 2h
schöne wie will die regierung bei den nächsten chaturwettbewerb dem öffnen?

MexiManned Meet

Bruce Sherman **MD** @bruce_sherman · 2h
Do yourself a favor and remote work in Mexico City — it is truly magical 🌵

Show 10 Tweets

Create story

What's on your mind, Simon?

Live video · Photos/videos · Feedingactivity

Create room

Franz Thaler · 2h · 2
Mit heute ist es genau 6 Jahre her, dass wir von null weg ein Startup namens "hello again" gegründet haben. Hello again 2018 endete mit 500 €20 Kunden in ganz Europa. Es liefen Millionen von Endnutzer über unsere Lösung. Wir wurden heute auf über 100 Mitarbeiter wachsen, und die Reise hat gerade erst begonnen (we are hiring 🙌🙌🙌)
VIELLEN DANK an die Co-Founder **Silvanus Aulinger**, **Michael Schwaner** und **Kevin Pfeils**, unser Hello again - Team, an unsere Investoren Florian G. ... See more

Thaler Christian, Jakob Löffler and 110 others · 2h · 25 Comments · 2 Shares

Like · Comment · Share

View previous comments

Thaler Christian · 2h
Happy bday, friends so glad 🙌🙌🙌
Like · Reply · 1

Write a comment...

Alfred Luger · 2h · 1

WERSTANDARD

Mo, 16.02.2021 · International · Inland · Wirtschaft · mehr...

Österreichs COVID-19

Gipfel mit Scharmützeln: Die politischen Differenzen rund um die Öffnungen

Als das Bund-Länder-Gipfel am Mittwoch begann, war weitgehend alles ausgehandelt – emotional wurde es dennoch vor allem beim Thema Teststrategie

Mehr zum Thema

- Öffnungen im März: Zu früh oder zu spät? 12:02

ÖRNWA 12:02

Breite Öffnung am 5. März: G-Regel und Maske fallen großflächig

Künftig sind beim Nachweis mehr notwendig als, was nicht in der abendwöchigen Nachtgenussweise. Die Maskepflicht gilt nur noch in Supermärkten und Co.

Mehr zum Thema

- Was heißt bei Corona Regeln weiterhin etwas strenger? 12:05

ÖRNWA 12:02

Champions League live: FC Salzburg führt gegen Bayern München 1:0

Österreichs bester Fußballer im Achtelfinale der Champions League: Der deutsche Rekordmeister Engländerer Adam Lallana trifft für die Bayern.

ÖRNWA 12:02

ÖRNWA 12:02

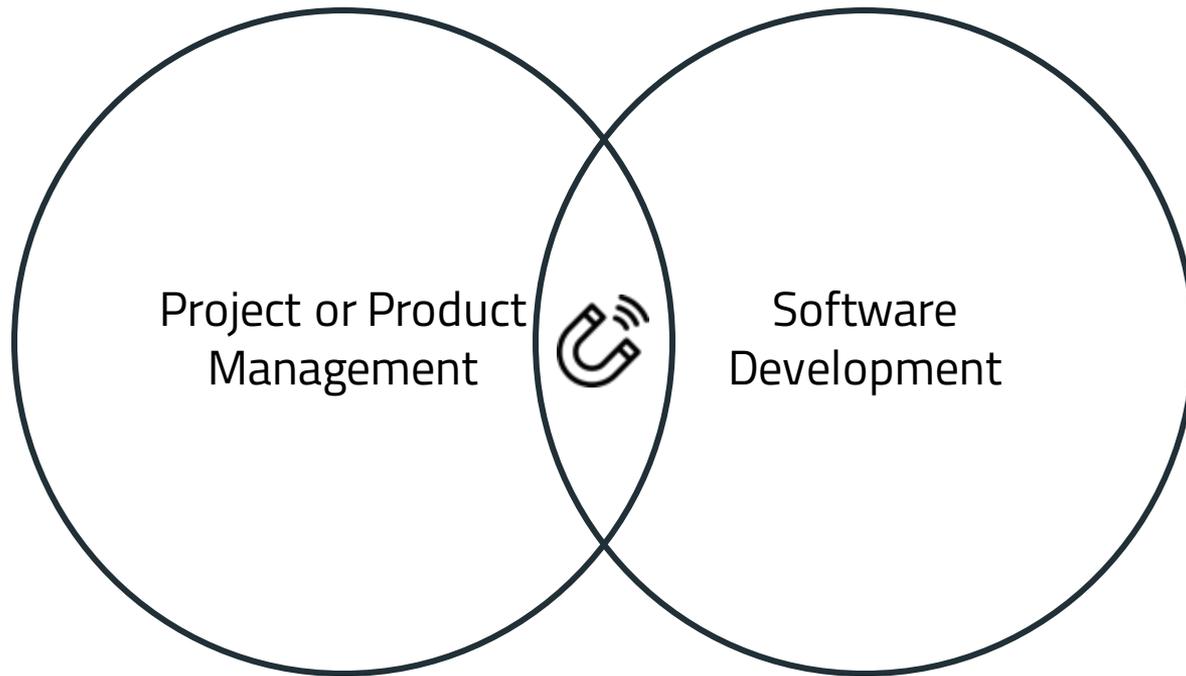
Sollten sich Krebspatienten gegen Covid-19 impfen lassen?

A large crowd of people is gathered at night for a concert. The scene is illuminated by bright, warm stage lights that create a hazy, golden atmosphere. In the center, a person stands with their arms raised in the air. The background features a large stage structure with many lights. The overall mood is energetic and celebratory.

Who is the audience?

Project or Product
Management

Software
Development



Types of Diagrams to describe Software



Structure Diagrams

Class

Component

Deployment

Object

Package

Profile

Composite Structure

Behavioral Diagrams

Use Case

Activity

State

Sequence

Communication

Interaction Overview

Timing

Let's do a Google- search for “Software architecture diagram”

The image shows a Google search for "software architecture diagram". The search results page displays a grid of 12 different software architecture diagrams. Each result includes a thumbnail image of the diagram and a brief title and source URL. The diagrams vary in style, including hierarchical flowcharts, layered block diagrams, and UML-style component diagrams. The search results are organized into a grid with navigation tabs at the top for "All", "Images", "Videos", "News", "Maps", and "More".

software architecture diagram

All Images Videos News Maps More Tools Collections SafeSearch

visio web application uml design website software engineering

Software architecture diagrams - which ...
dev.to

Structurizr
structurizr.com

Instrumentation Software Architecture ...
researchgate.net

Wie erstelle ich ein ...
geekflare.com

Architectural Diagrams ...
lucidchart.com

The UML component diagram of the ...
researchgate.net

Free Online Architecture Diagram Maker ...
edrawmax.com

ARIS Architecture Diagram Software
visual-paradigm.com

Ciso diagram | Software architecture ...
pinterest.com

Graphyze Software Architecture Diagram ...
researchgate.net

Technical Architectural Diagram ...
atibabarcoud.com

How to Create Enterprise Architecture ...
youtube.com

They all look different

The image shows a Google search for "software architecture diagram". The search results page displays a grid of 12 different software architecture diagrams, each with a unique style and layout. The diagrams include:

- A hierarchical tree structure with blue boxes.
- A flowchart with a central node and multiple branches.
- A complex flowchart with various colored boxes and arrows.
- A diagram with a central cloud icon and surrounding components.
- A diagram with a central orange box and surrounding components.
- A complex flowchart with many nodes and arrows.
- A diagram with a central box and surrounding components.
- A diagram with a central box and surrounding components.
- A diagram with a central box and surrounding components.
- A diagram with a central box and surrounding components.
- A diagram with a central box and surrounding components.
- A diagram with a central box and surrounding components.

Each diagram is accompanied by a small caption and a source URL. The search results also show a navigation bar at the top with options like "All", "Images", "Videos", "News", "Maps", and "More".

