Mastering Visual Communication

for Software Development

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O'REILLY

Communication Patterns

A Guide for Developers and Architects

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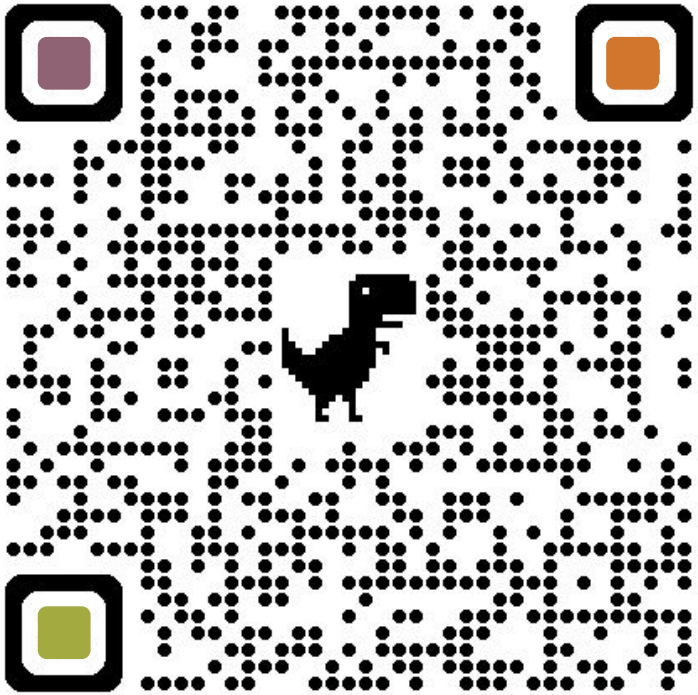
I

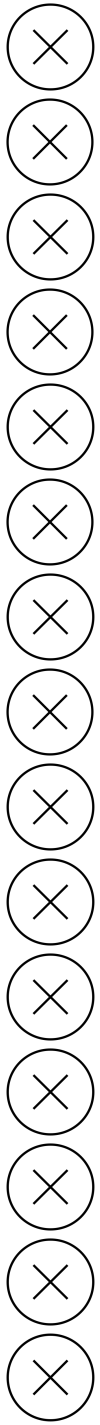
❤️

Feedback



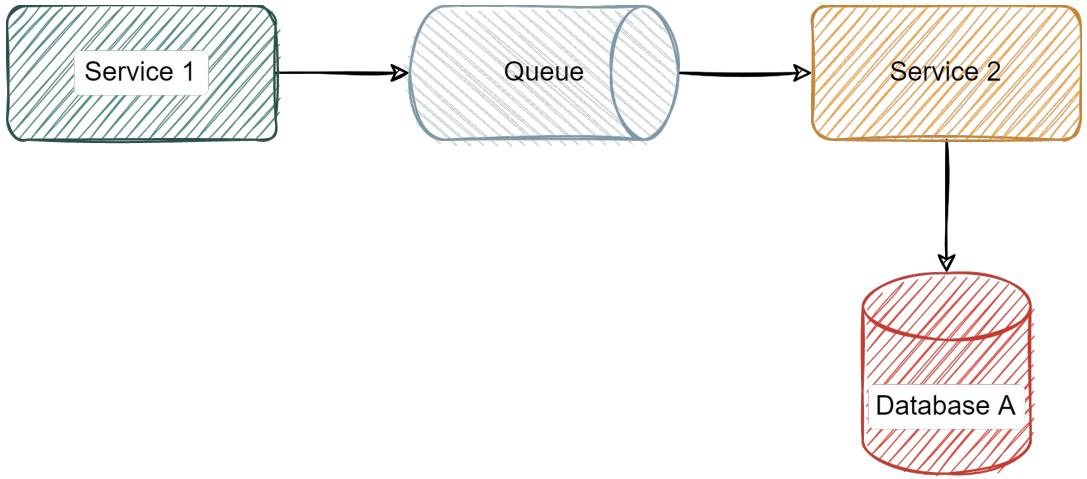
Effective visual communication

Patterns & Antipatterns

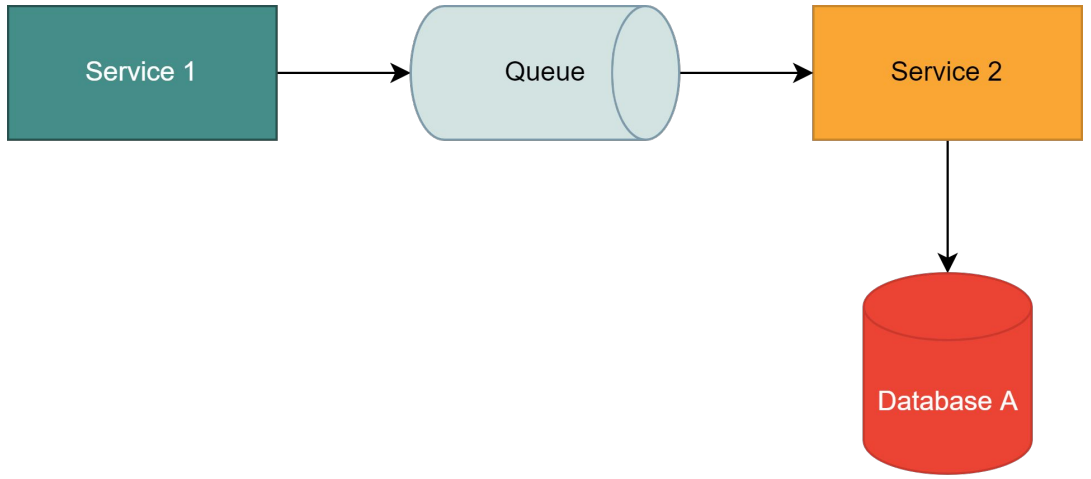


Avoid diagram pitfalls and deliver impact

Style Communicates



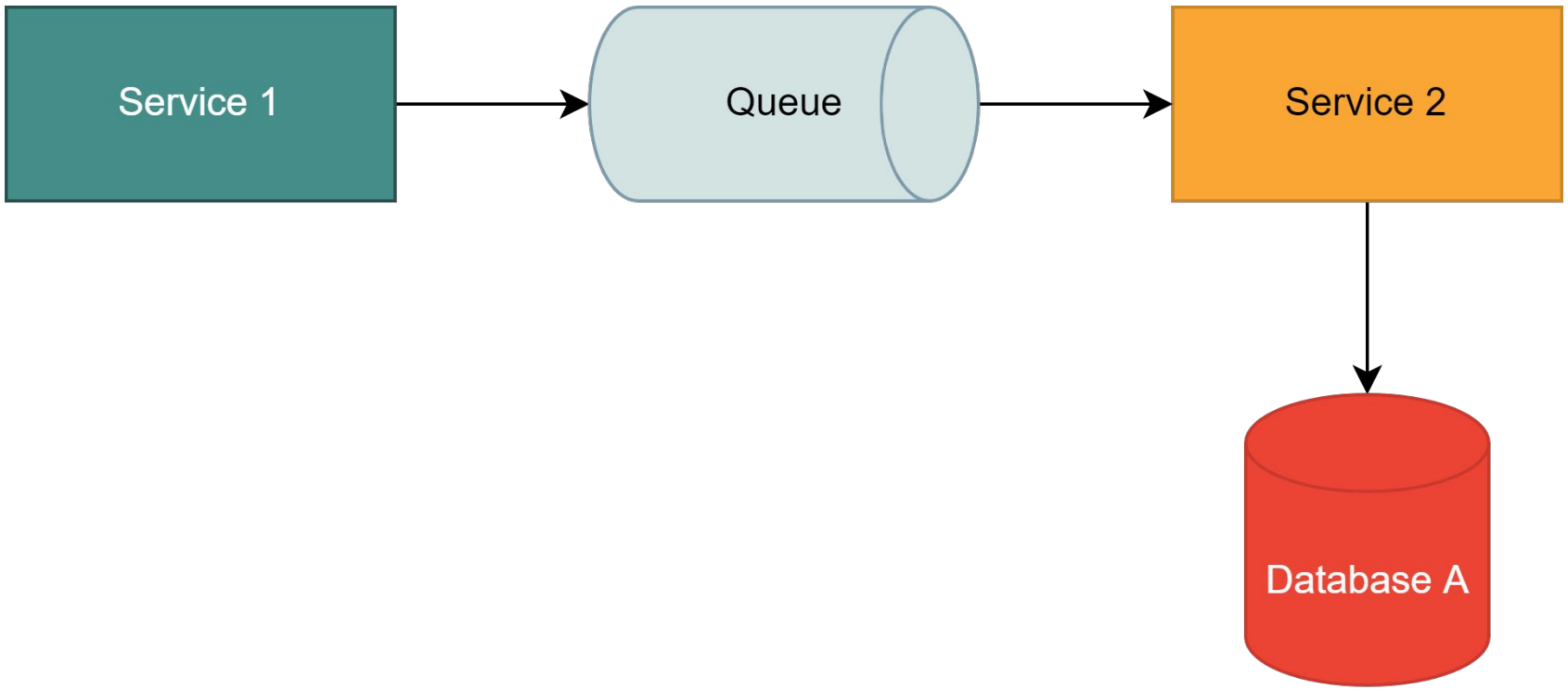
1



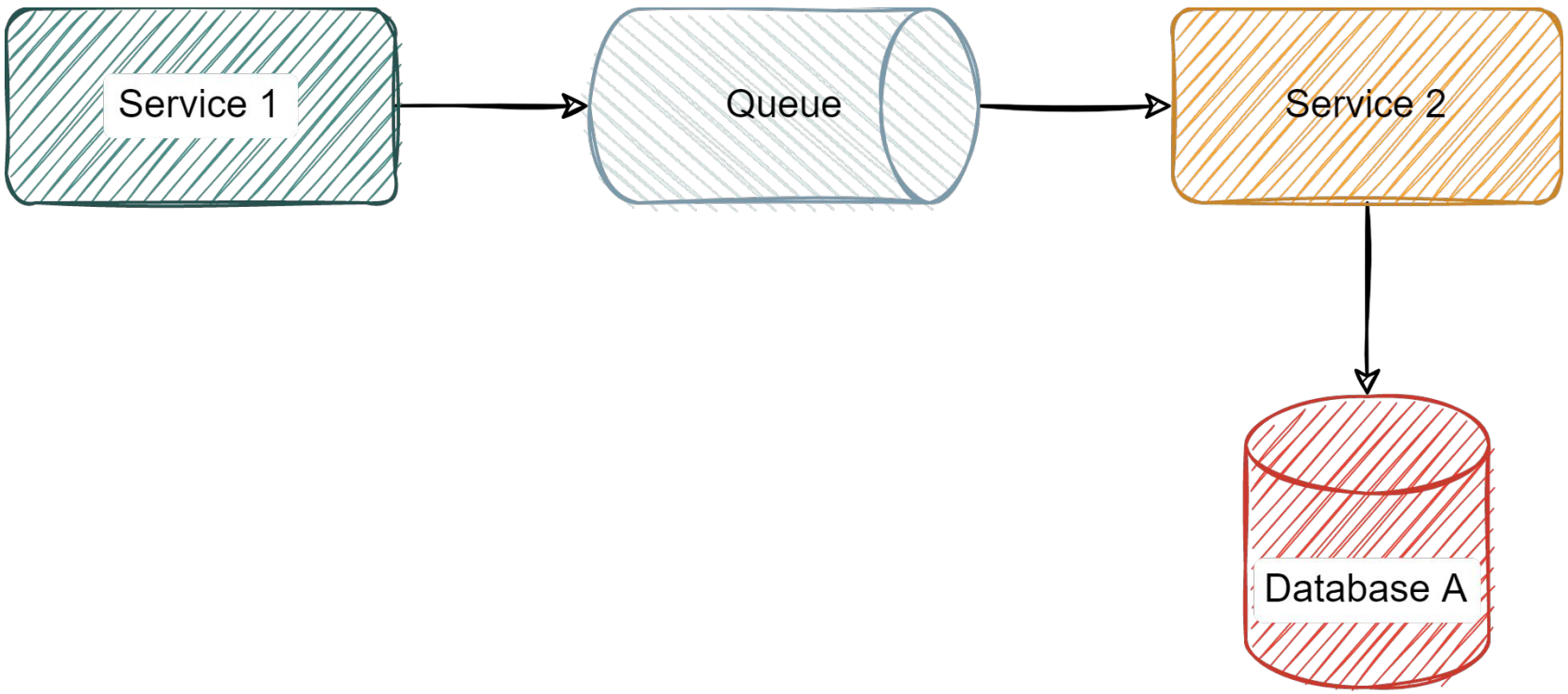
2

Use style to visually communicate to your audience

Style Communicates



Style Communicates



Pattern

Meta Style

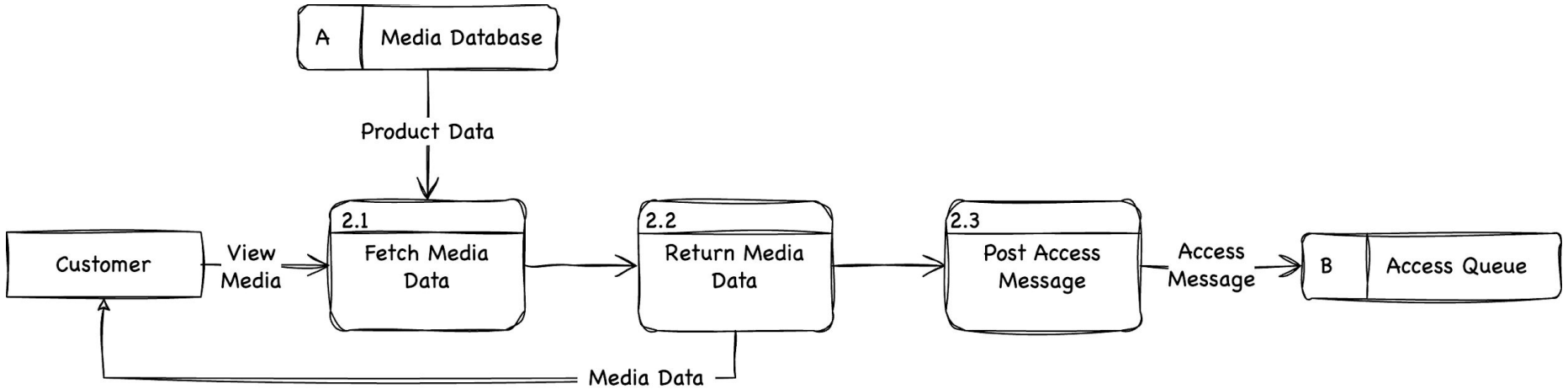
AKA: using style to communicate

Use style to your advantage

Avoid miscommunication

Which style is correct?

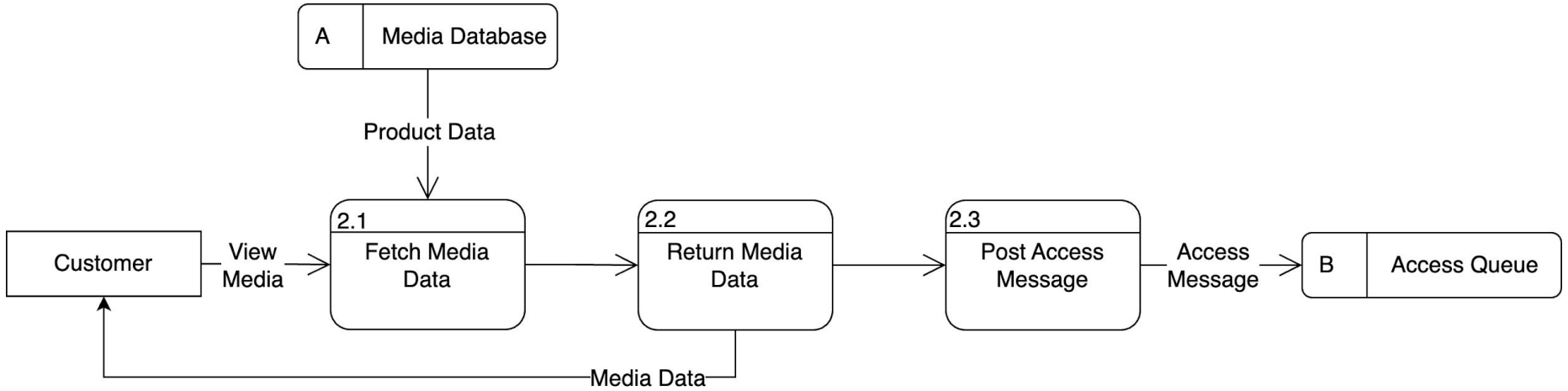
1



Polyglot Media

Data Flow Diagram: media search, view and access analytics - 2. Fetch Media

2



Polyglot Media

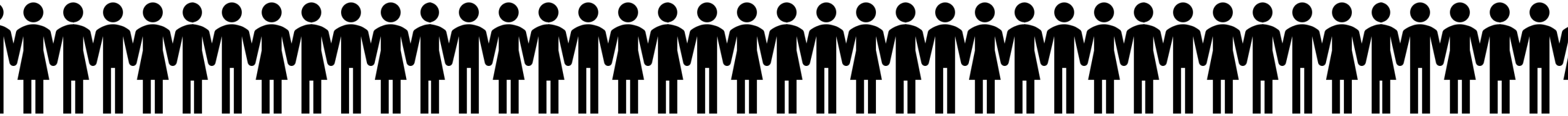
Data Flow Diagram: media search, view and access analytics - 2. Fetch Media

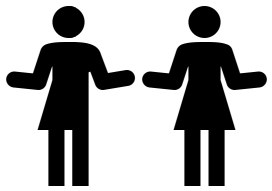
Pattern

Face in the Crowd

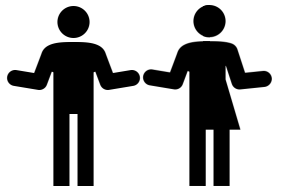
AKA: know your audience

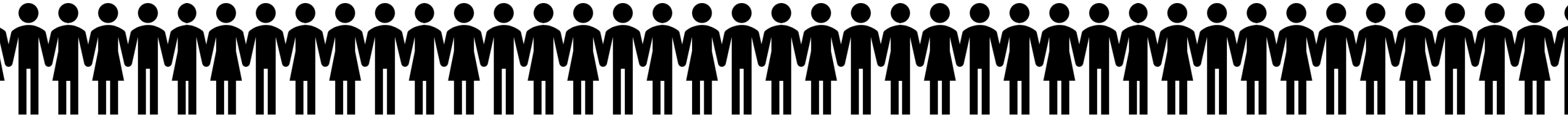
Different audiences need different levels of detail and different types of diagram





Who is your diagram for?