Google software architecture diagram

All Images Videos News Maps More Tools Collections SafeSearch

visio web application uml design website software engineering



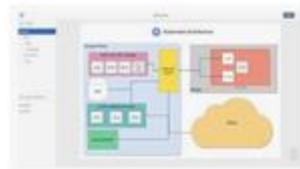
Software architecture diagrams - which ...
dev.to



Structurizr
structurizr.com



Instrumentation Software Architecture ...
researchgate.net



Wie erstelle ich ein ...
geekflare.com



Architectural Diagrams ...
lucidchart.com



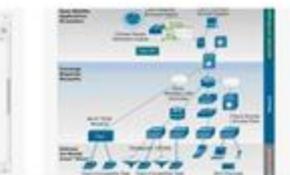
The UML component diagram of the ...
researchgate.net



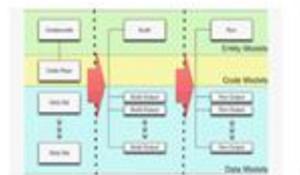
Free Online Architecture Diagram Maker ...
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ARIS Architecture Diagram Software
visualparadigm.com



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pinterest.com



Graphyte Software Architecture Diagram ...
researchgate.net



Technical Architectural Diagram ...
atibabirloud.com



How to Create Enterprise Architecture ...
youtube.com

There is no industry standard



Software architecture diagrams - which ...
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Structurizr
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researchgate.net



Wie erstelle ich ein ...
geekflare.com



Architectural Diagrams ...
lucidchart.com



The UML component diagram of the ...
researchgate.net



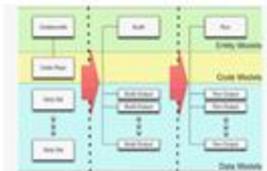
Free Online Architecture Diagram Maker ...
edrawmax.com



ARIS Architecture Diagram Software
visualparadigm.com



Cisco diagram | Software architecture ...
pinterest.com



Graphyfte Software Architecture Diagram ...
researchgate.net



Technical Architectural Diagram ...
atibabir.com

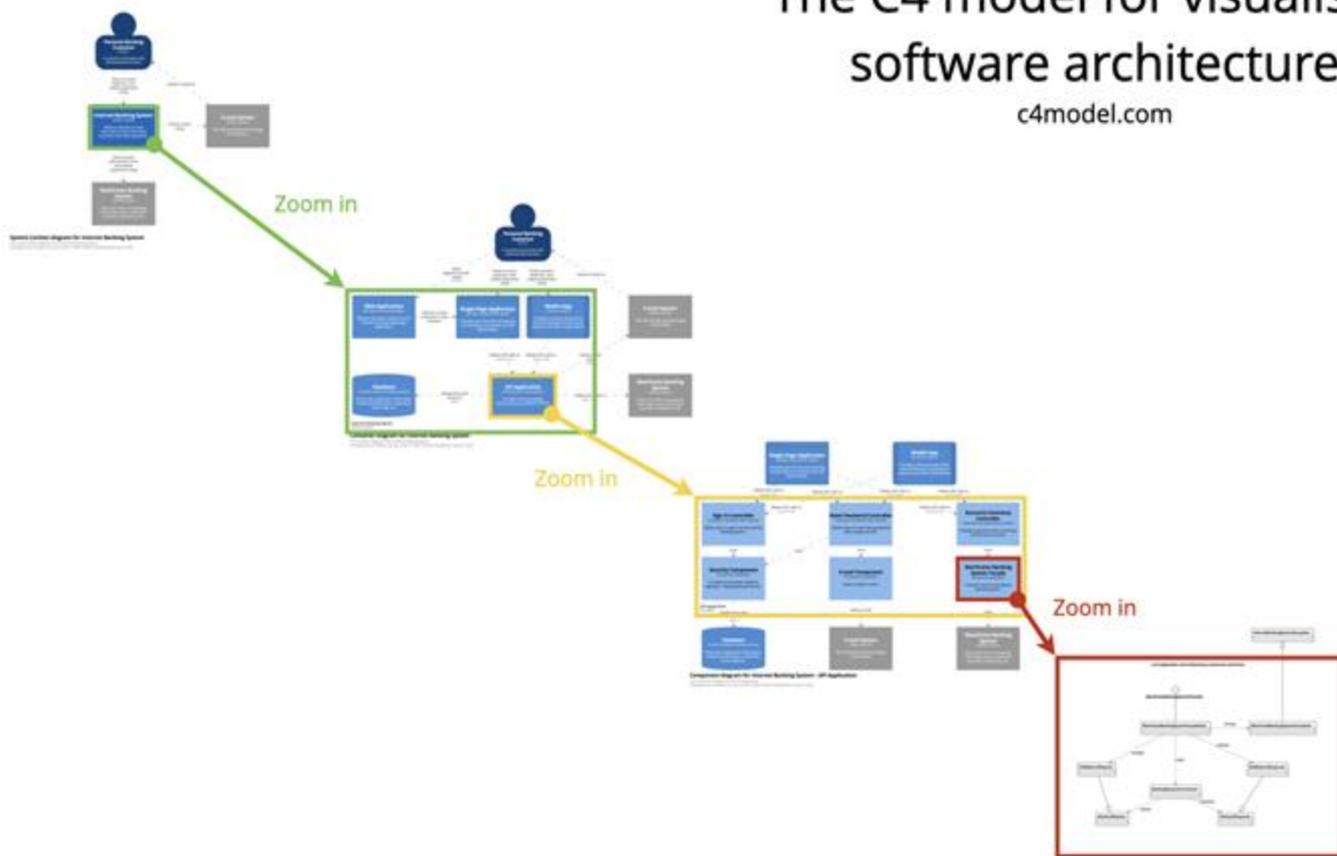


How to Create Enterprise Architecture ...
youtube.com

**But there are
common things**

The C4 model for visualising software architecture

c4model.com



Level 1
Context

Level 2
Containers

Level 3
Components

Level 4
Code

Easy to read

Our audience should be able to understand our diagram in seconds

Standalone

Major parts must make sense without additional explanation

Fast to create

We must be quick in creating diagrams

Goals

Easy to maintain

Things change, it must be easy to change the diagrams as well

Beautiful

Diagrams act as marketing material for technical ideas

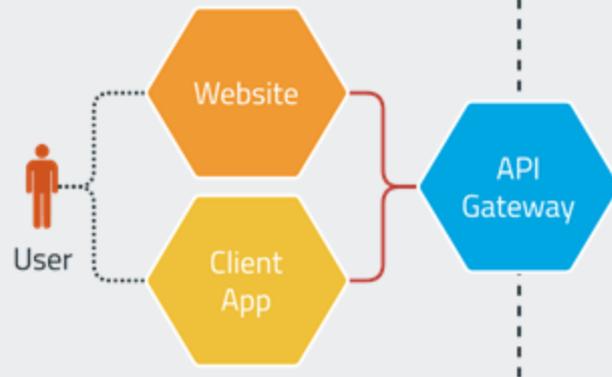
Guidelines



Have a Title

Defines focus of the diagram

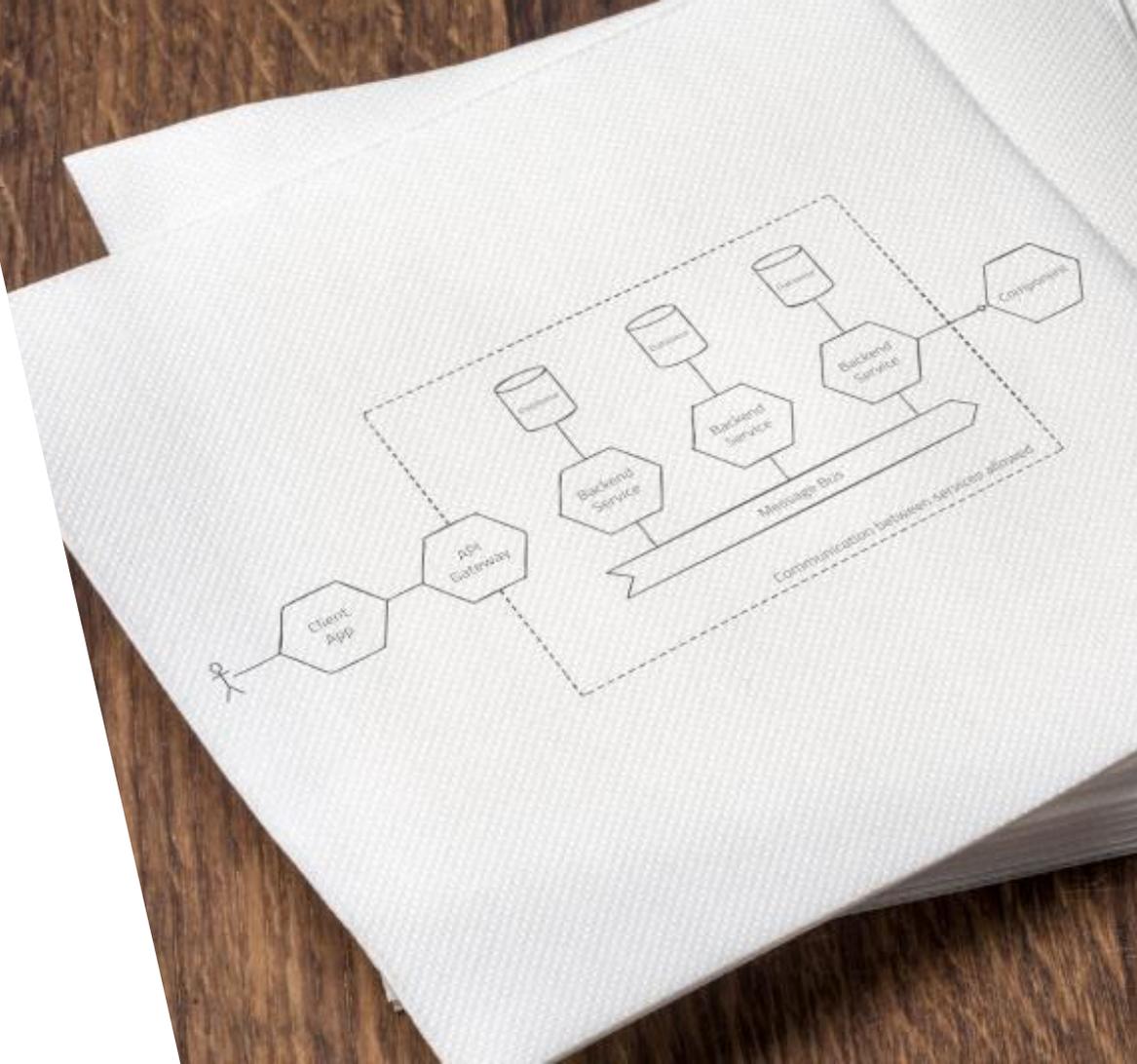
A Shop Architecture



Abstraction Level

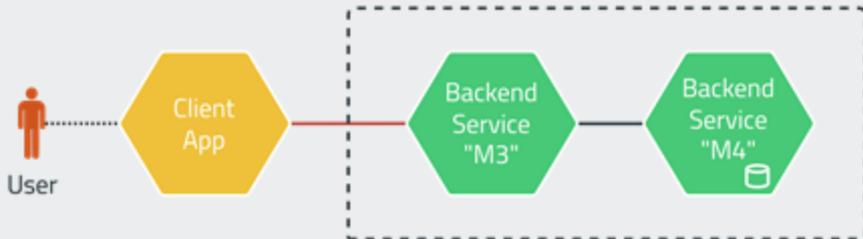
C4 Level 2 (Containers)

What you can draw on a napkin



Only show structure

At this abstraction level, we focus on the general structure of the system

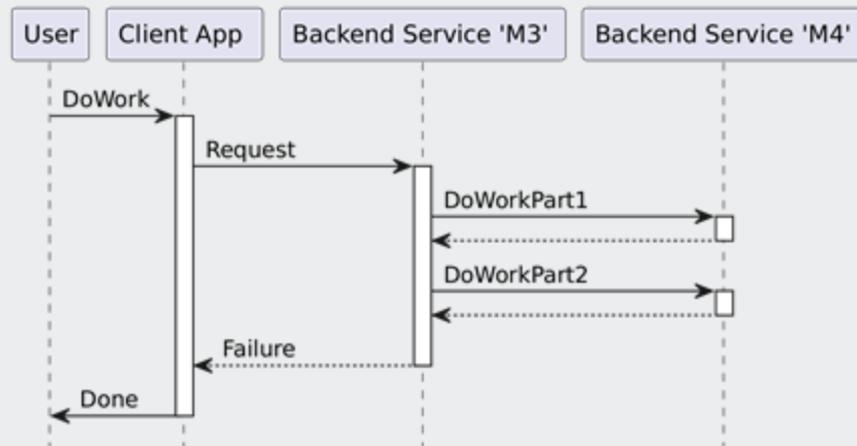
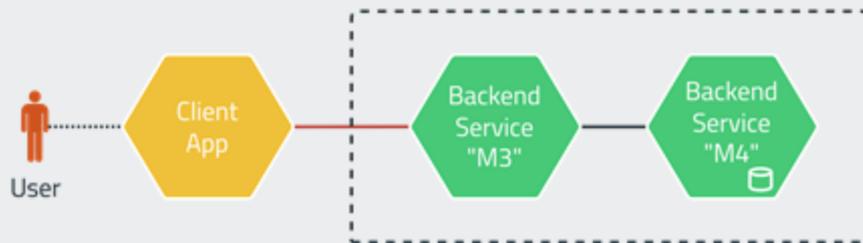


Only show structure

Don't show behavior

This is a static map of your system

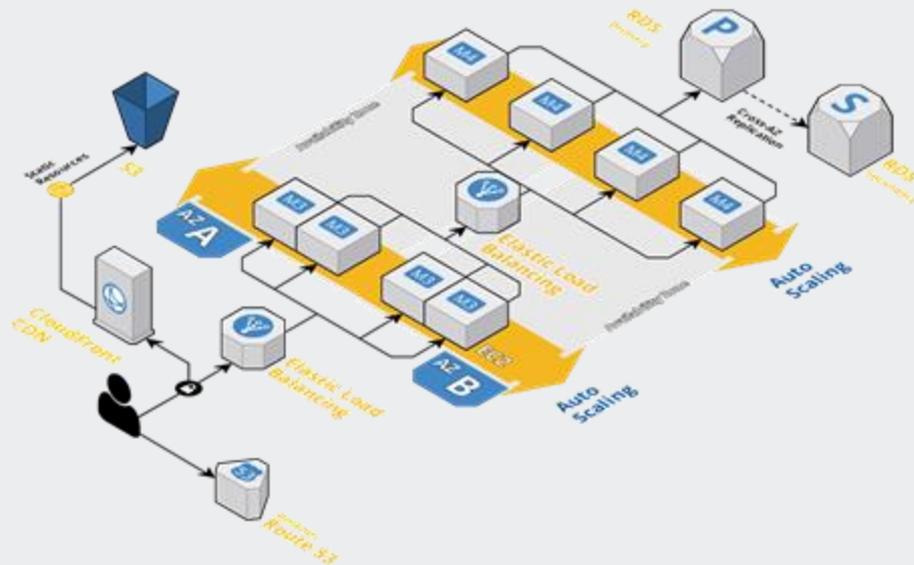
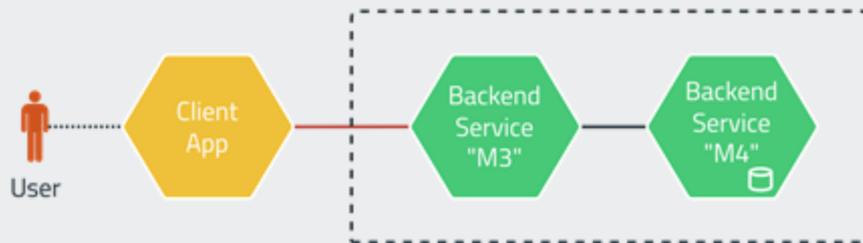
It has no notion of time



Only show structure

Don't show infrastructure

The shape of the infrastructure might differ significantly from the logical structure