Think about these

What is their technical understanding?

Think about these

What is their technical understanding?

What level of detail do they need?

Think about these

What is their technical understanding?

What level of detail do they need?

What do they want from you?

Think about these

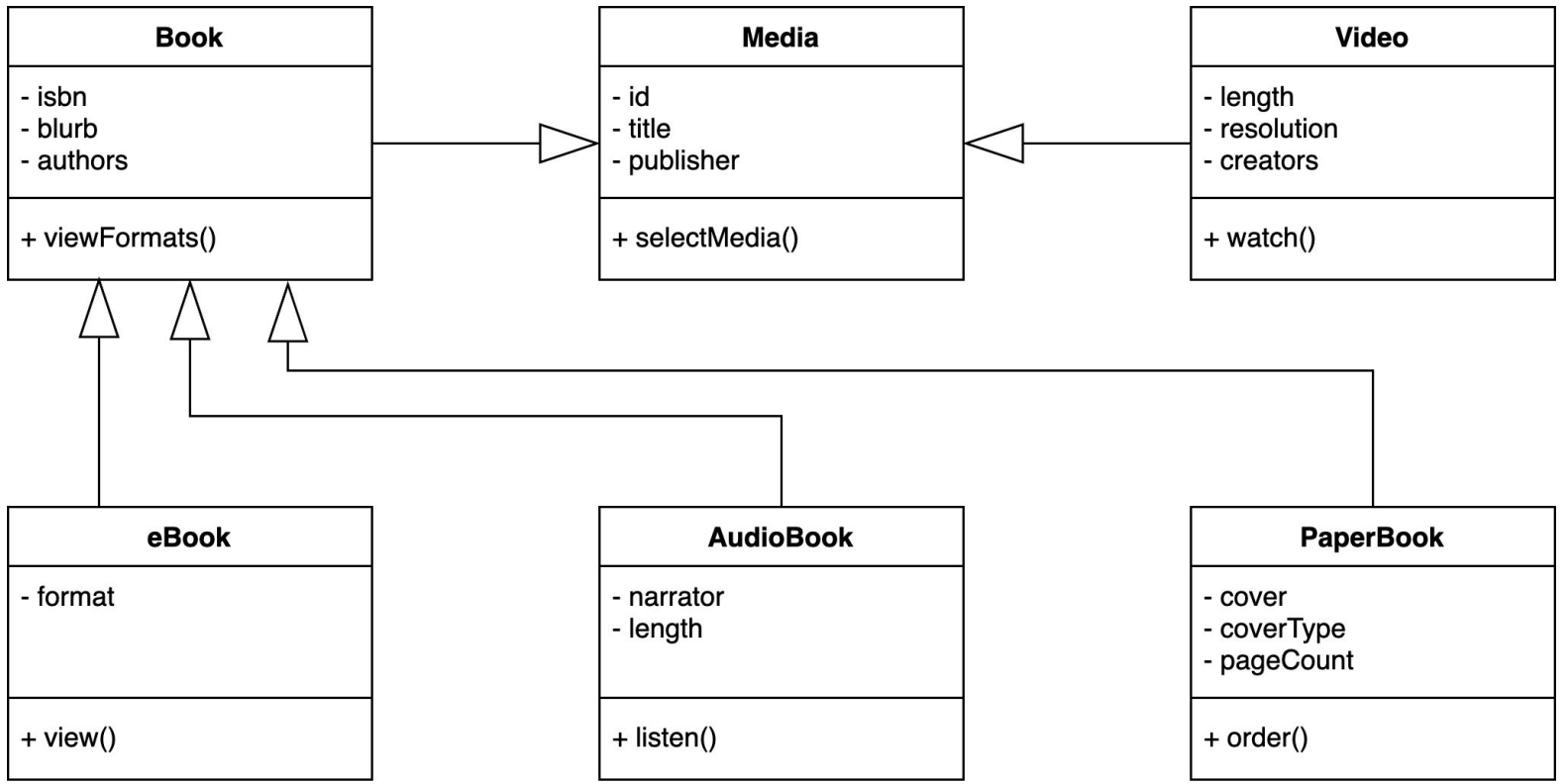
What is their technical understanding?

What level of detail do they need?

What do they want from you?

What do you want from them?

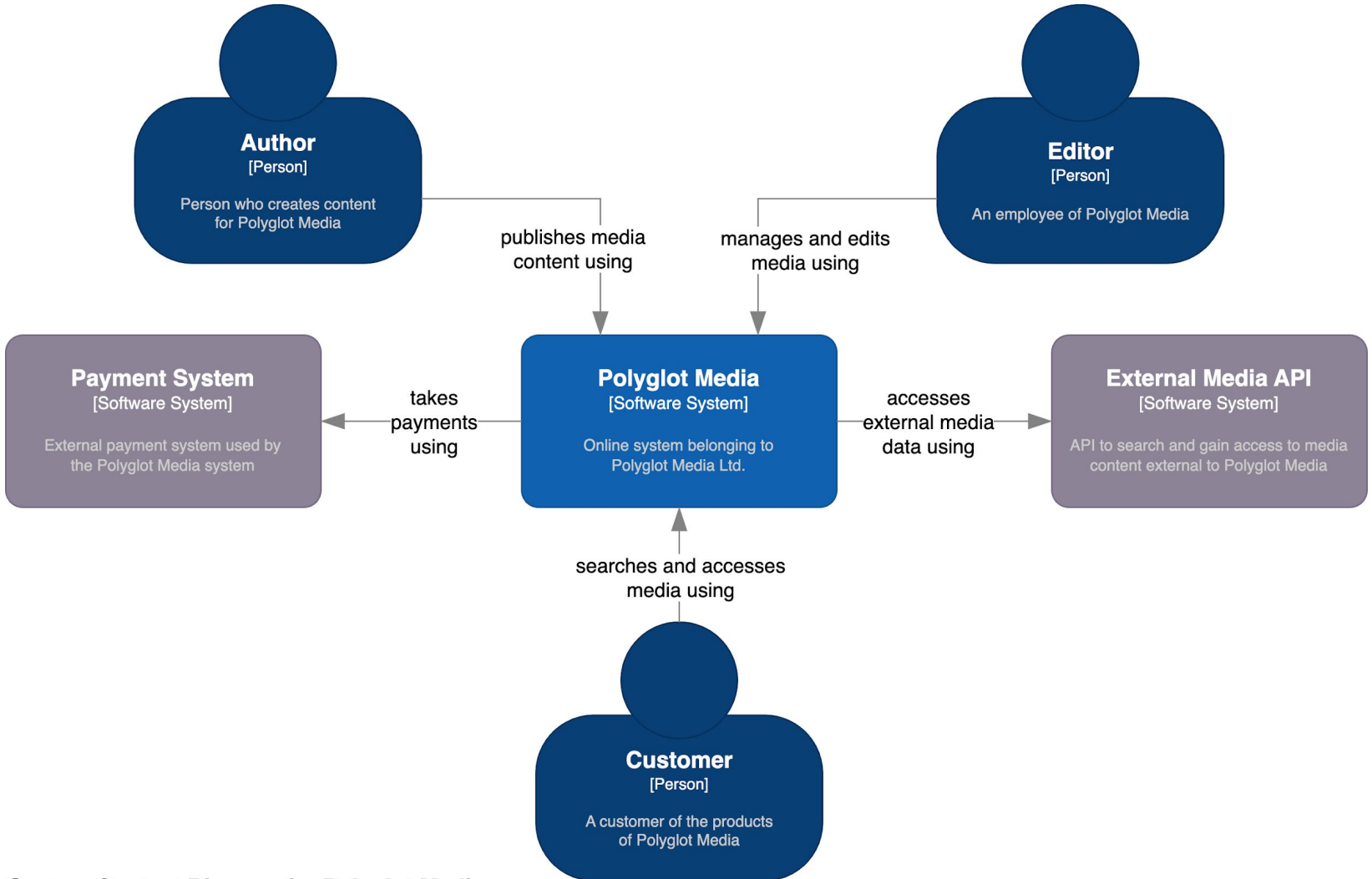
Who is this for?



Media

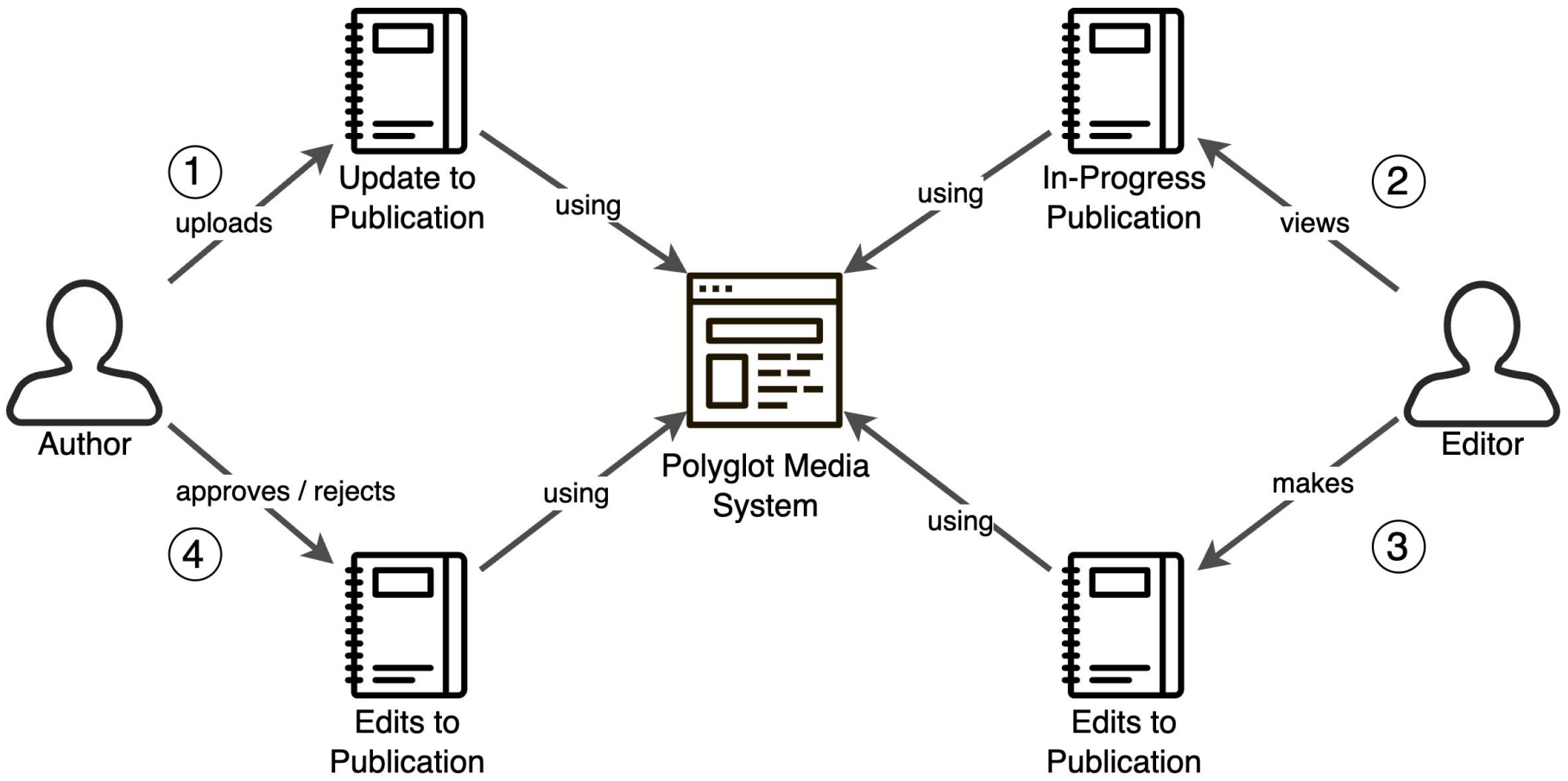
Class Diagram

Who is this for?



System Context Diagram for Polyglot Media
Showing the high-level interactions with the Polyglot Media system.

Who is this for?



Polyglot Media

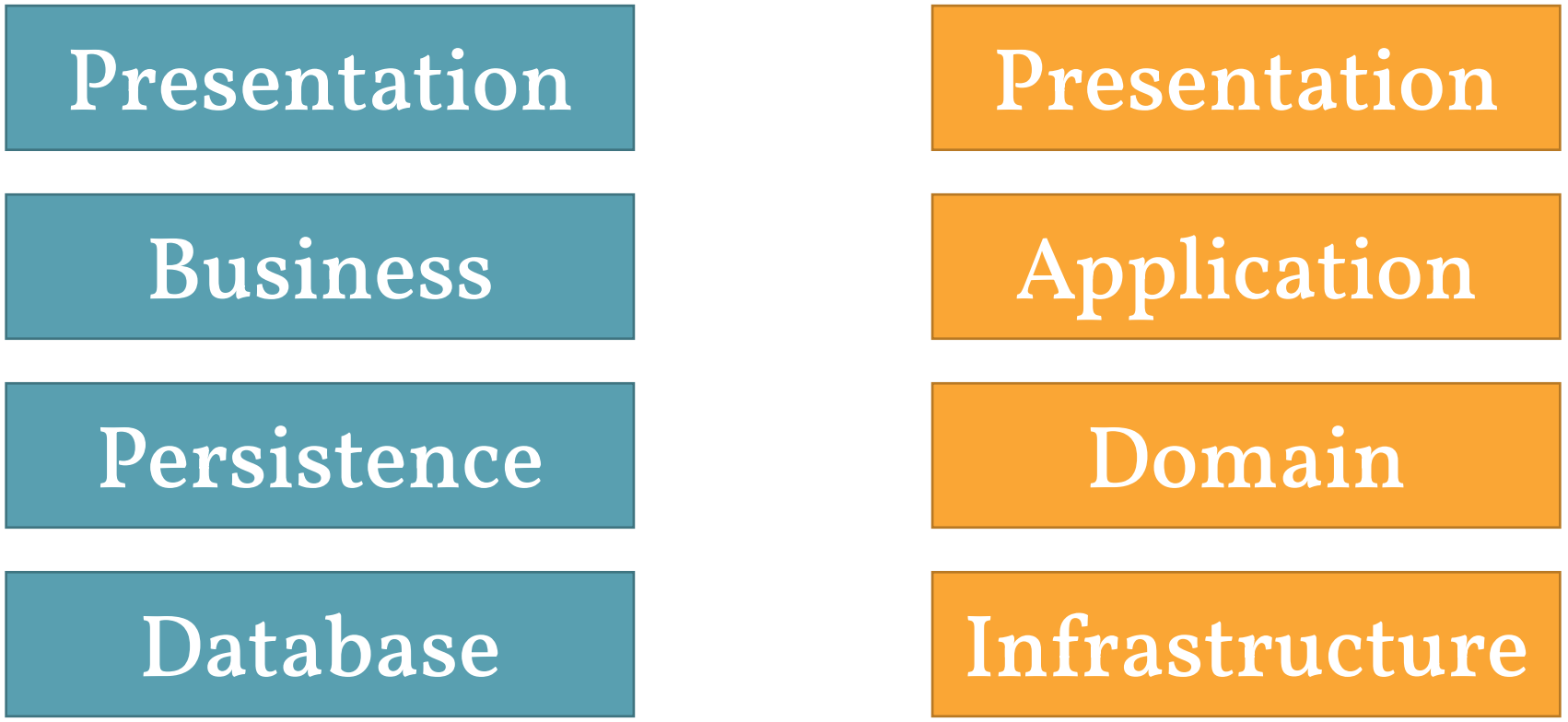
High-Level Domain Story | Publication editing process