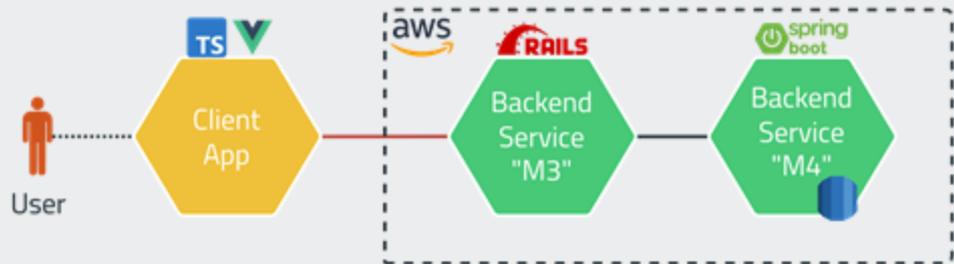


Only show structure

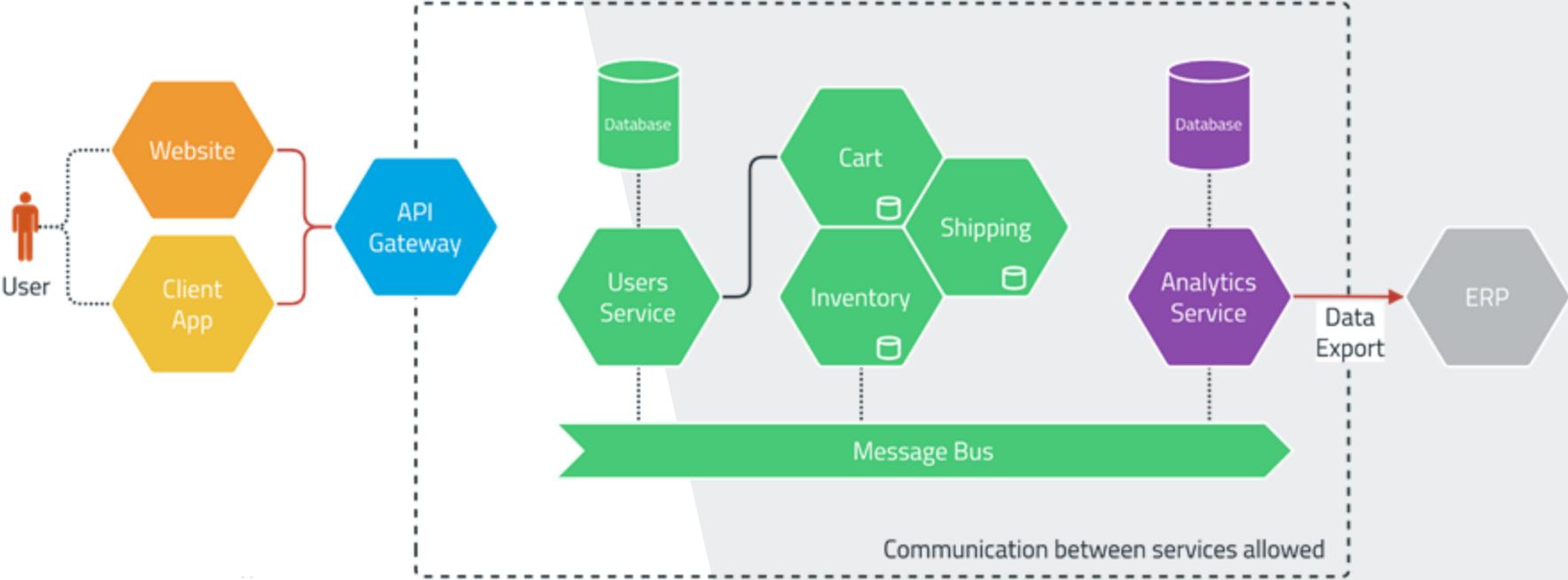
Don't show technology

Icons are distracting

Technology is a detail of a deeper level



Left to right direction



Consistent Symbols

Use a small set of symbols/shapes

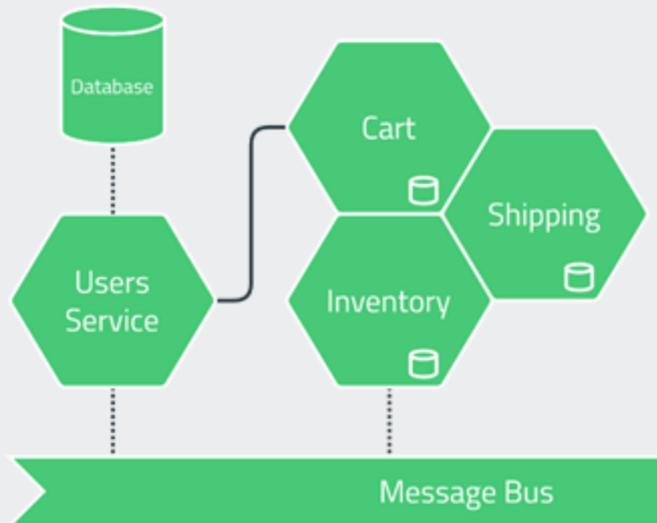
Use the same size everywhere



Label every node

Nodes are the most important parts of your diagram, they must have a label

Only use abbreviations that are clear to the audience



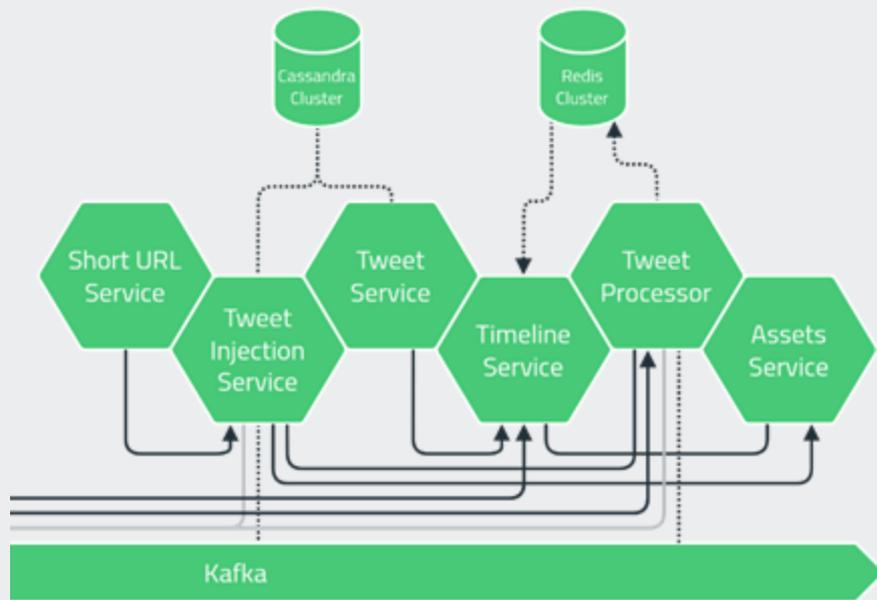
Connections

Use orthogonal connection style

Avoid crossing connections

Avoid more than 2 parallel connections

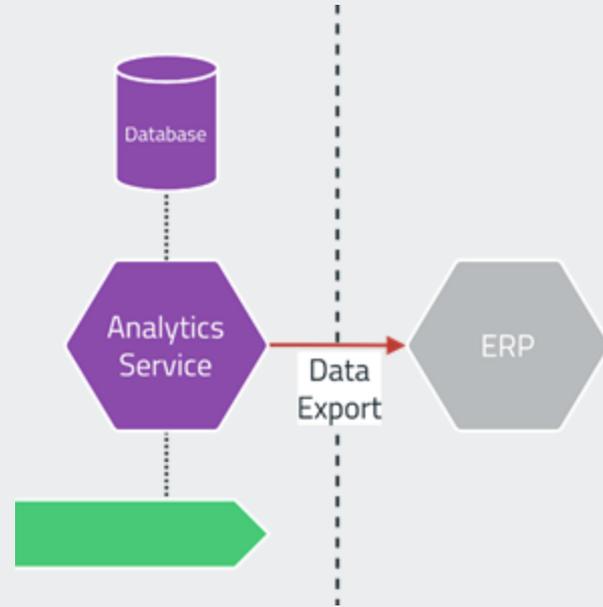
Ask yourself if showing all connections is necessary



Explain connections

The legend should give a clear description of the meaning of connections

Only add additional labels that are not clear or need additional information



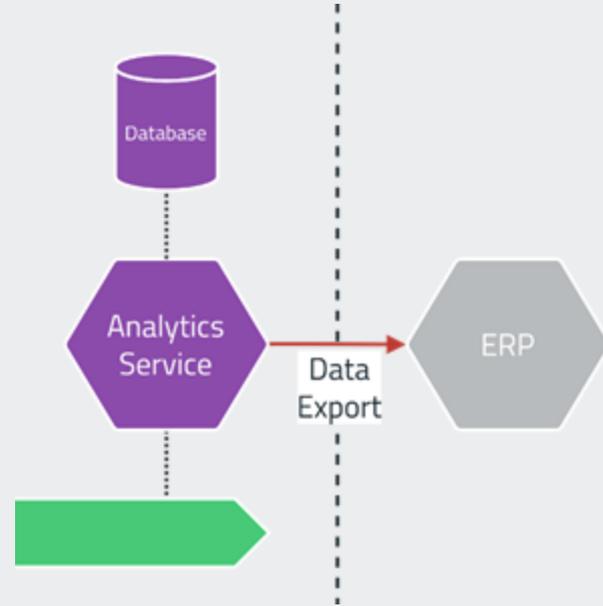
Arrow heads

Use them only if they have a special meaning on the “map”

E.g. if you have a “one-way-road”

Explain the meaning in the legend

Only add an arrow head to one end, not both



Legend

Explain

- symbols
- shapes
- colors
- connectors
- meaning of arrows
- meaning of proximity of shapes

 Client Application

 Backend Service

 Analytics Service

 Gateway Service

 External Service

- - Internet Boundary

— HTTP Traffic

— HTTPS Traffic

..... Other Protocol

Arrows represent ...

Touching components
belong to the same
application

Color coding

Use colors to visualize information

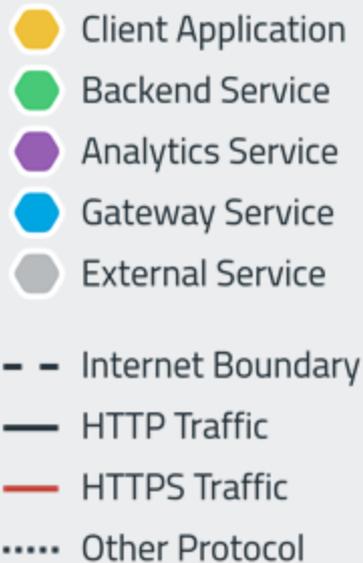
Use a set of colors that works well together

Explain the color-code in the legend

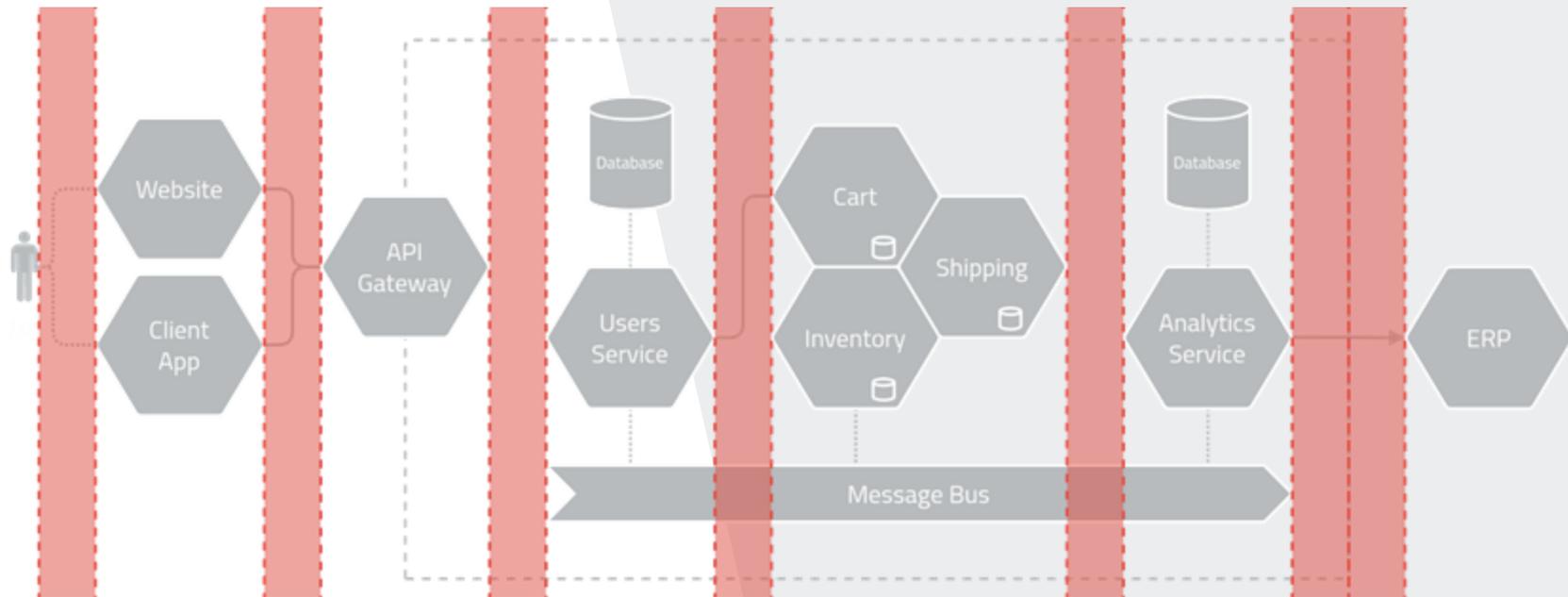
Basically you have only 2 domains for color coding:

- fill color of shapes
- line color of connections

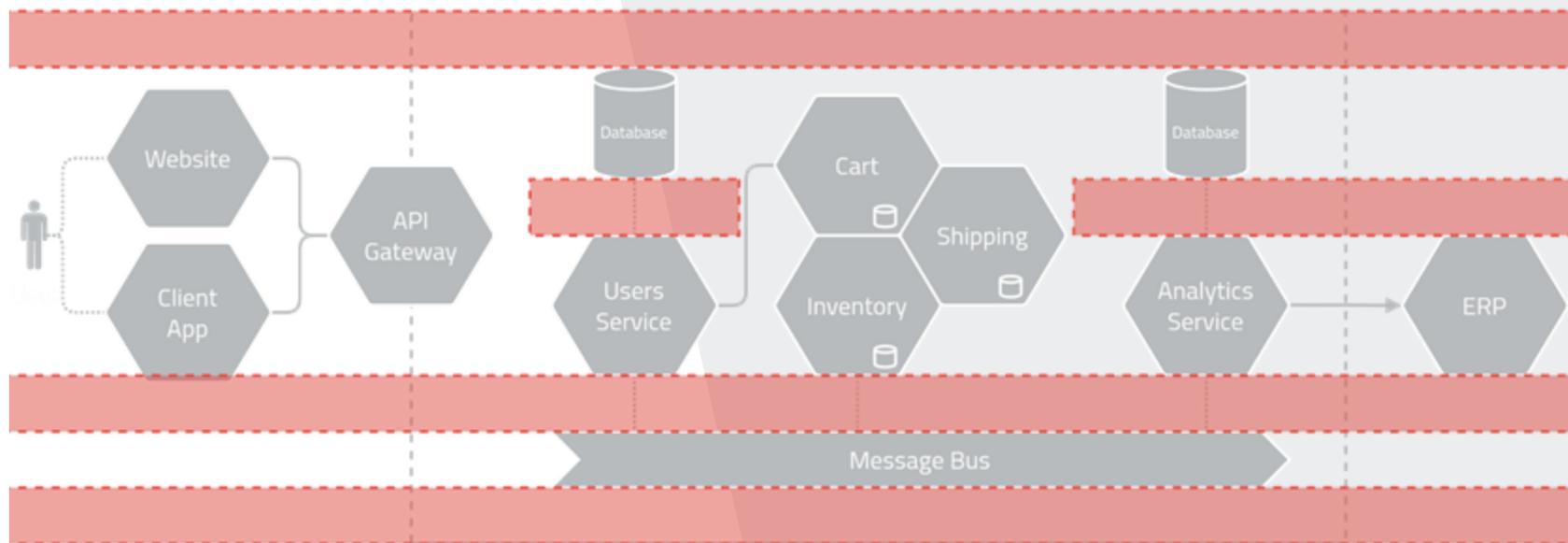
Avoid color coding the border of shapes



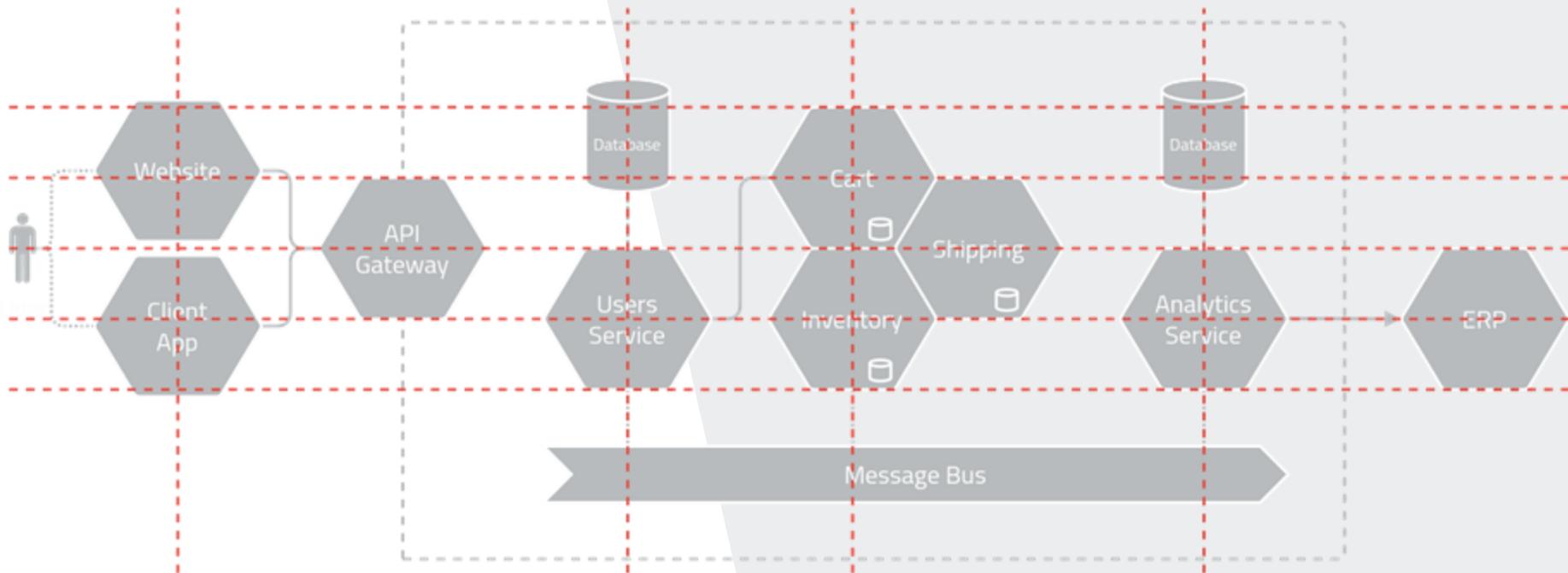
Consistent Spacing



Consistent Spacing



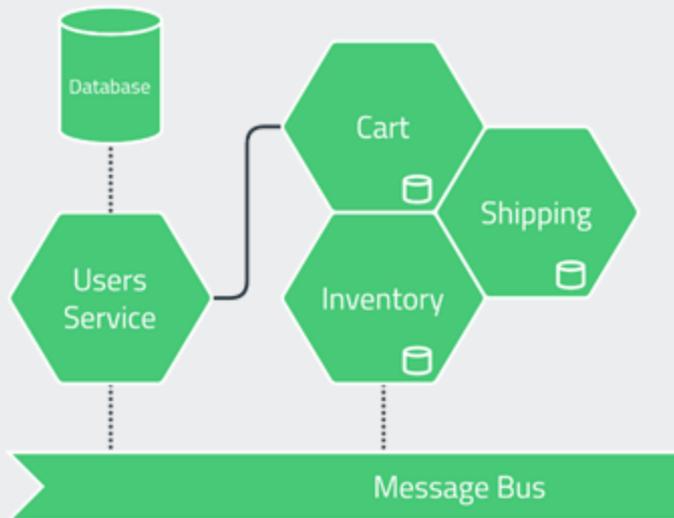
Alignment



Proximity

Use clusters or let components touch to indicate a special relationship

Explain the meaning in the legend



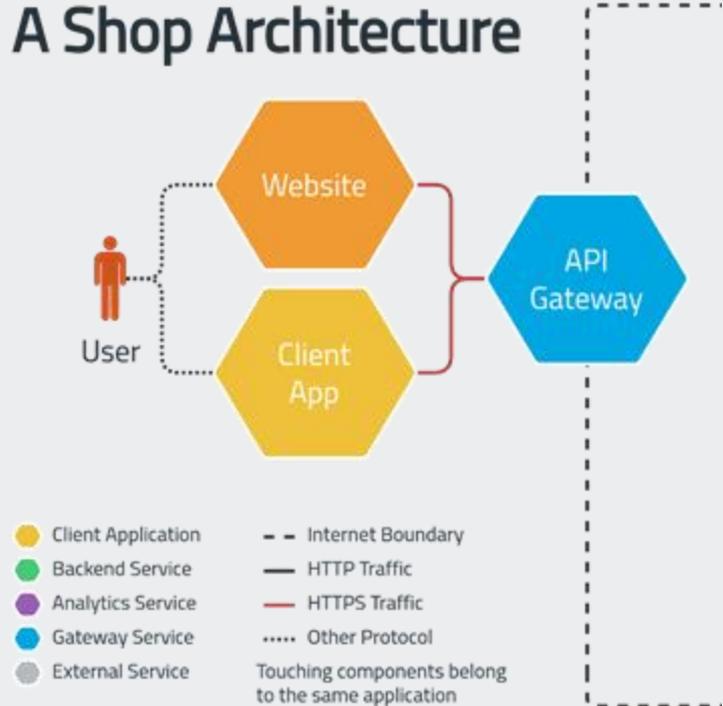
Fonts

Use up to 2 different fonts

Use up to 3 different font-sizes

Try to use the same fonts that are used in the rest of the documentation

A Shop Architecture



Design it!

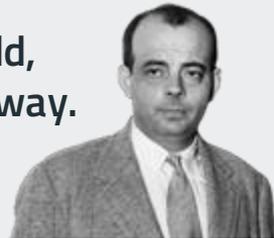
Diagrams are technical marketing material

We can learn from graphics design

Take your time

**Perfection is achieved,
not when there is nothing more to add,
but when there is nothing left to take away.**

- Antoine de Saint-Exupery



**It is about subtracting the non-essentials,
making your design practical, yet pure**

- Dieter Rams

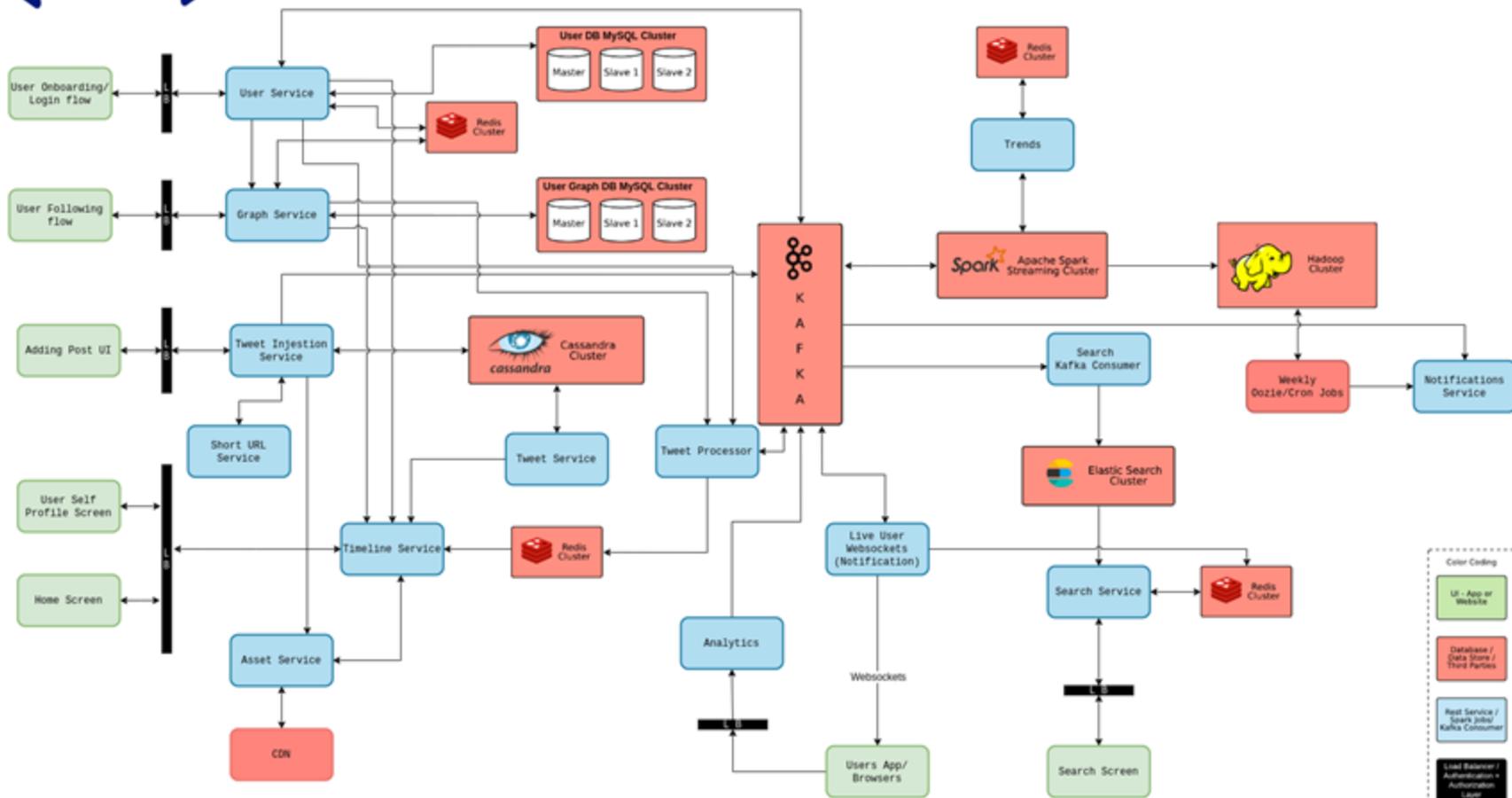


Examples



Twitter System Design

<code karle>



Twitter System Design

Based on Codecarle's work



User

Client App

API Gateways

MySQL Cluster

Redis Cluster

MySQL Cluster

User Service

Graph Service

Short URL Service

Tweet Injection Service

Tweet Service

Timeline Service

Tweet Processor

Assets Service

Kafka

Live User Websockets

Search Service

Search Kafka Consumer

Redis Cluster

Elastic Search Cluster

Trends

Spark Streaming Cluster

Notification Service

Analytics

Redis Cluster

Hadoop Cluster

Cassandra Cluster

Redis Cluster

CDN

- Client Application
- Backend Service
- Analytics Service
- Gateway Service
- External Service

- Internet Boundary
- HTTP Traffic
- HTTPS Traffic
- Other Protocol

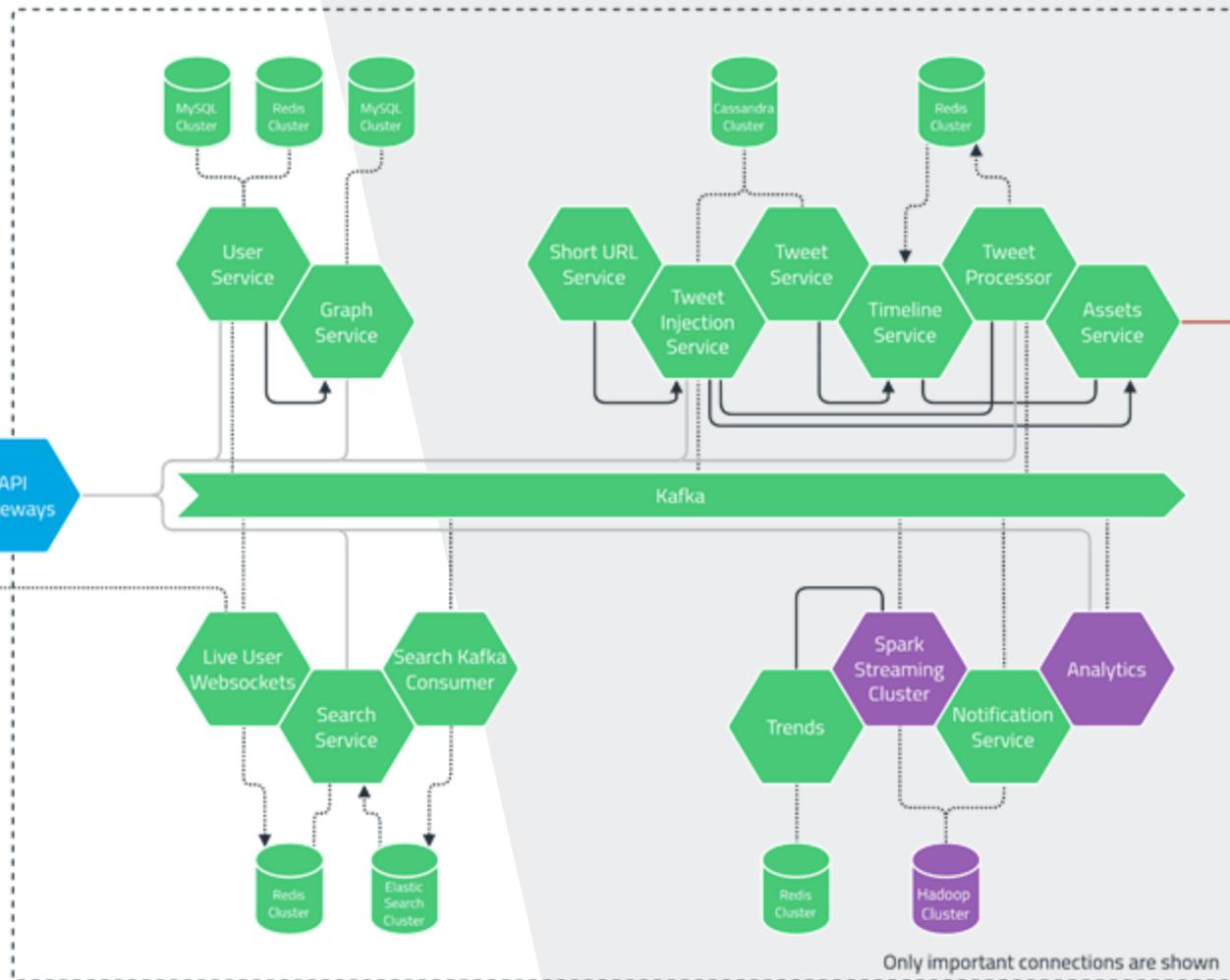
Arrows represent the usual control flow
Touching components have a close relationship