Antipattern

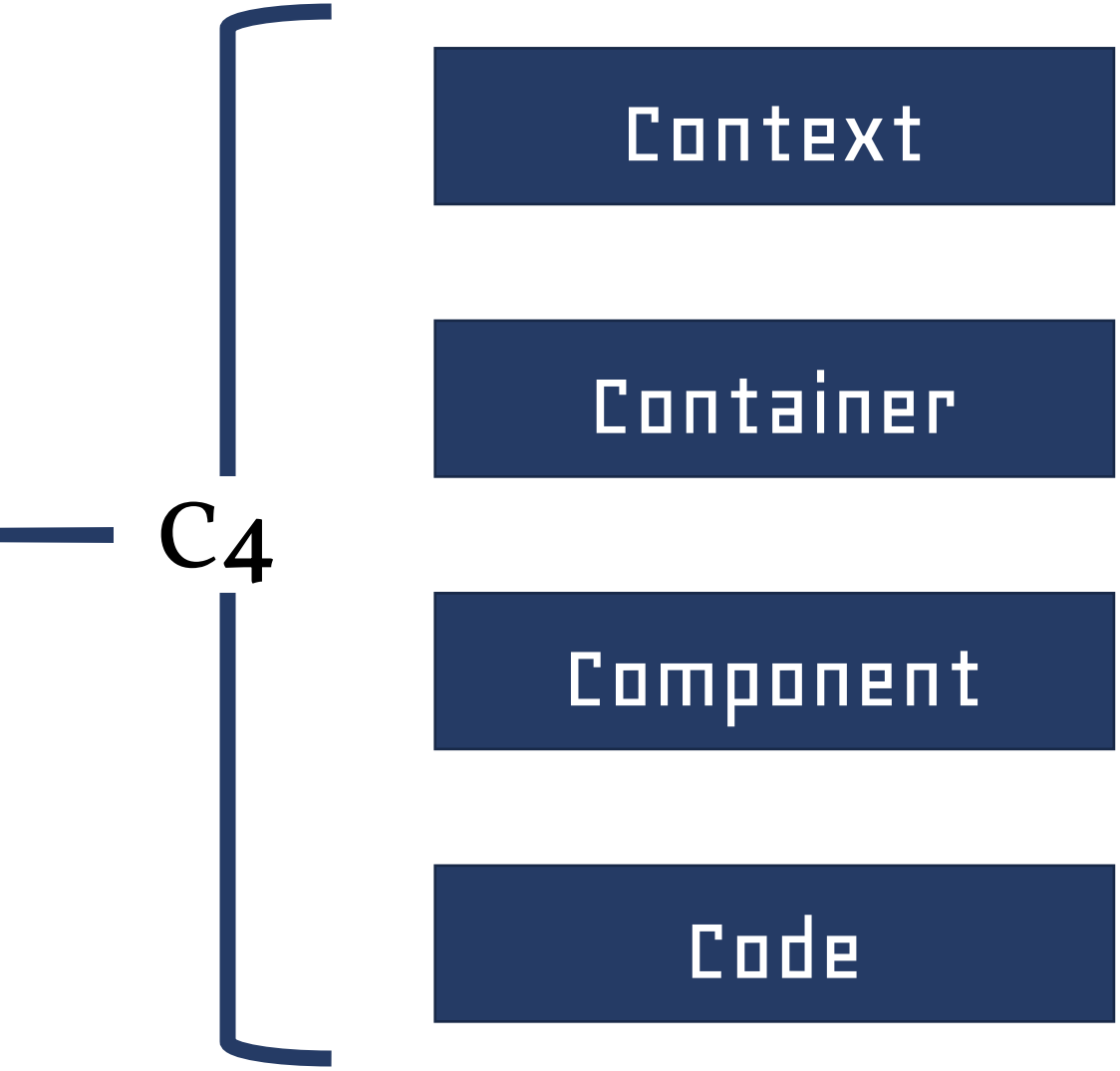
Multi-Storey Diagram

AKA: mixing levels of abstraction

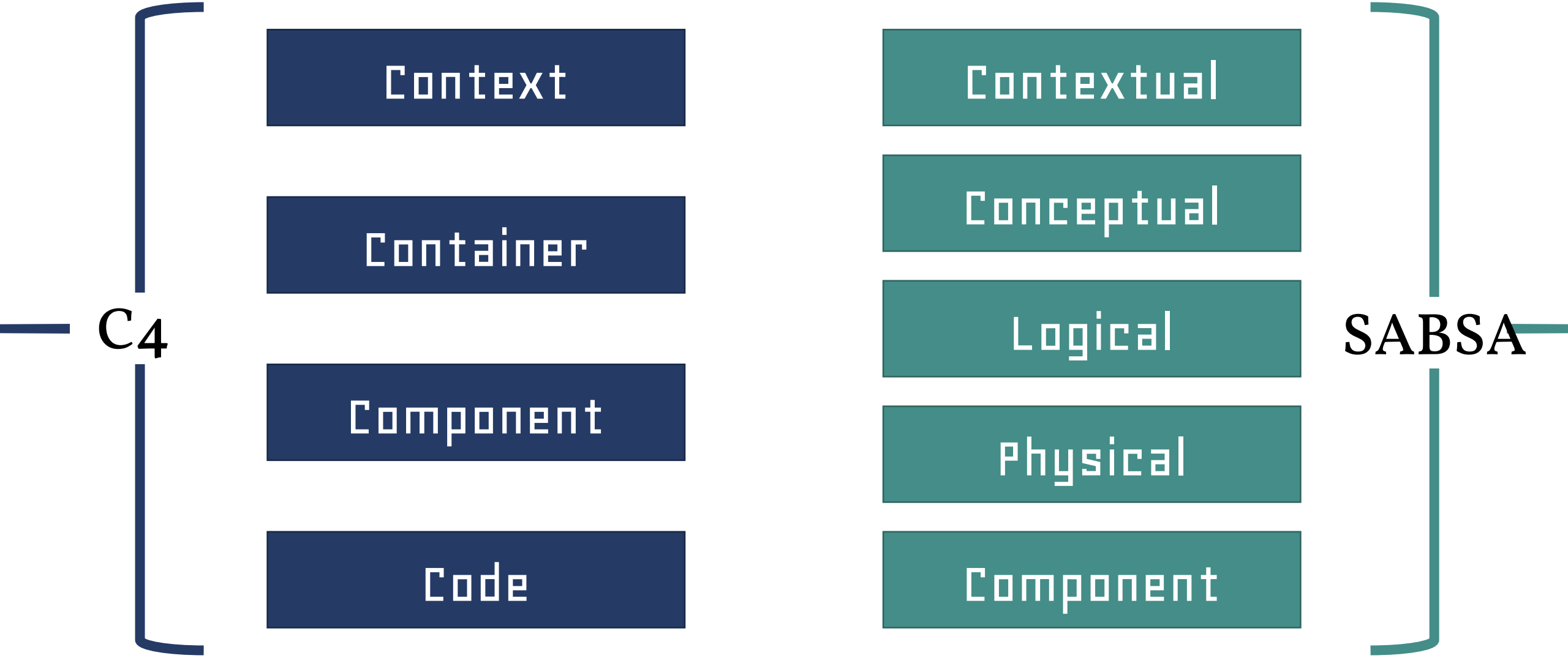
A 'Sin' in Coding



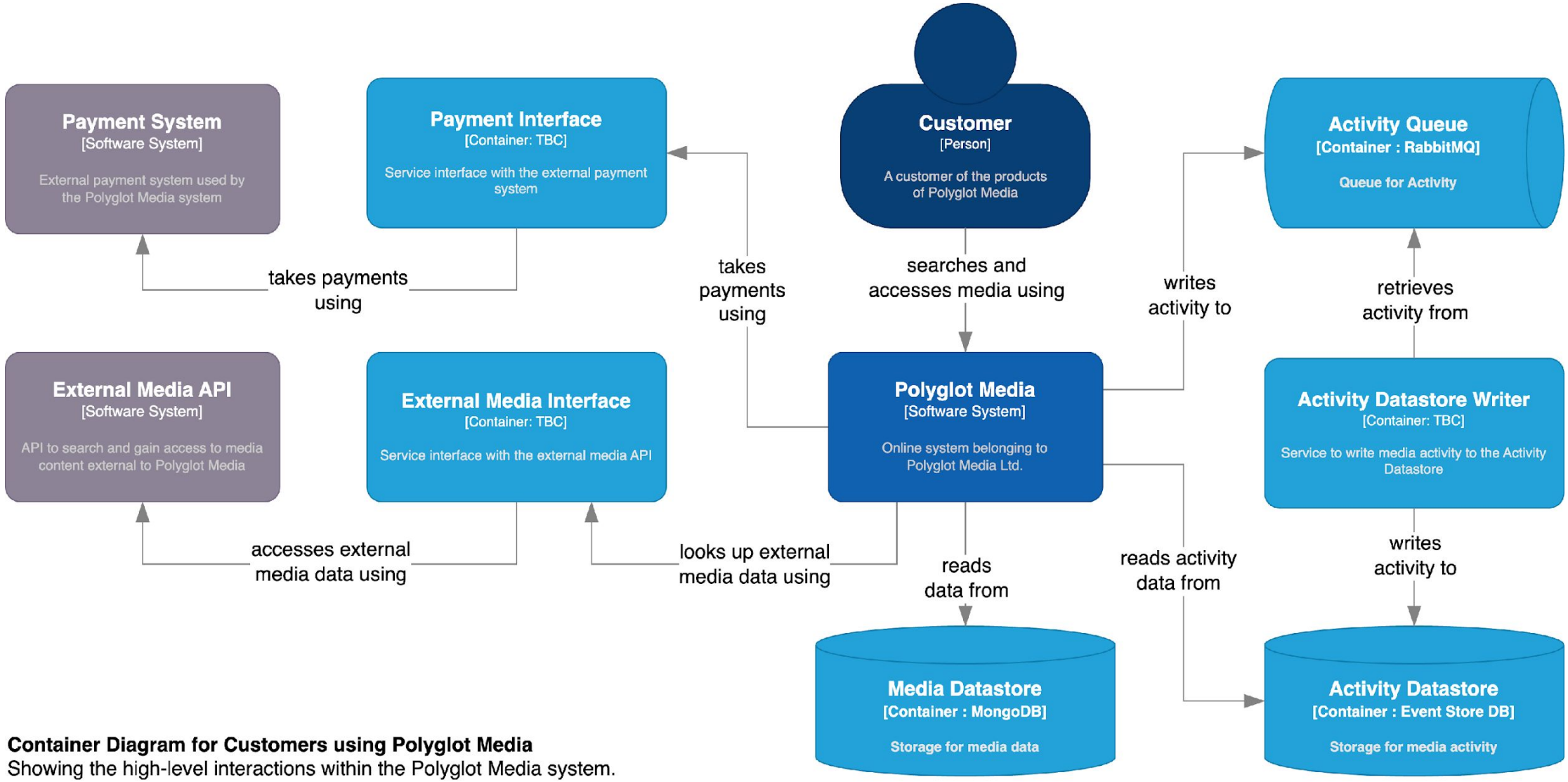
Levels of Abstraction in Architecture



Levels of Abstraction in Architecture

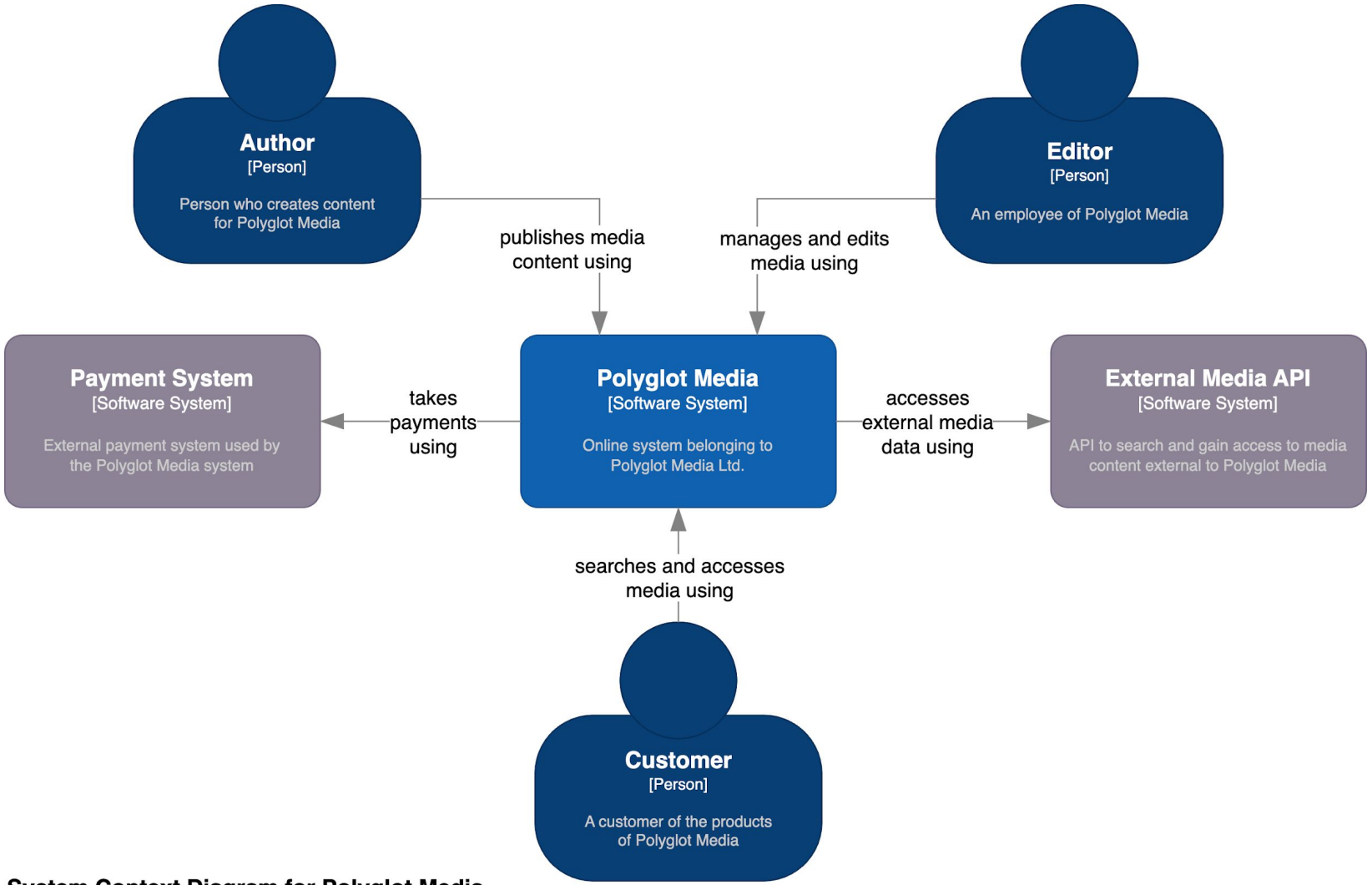


What's wrong here?



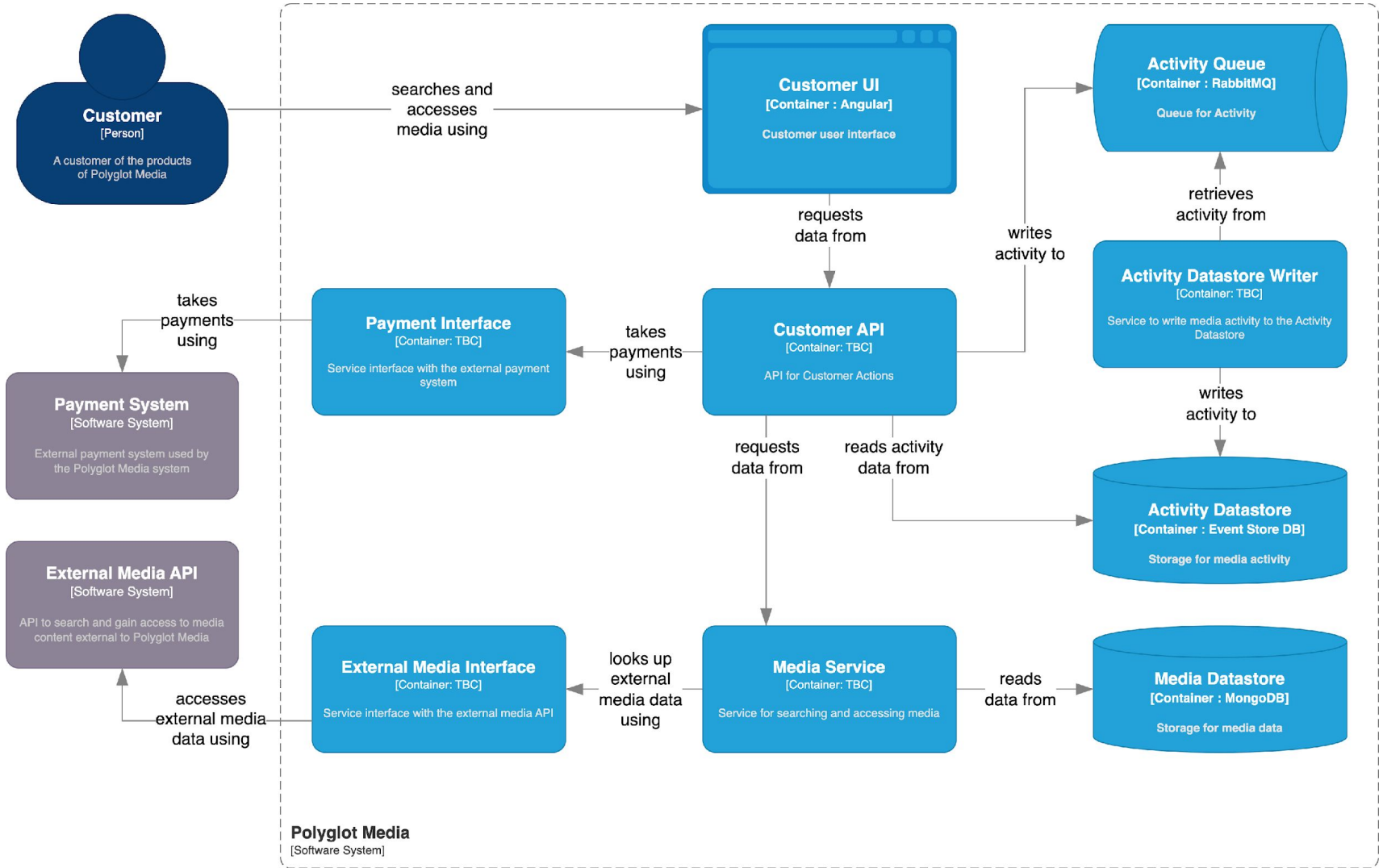
Container Diagram for Customers using Polyglot Media
Showing the high-level interactions within the Polyglot Media system.