Twitter System Design

Based on Codecarle's work



User



- Client Application
- Backend Service
- Analytics Service
- Gateway Service
- External Service

- Internet Boundary
- HTTP Traffic
- HTTPS Traffic
- Other Protocol

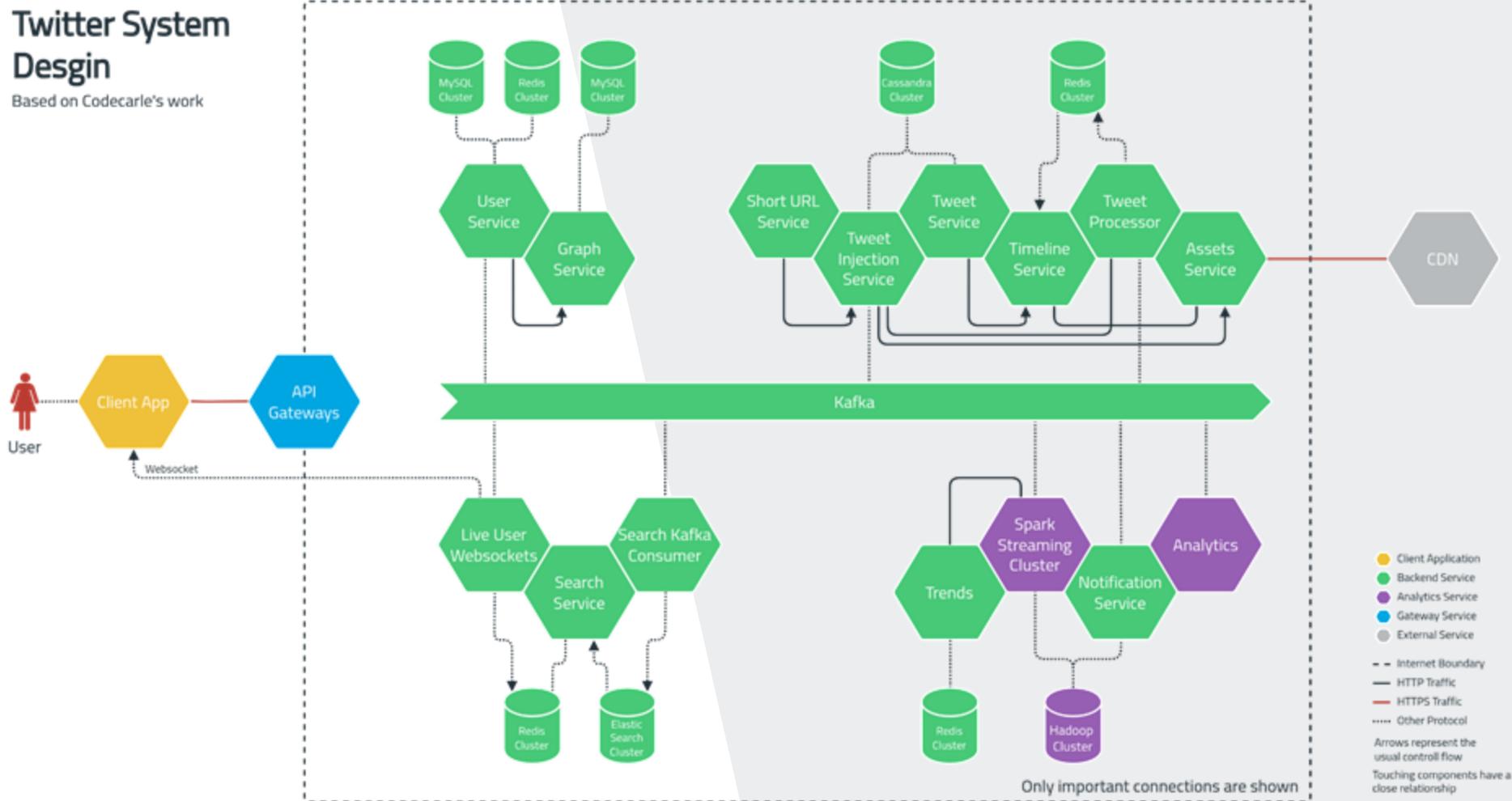
Arrows represent the usual control flow
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Twitter System Design