Context Diagram



System Context Diagram for Polyglot Media
Showing the high-level interactions with the Polyglot Media system.

Container Diagram



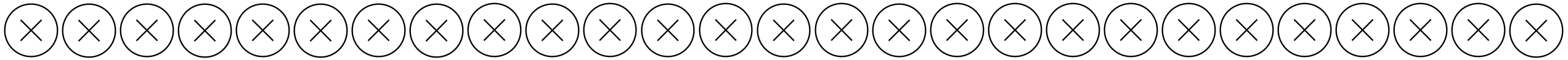
Container Diagram for Customers using Polyglot Media
Showing the high-level interactions within the Polyglot Media system.

Mixing levels of abstraction causes confusion

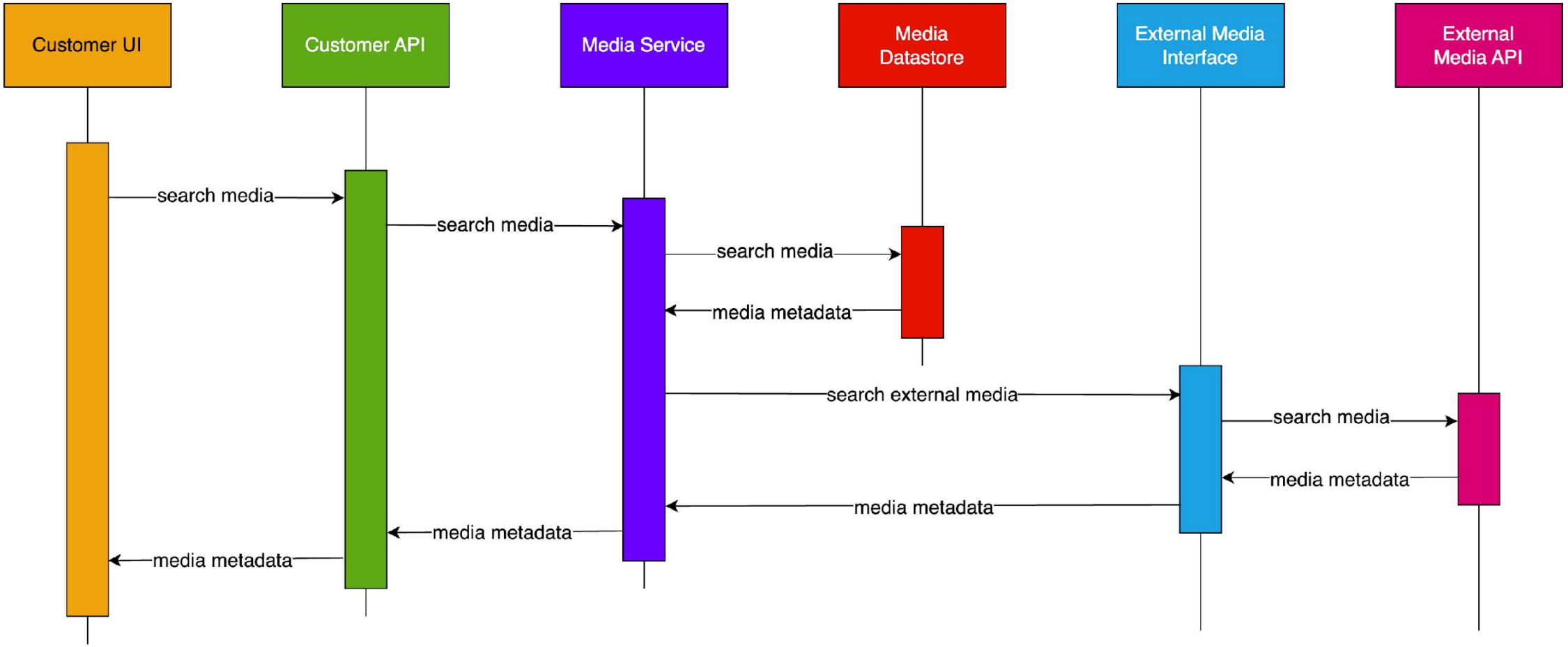
Antipattern

Explosion of Unicorns

AKA: Too many colours

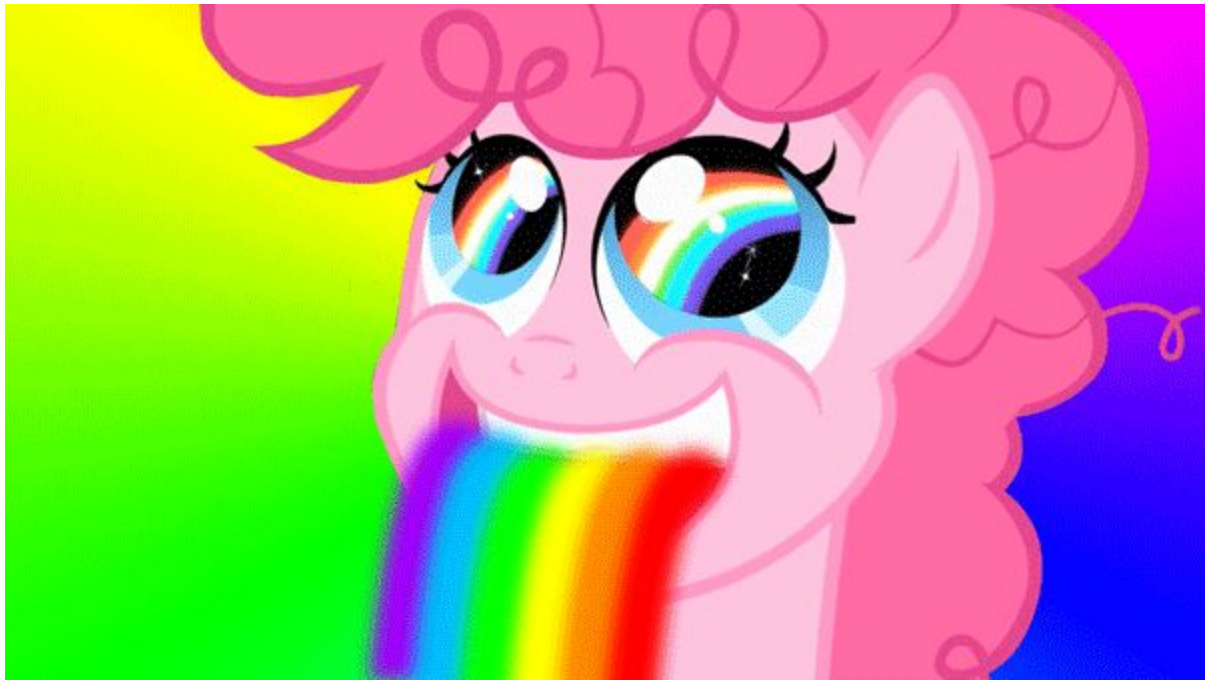


Rainbow Flow



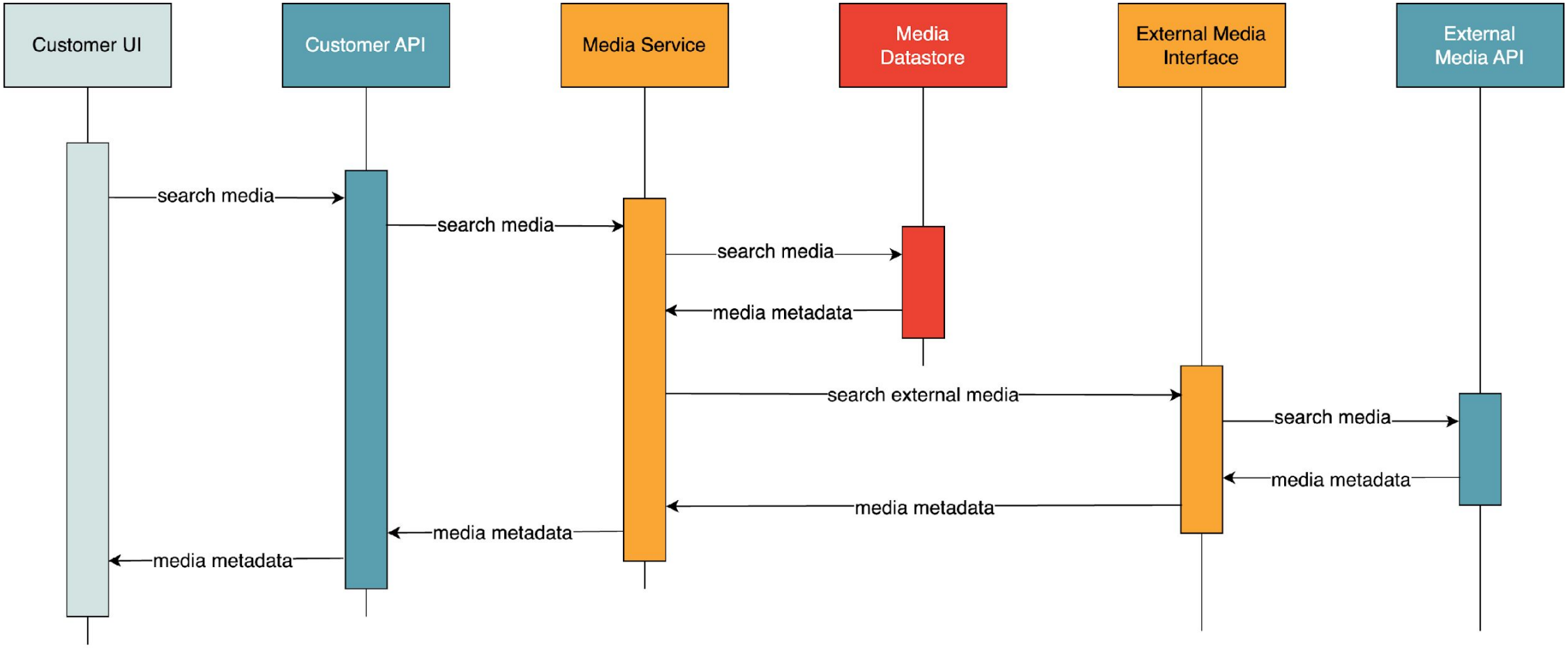
Polyglot Media

Media search process, internal and external media



https://tenor.com/view/rainbow-unicorn-rainbow-unicorn-gif-12940218

Group by type or function



Polyglot Media

Media search process, internal and external media

Key: User Interface | Application Programming Interface | Service/Interface | Datastore

Minimise your colour palette

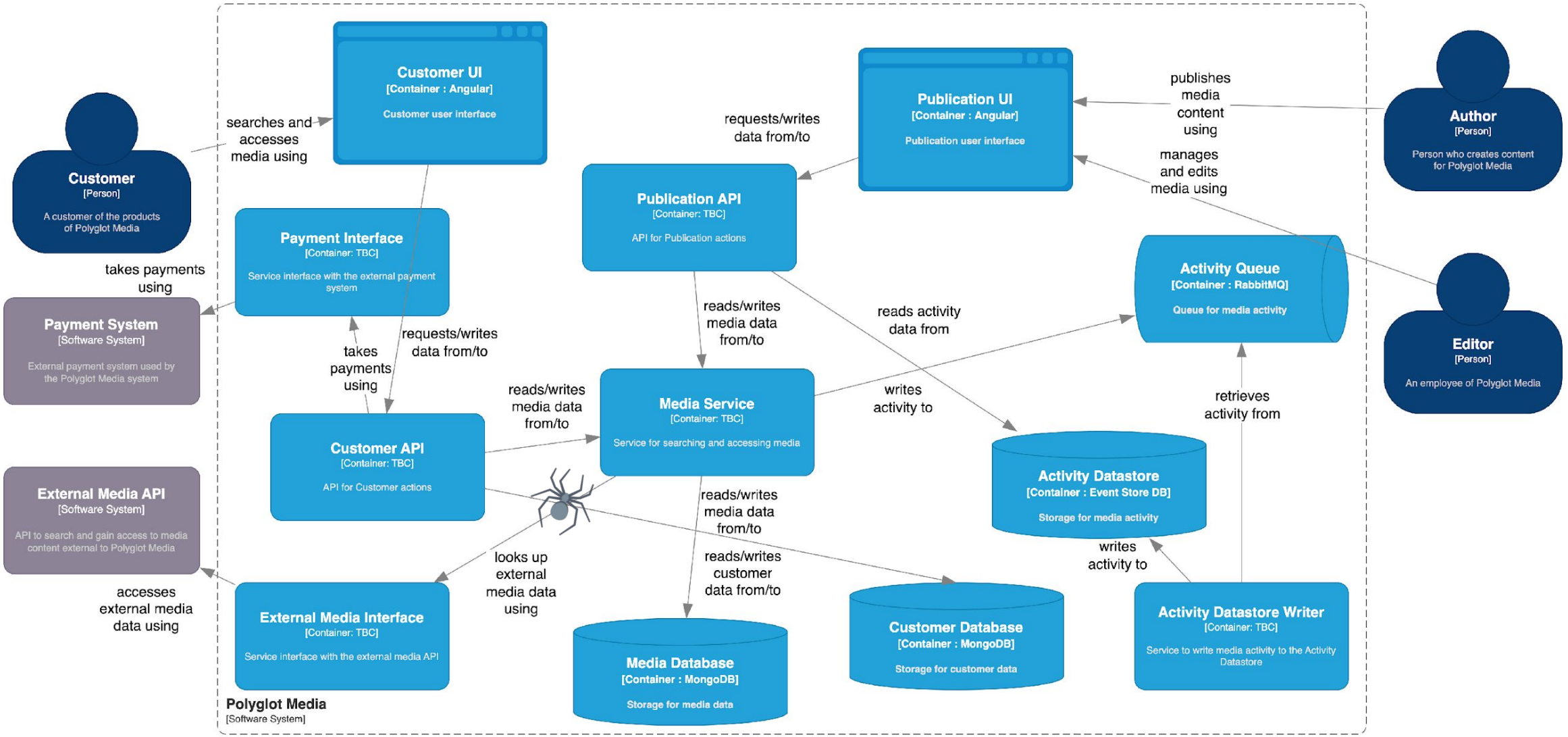
Use colour to aid communication

Antipattern

Spider's Web

AKA: unclear relationships

Welcome little fly...



Container Diagram for Polyglot Media
Showing the high-level interactions within the Polyglot Media system.

Do

Remove unnecessary information

Do

Remove unnecessary information

Split up diagrams when necessary

Do

Remove unnecessary information

Split up diagrams when necessary

Minimise lines crossing & use obvious line jumps

Do

Remove unnecessary information

Split up diagrams when necessary

Minimise lines crossing & use obvious line jumps

Standardise the position of the relationship label

Do

Remove unnecessary information

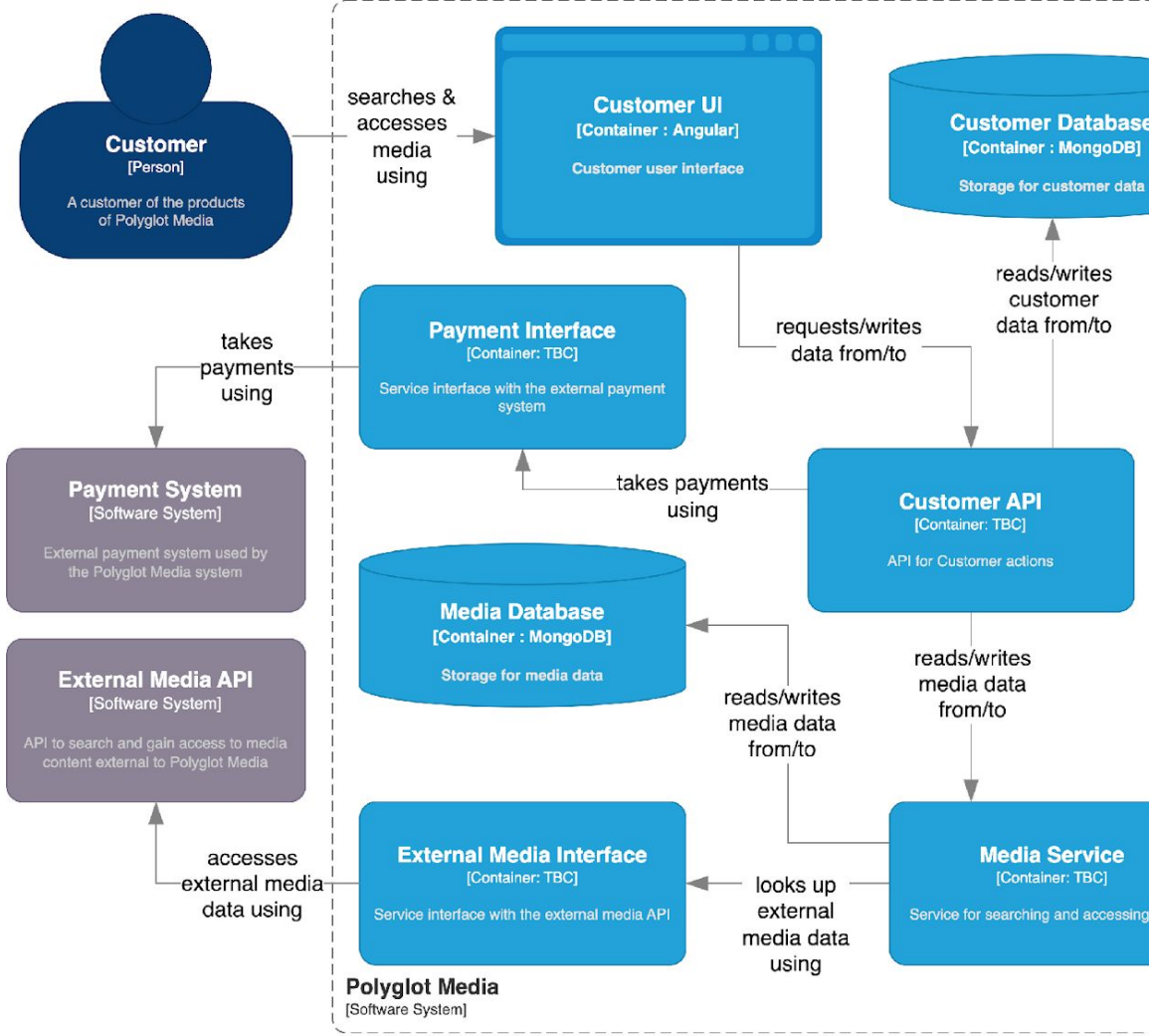
Split up diagrams when necessary

Minimise lines crossing & use obvious line jumps

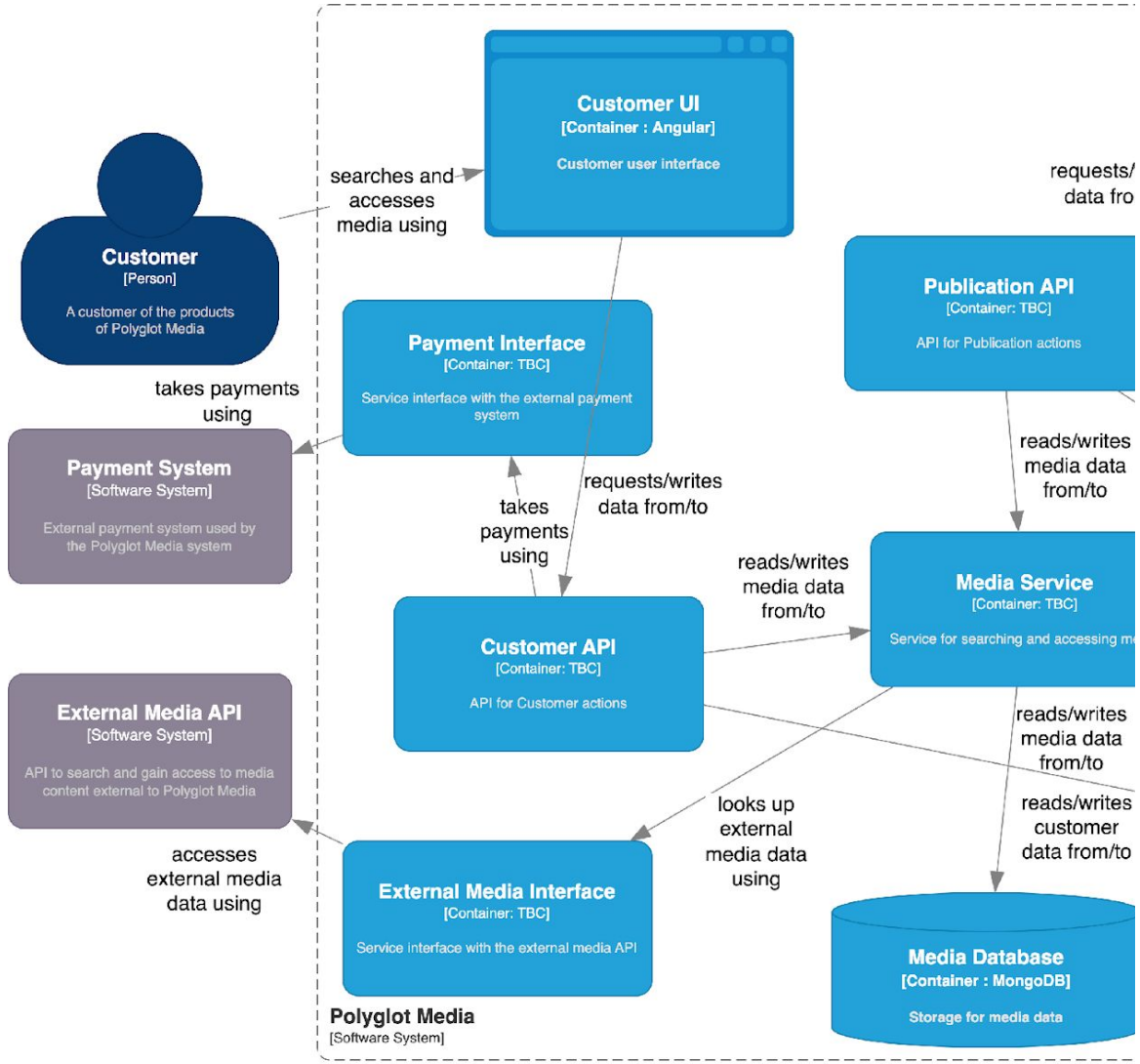
Standardise the position of the relationship label

Use angled lines to make relationships clearer

Untangled vs. Tangled

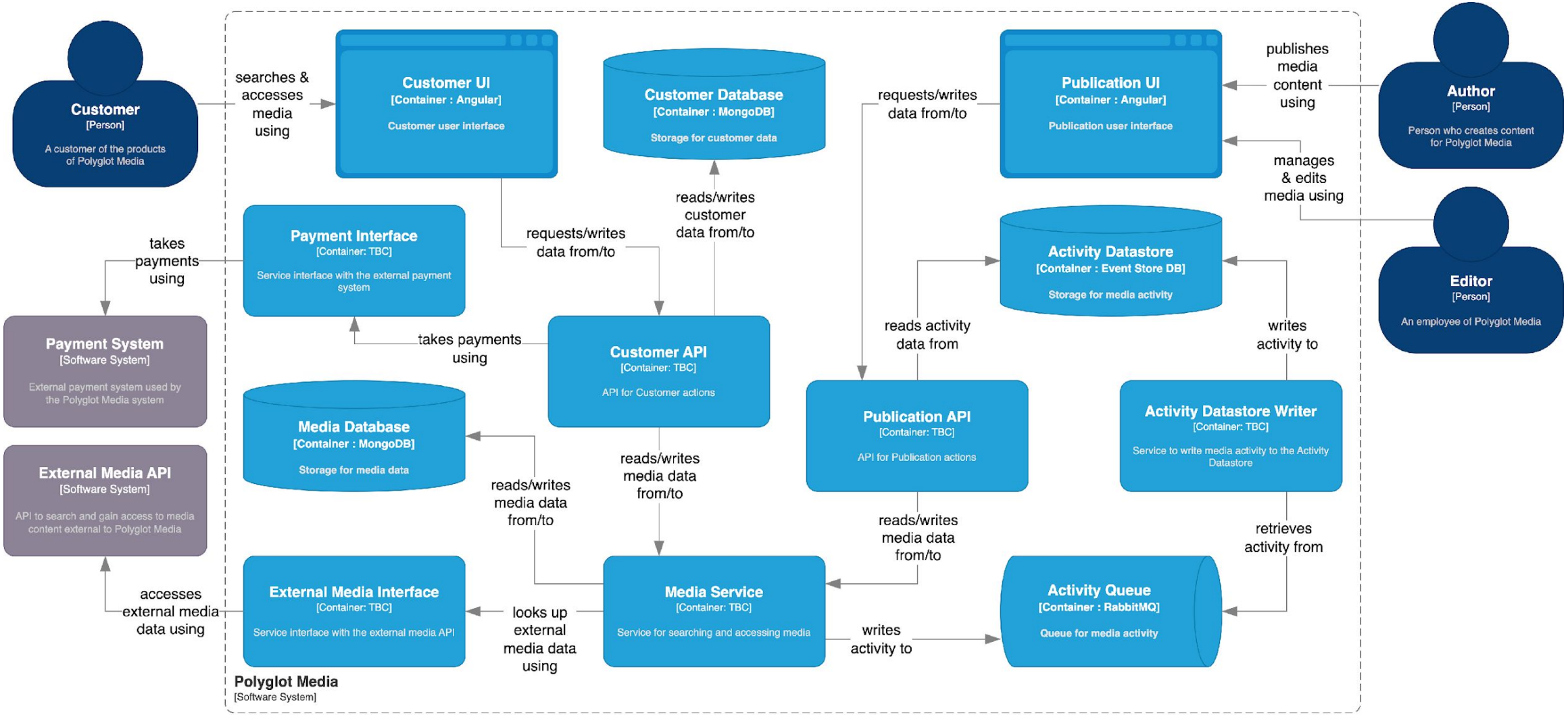


Container Diagram for Polyglot Media
Showing the high-level interactions within the Polyglot Media system.



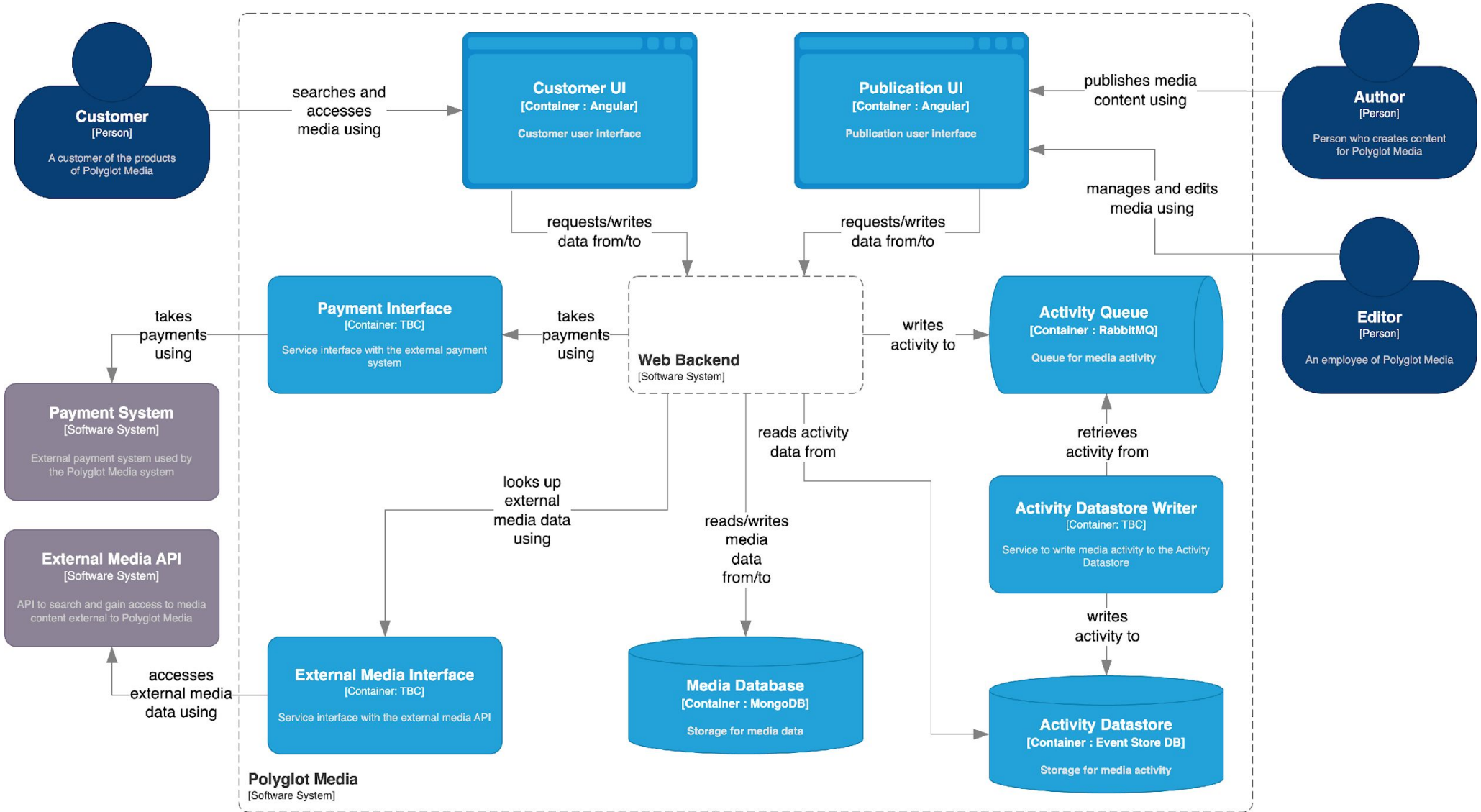
Container Diagram for Polyglot Media
Showing the high-level interactions within the Polyglot Media system.

Untangled



Container Diagram for Polyglot Media
Showing the high-level interactions within the Polyglot Media system.

Reduced



Container Diagram for Media in Polyglot Media
Showing the high-level Media interactions within the Polyglot Media system.

Diagrams are free

Antipattern

Colour is Key

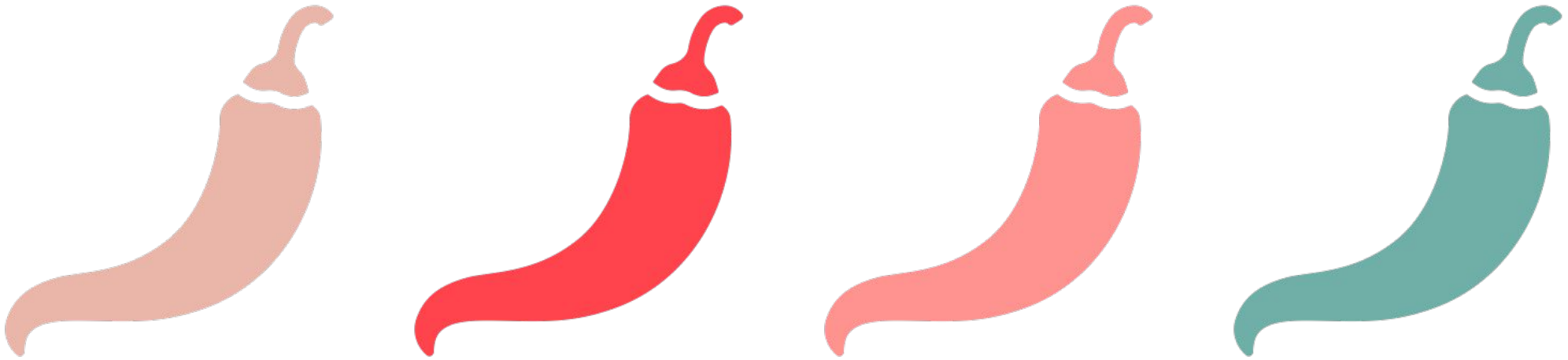
AKA: relying on colour to communicate

Can you pass me the yellow one?

a b c d

Simulated Protanopia

Can you pass me the yellow one?

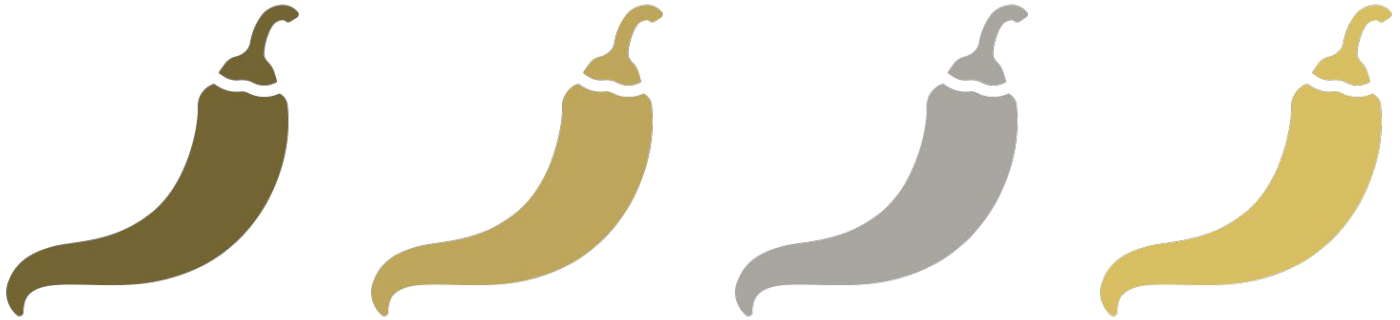


e f g h

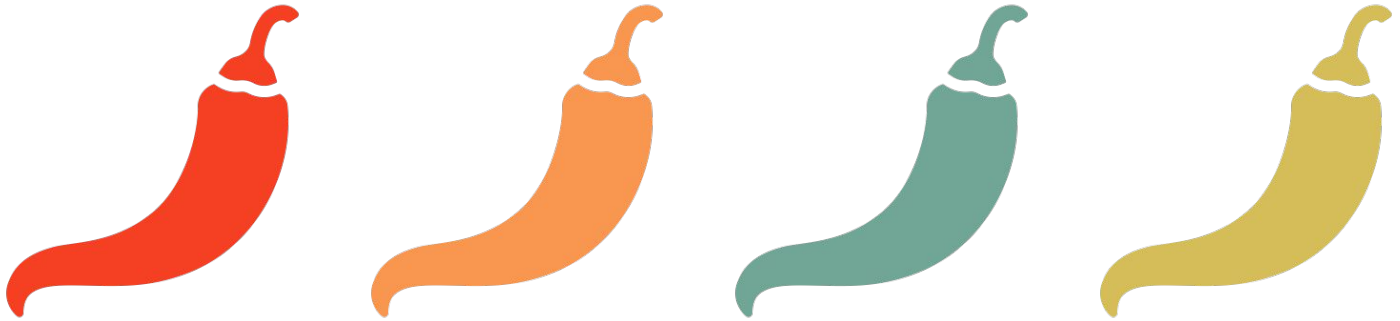
Simulated Tritanopia

Can you pass me the yellow one?