Based on Codecarle's work

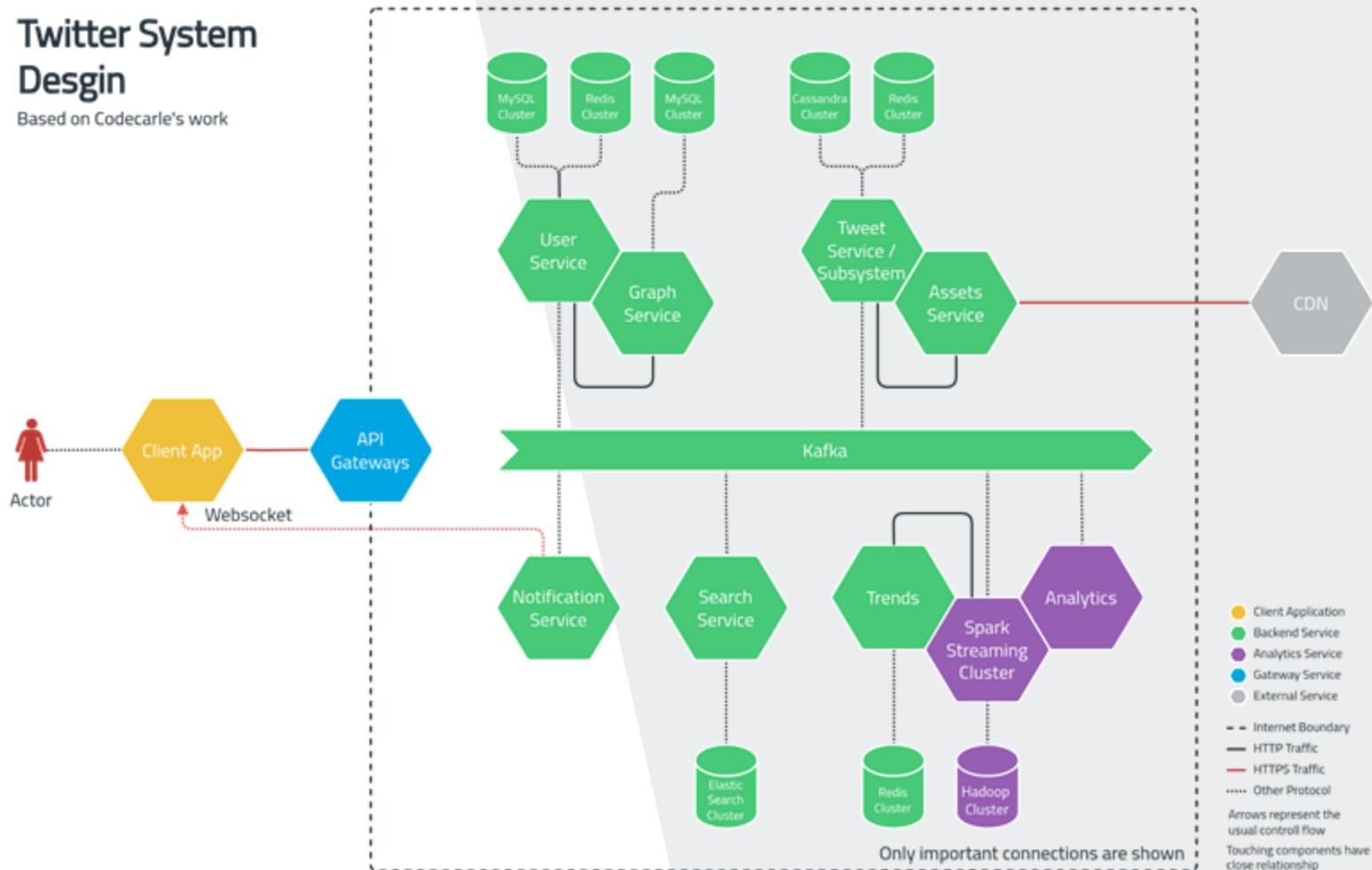


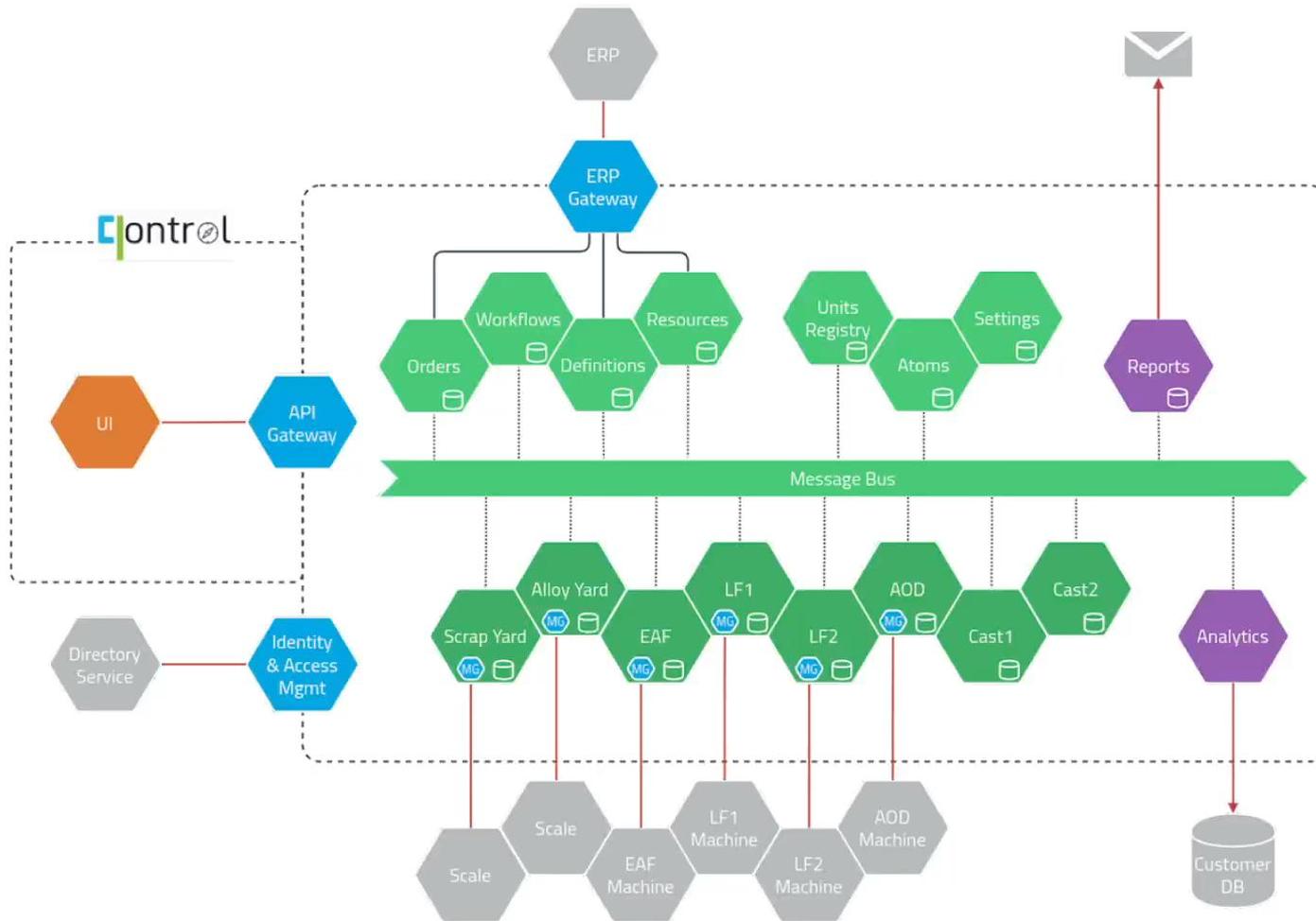
User

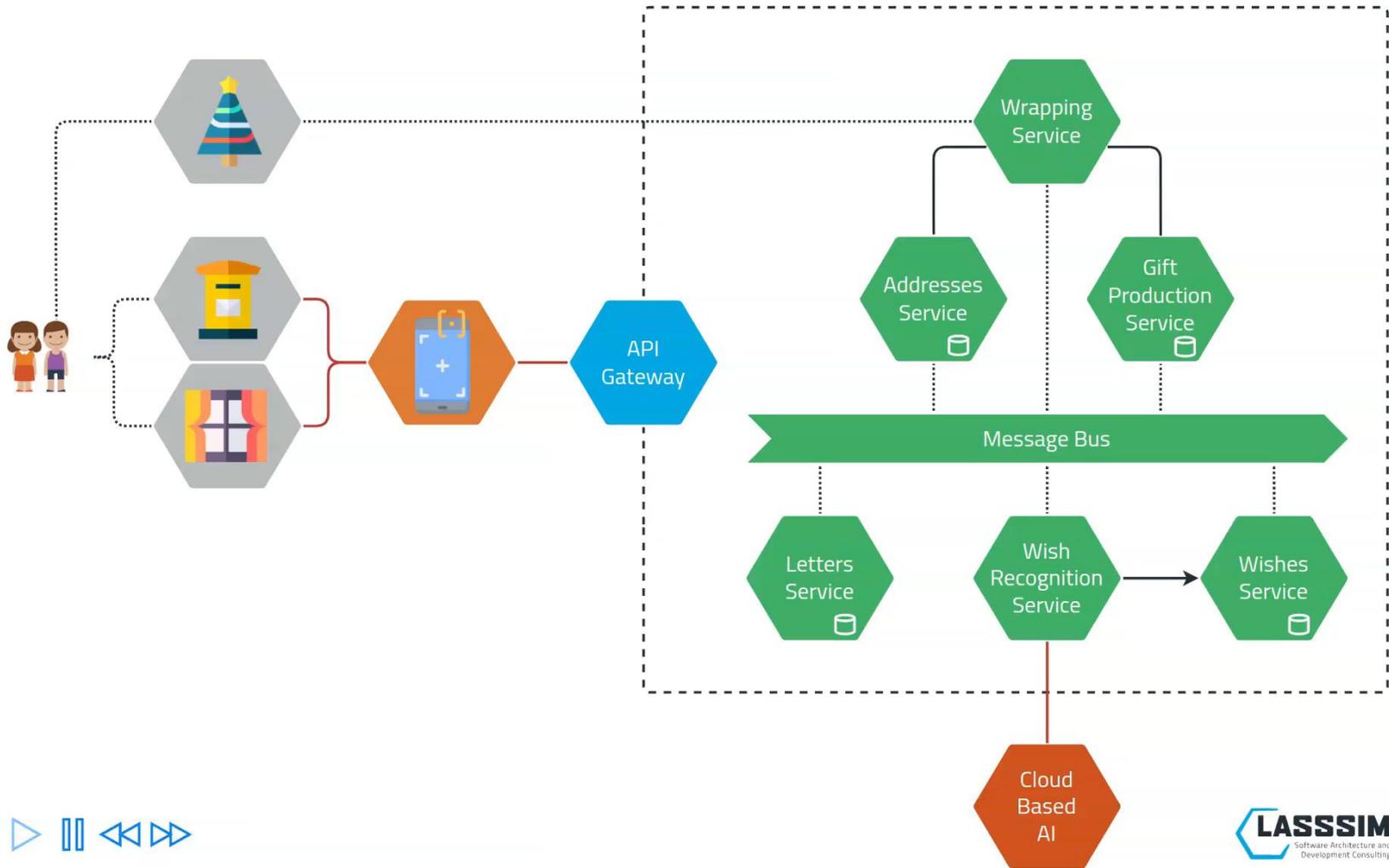


Twitter System Design

Based on Codecarle's work







100% of employees are people.

100% of customers are people.

100% of investors are people.

**If you don't understand people, you don't
understand business.**

Simon Sinek



**100% of colleagues are people.
100% of stakeholders are people.
If you don't understand your audience, you
don't understand communication.**

Simon Lasselsberger



A person is seen from behind, wearing a white long-sleeved sweater. The sweater has text printed on the back. The person is looking out over a city skyline at sunset. The sky is bright orange and yellow, and the city buildings are silhouetted against it. The person's hands are behind their back. A camera is visible in the bottom right corner of the frame.

per-cep-tion /

Organize Identify Interpret

Represent & Understand



<https://www.lasssim.com/diagrams>

Simon Lasselsberger

Software Architect and Development Expert
Helping companies build scalable systems



@lasssim