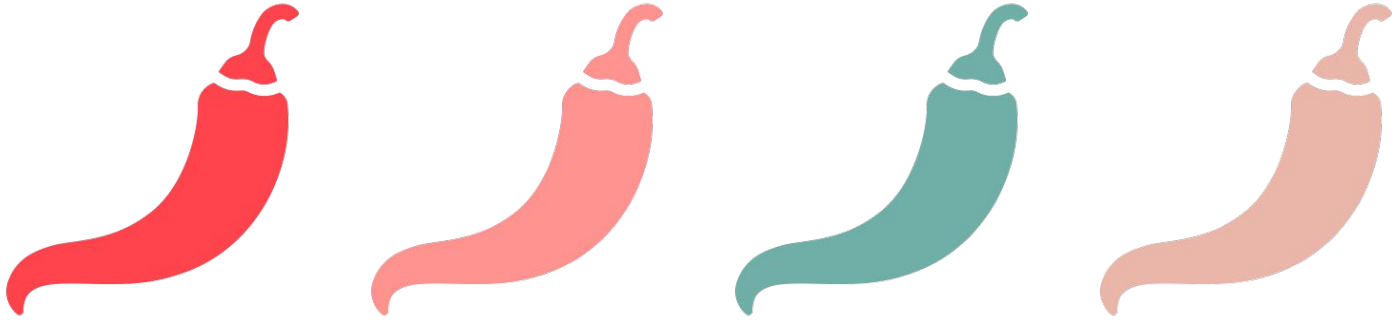
Protanopia



Standard



Tritanopia



Protanomaly

Deuteranomaly

Tritanomaly

Protanopia

Deuteranopia

Tritanopia

Achromatopsia

Approximately 4.5% of the world's population is colour vision deficient

1 in 12 men &
1 in 200 women
are colour blind

More than 350 million people worldwide

rainbow - Ecosia - Images

ecosia.org/images?q=rainbow

ECOSIA

rainbow

All | Images | News | Videos | Maps | More | Settings

Search region: United Kingdom | All sizes | All colors | All types | Any time | All layouts | All usage rights

Normal
Protanopia
Protanomaly
Deuteranopia
Deuteranomaly
✓ Tritanopia
Tritanomaly
Achromatopsia
Achromatomaly
Low-Contrast

God 's Rainbow | Rainbow Color Art | Rainbow Drawing | Rainbow Art | Awesome Rainbow | Fire Rainbow | Rainbow Candy | Rainbow Fabric | Rainbow Kids | Rainbow Stuff | Rainbow Neon Lights | Pretty Rainbow


The rainbow's colors in Cottontail Fizz are in t...
www.reddit.com


The Rainbow | ferrebeekeeper
ferrebeekeeper.wordpress.com


Rainbow Sky | By popular d...
www.flickr.com


Big Horn Rainbow...
fineartamerica.com


A Full Double Rainbow - Burnsland - Photo...
www.burnsland.com


Rainbow ~ Jineral Knowledge
jineralknowledge.com


There is a common element in the pass...
www.democraticunderground.com


Double Rainbow | First time to spot a double...
www.flickr.com


301 Moved Permanently
rainbowveins44.wordpress.com


Strange and mysterio...
strangesounds.org


Striking Double Rainbow Photograph by Brent Thomas
fineartamerica.com


Ravishing Rainbow...
www.boredart.com


Colorful Rainbow Photos | AmO
amolife.com


The 14 Most Beautiful Rainbow Photos...
www.mostbeautifulthings.net

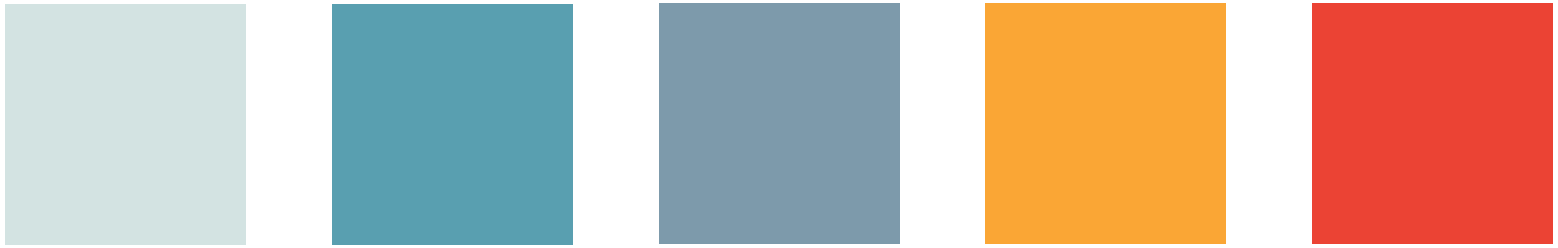

The Rainbow Connection—To Physics
www.sciencefriday.com


Bill's Log: A Rainbow of Pro...
bills-log.blogspot.com

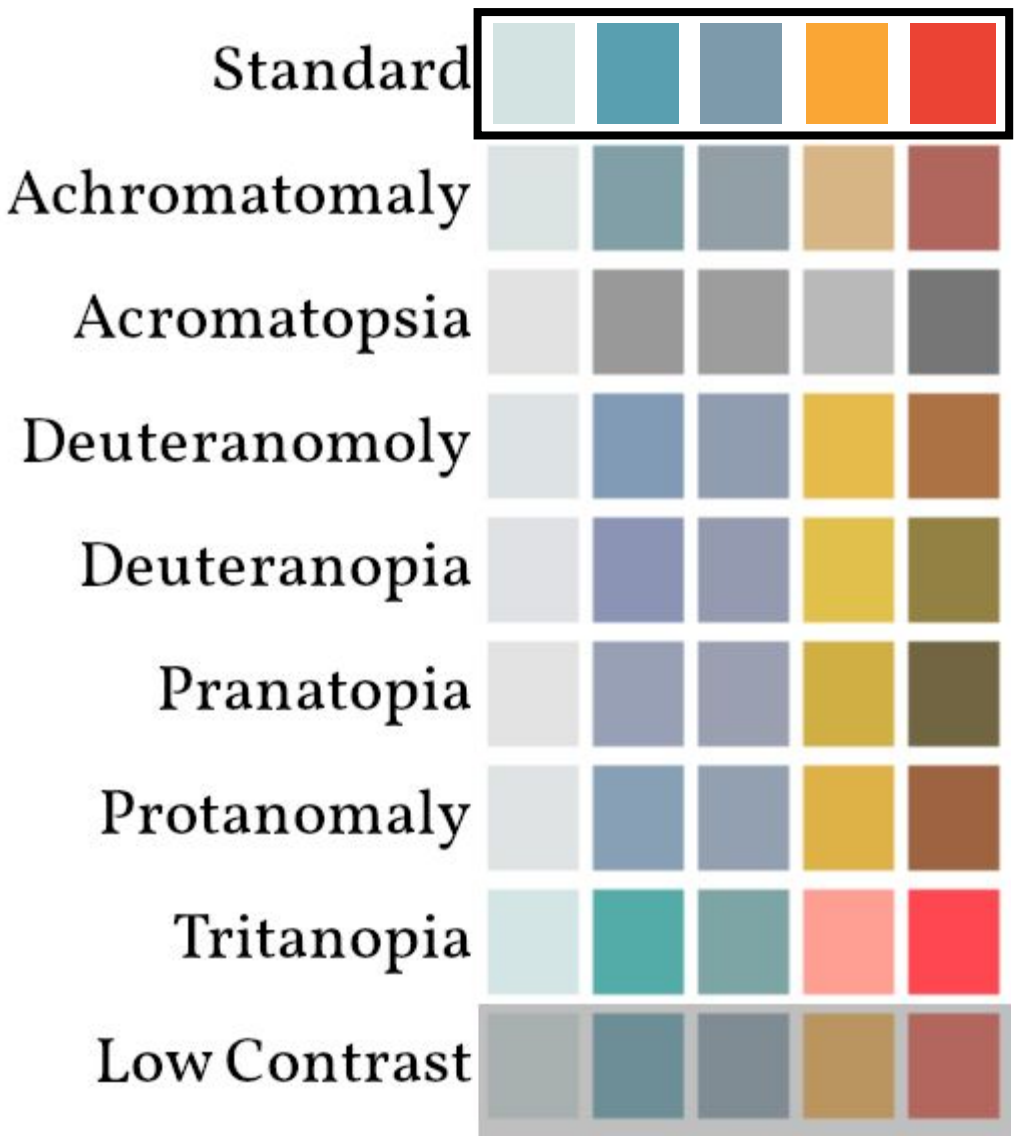

Amazing rainbow! : Adelaide
www.reddit.com


What causes a double rainbow? | The Weather Guys
wxguys.ssec.wisc.edu

A palette I created



A pallet I created



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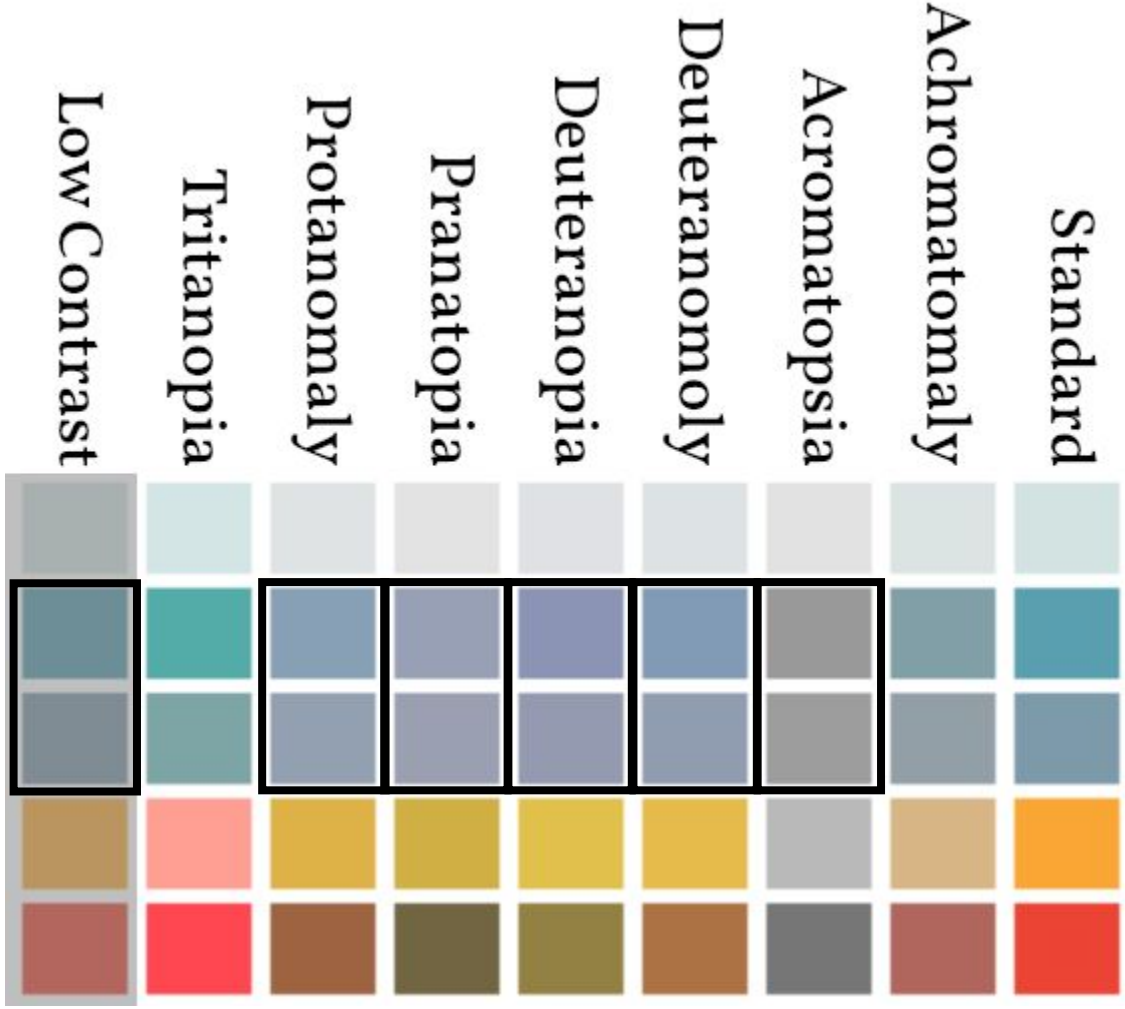
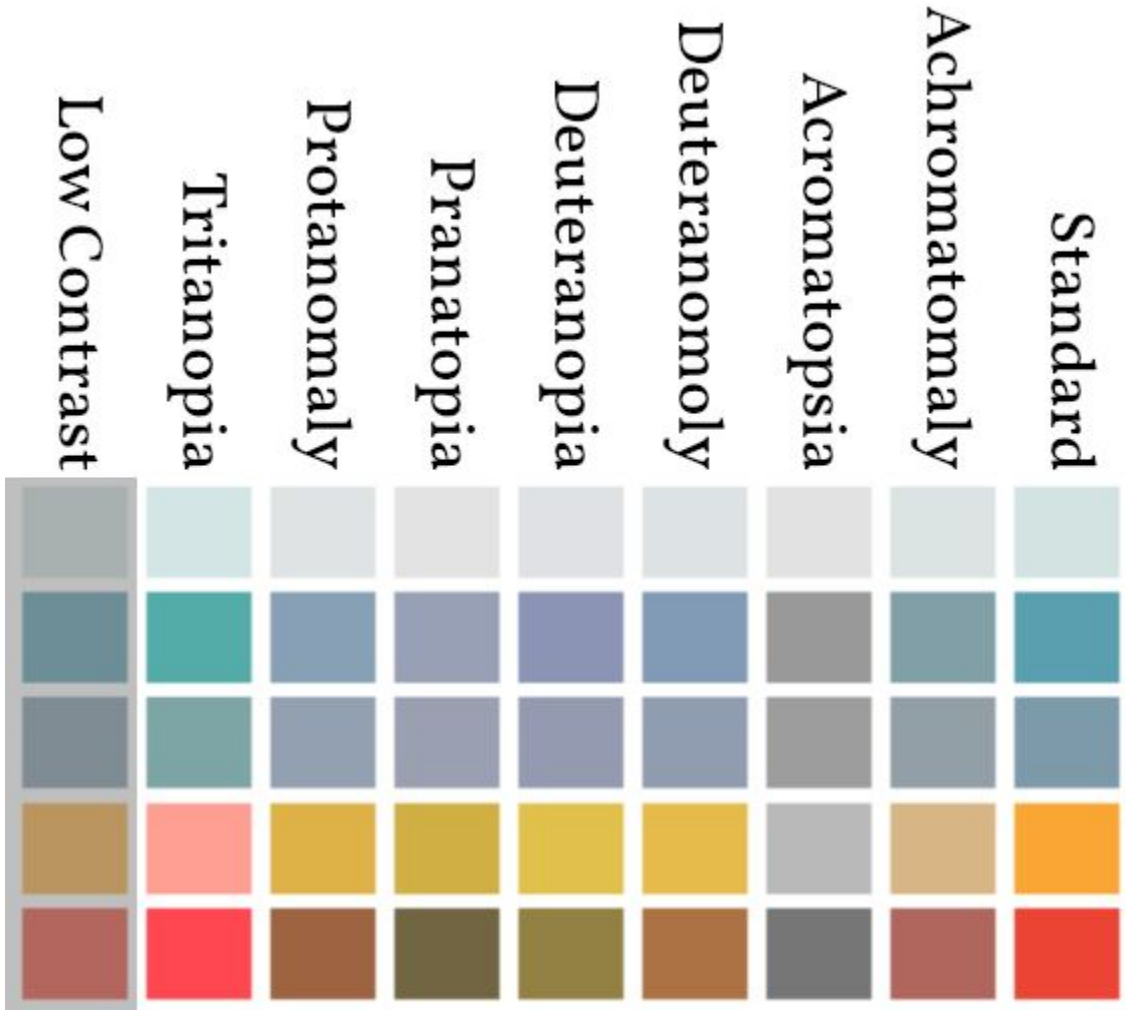


An accessible palette I created



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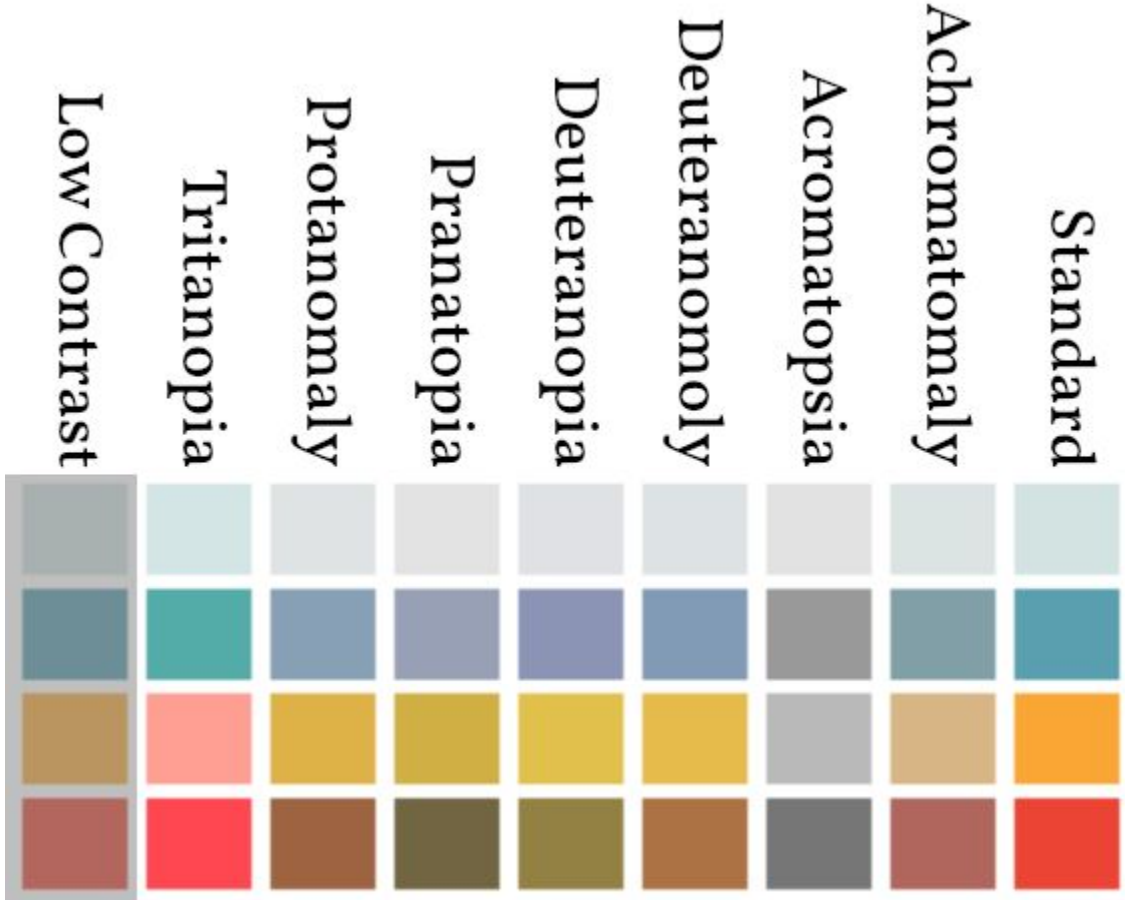
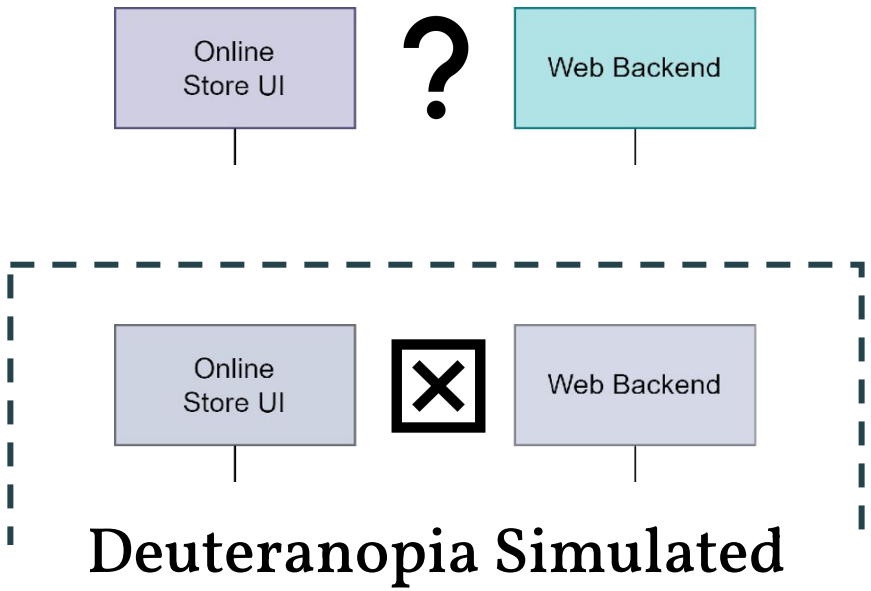


Use a colour-blind simulator

Draw.io Standard Colours

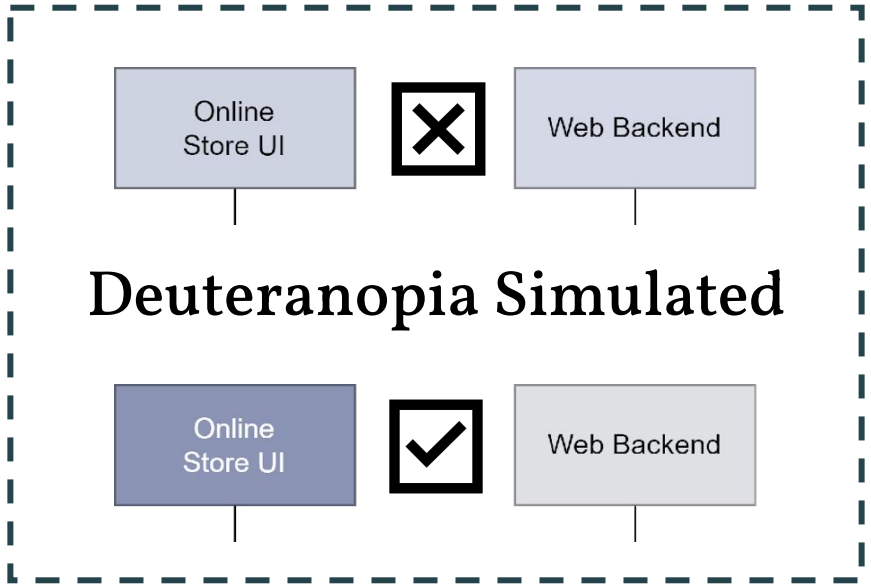


Draw.io Standard Colours

Deuteranopia Simulated

Colour-Deficiency-Friendly

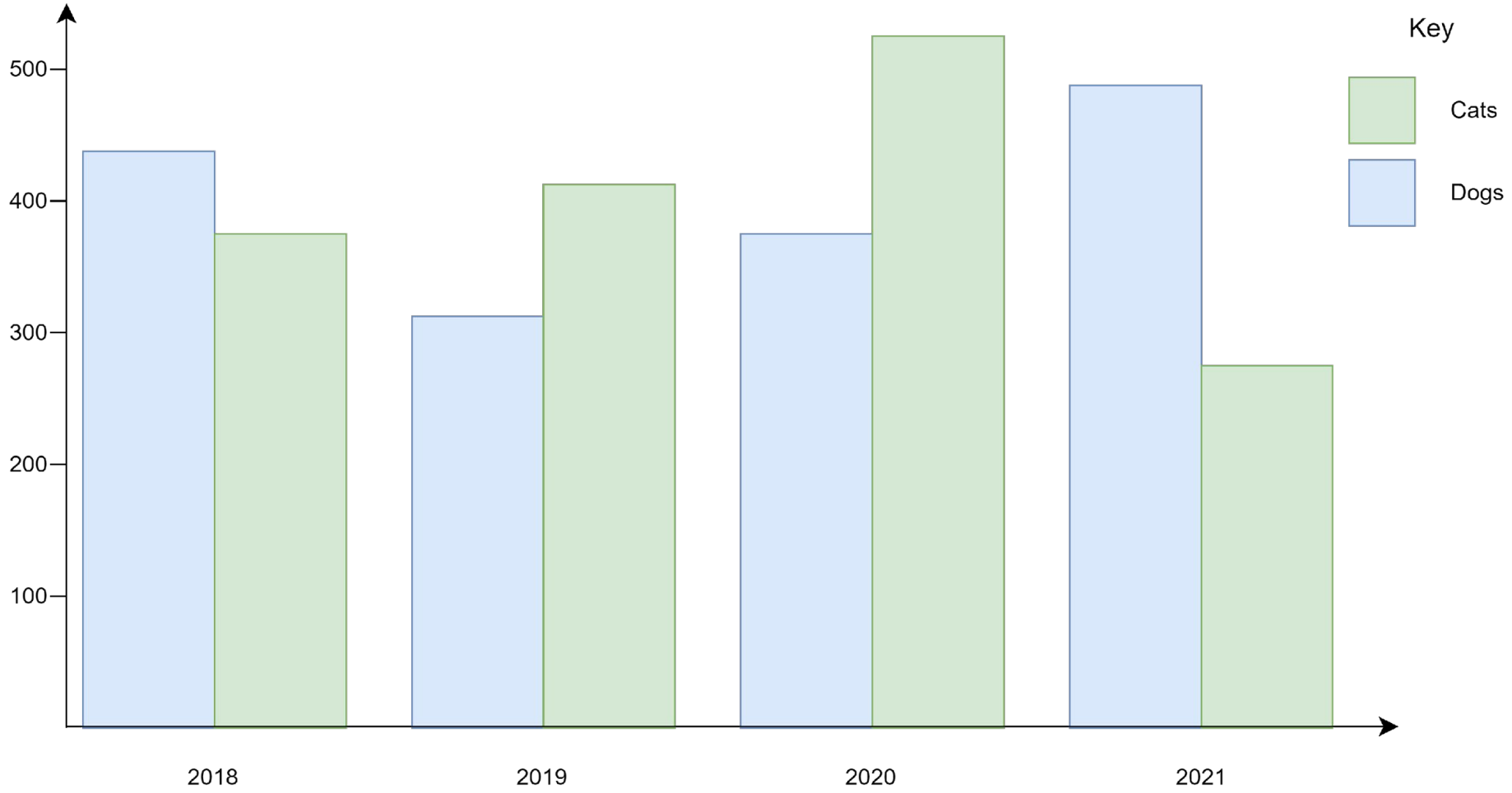
Draw.io Standard Colours



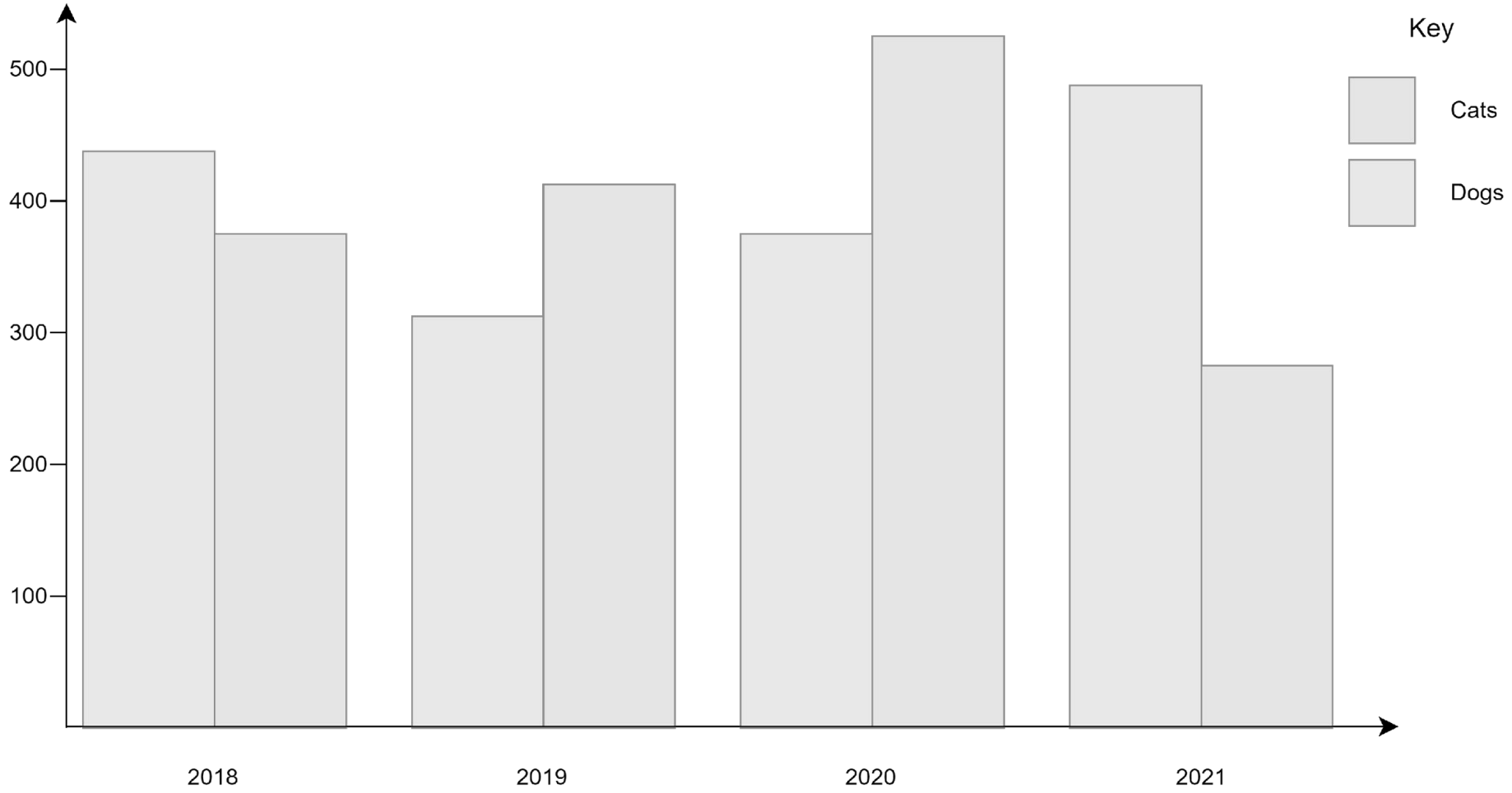
Colour-Deficiency-Friendly

Don’t rely on colour alone

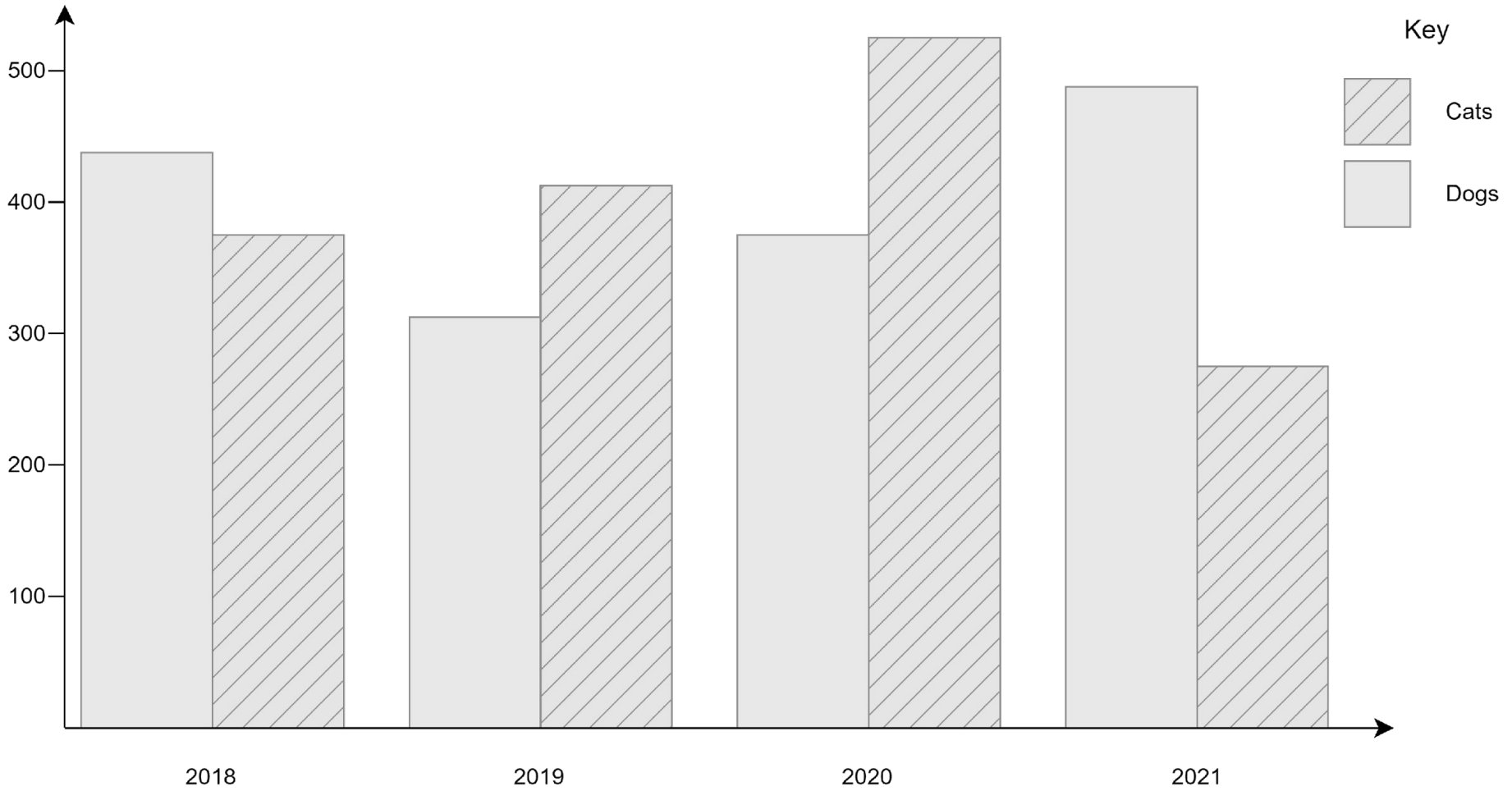
Colour is key?



What about greyscale?



Use pattern



Use symbols






Do

Use patterns, symbols or labels, along with colour

Do

Use patterns, symbols or labels, along with colour

Choose colours with different saturation levels

Do

Use patterns, symbols or labels, along with colour

Choose colours with different saturation levels

Use a colour deficiency simulation tool

Do

Use patterns, symbols or labels, along with colour

Choose colours with different saturation levels

Use a colour deficiency simulation tool

Consider monitor and projector colour calibration

Do

Use patterns, symbols or labels, along with colour

Choose colours with different saturation levels

Use a colour deficiency simulation tool

Consider monitor and projector colour calibration

Consider if your diagram will be shown in greyscale

Pattern

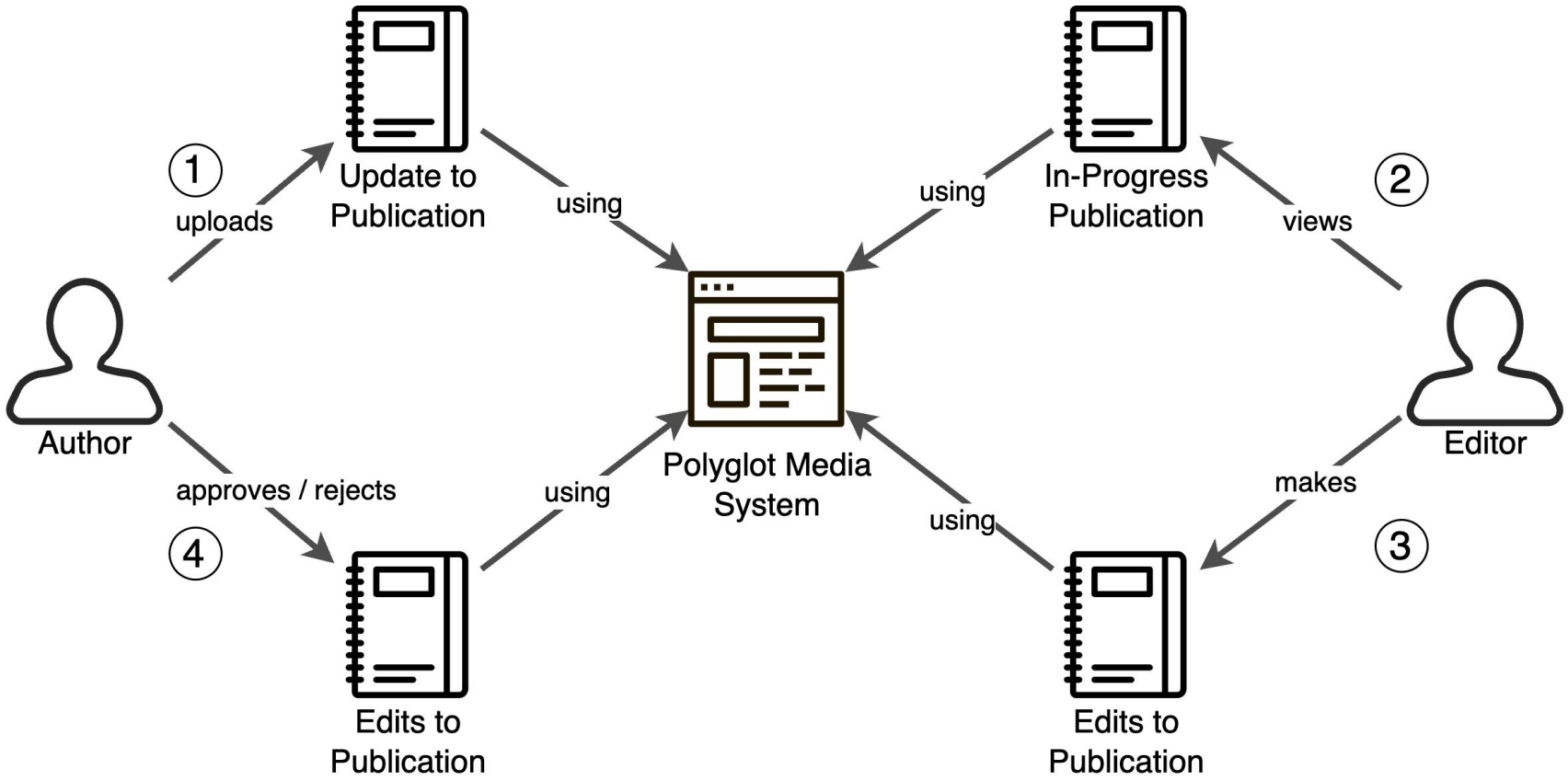
Written in Legend

AKA: use a key or legend

Don’t rely on your audience having specific knowledge

It’s a balancing act

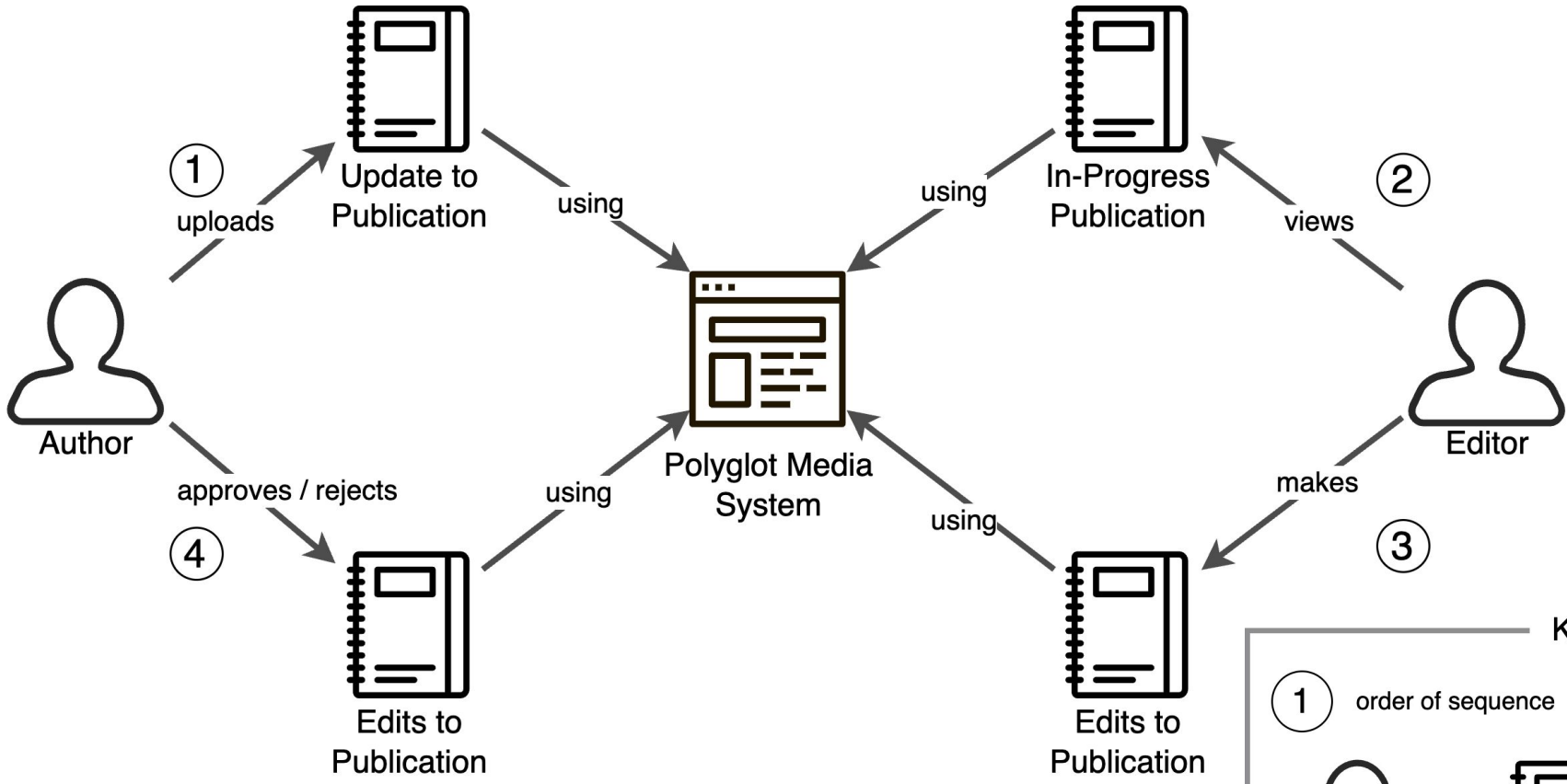
Seems obvious? No.



Polyglot Media

High-Level Domain Story | Publication editing process

Make it Explicit

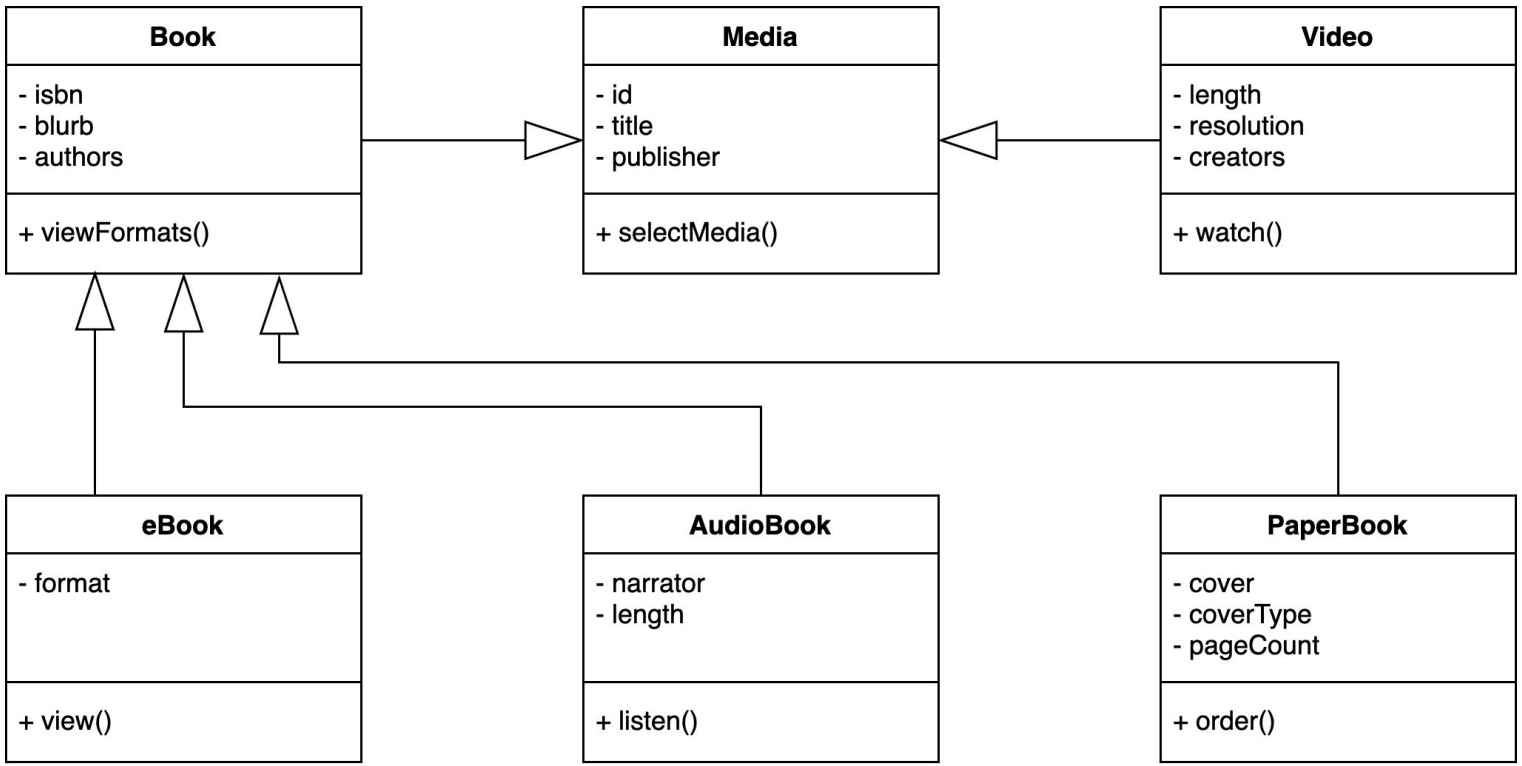


Polyglot Media

High-Level Domain Story | Publication editing process

Don’t leave it open to interpretation

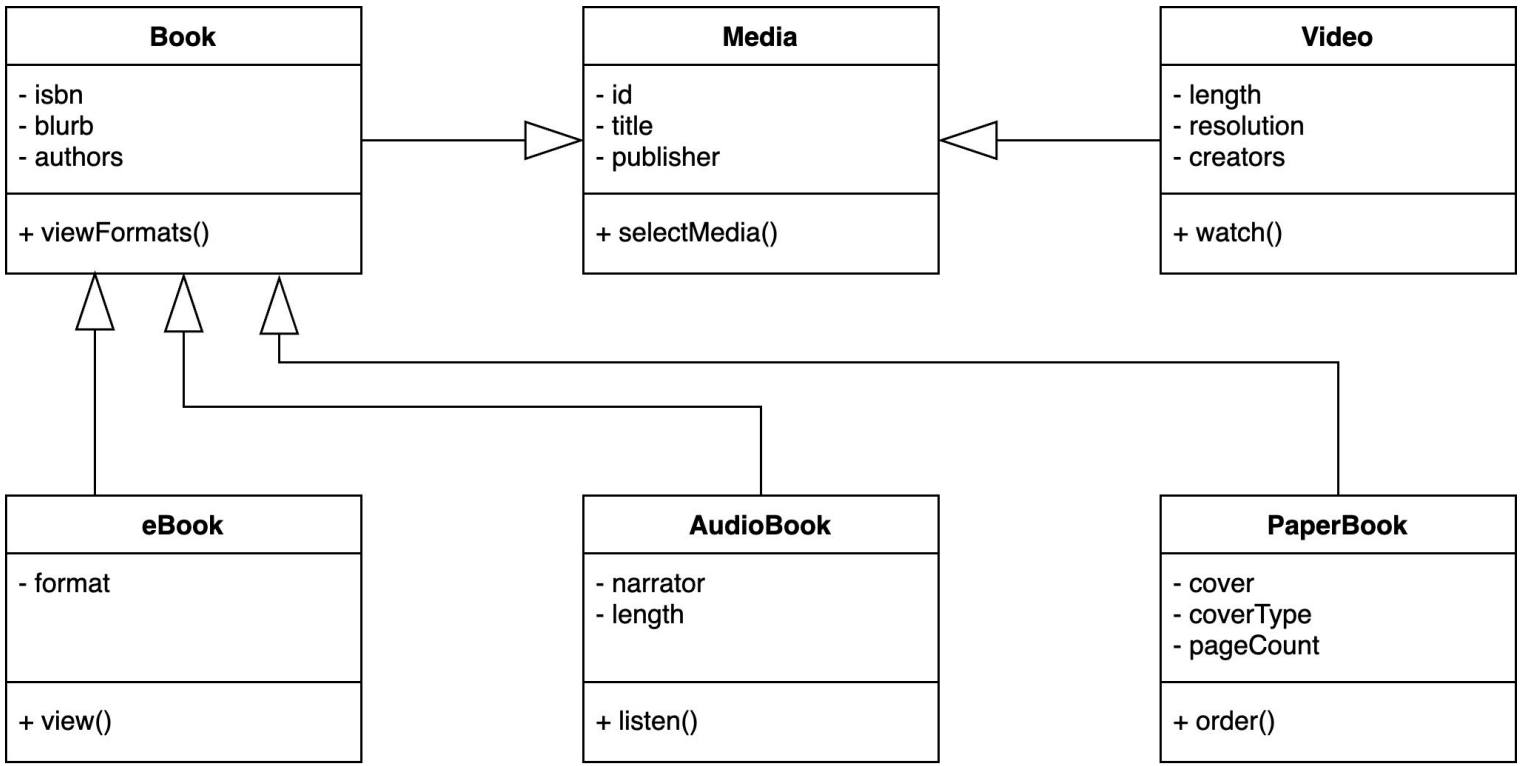
UML, easy? No.



Media

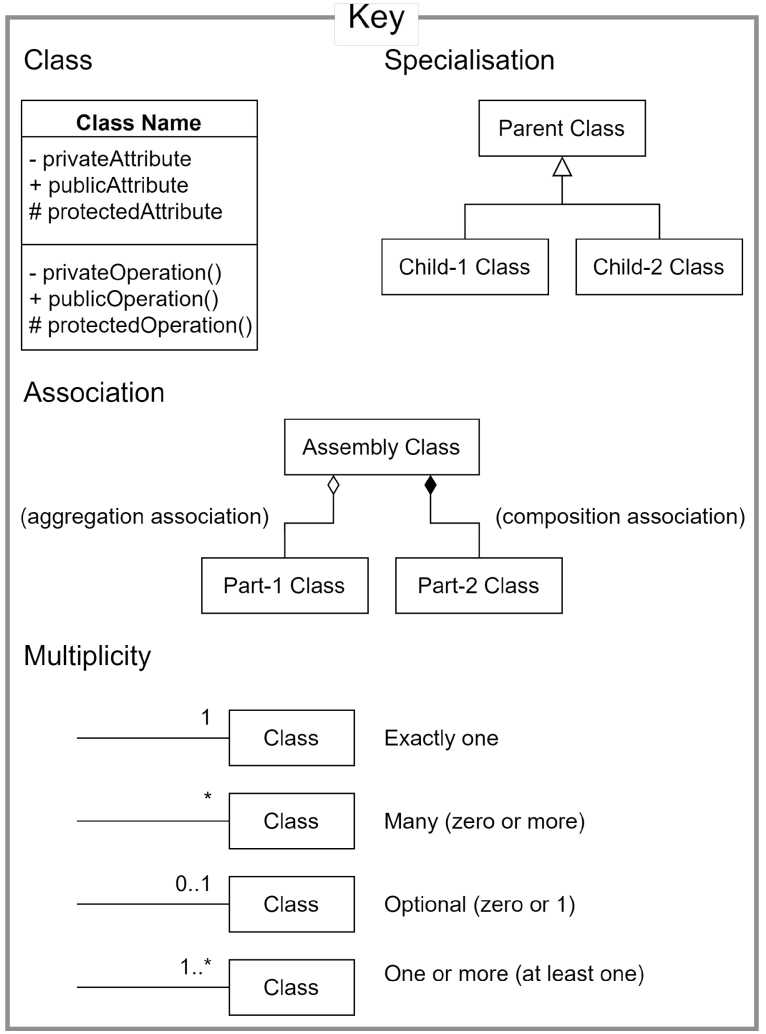
Class Diagram

UML Reminder



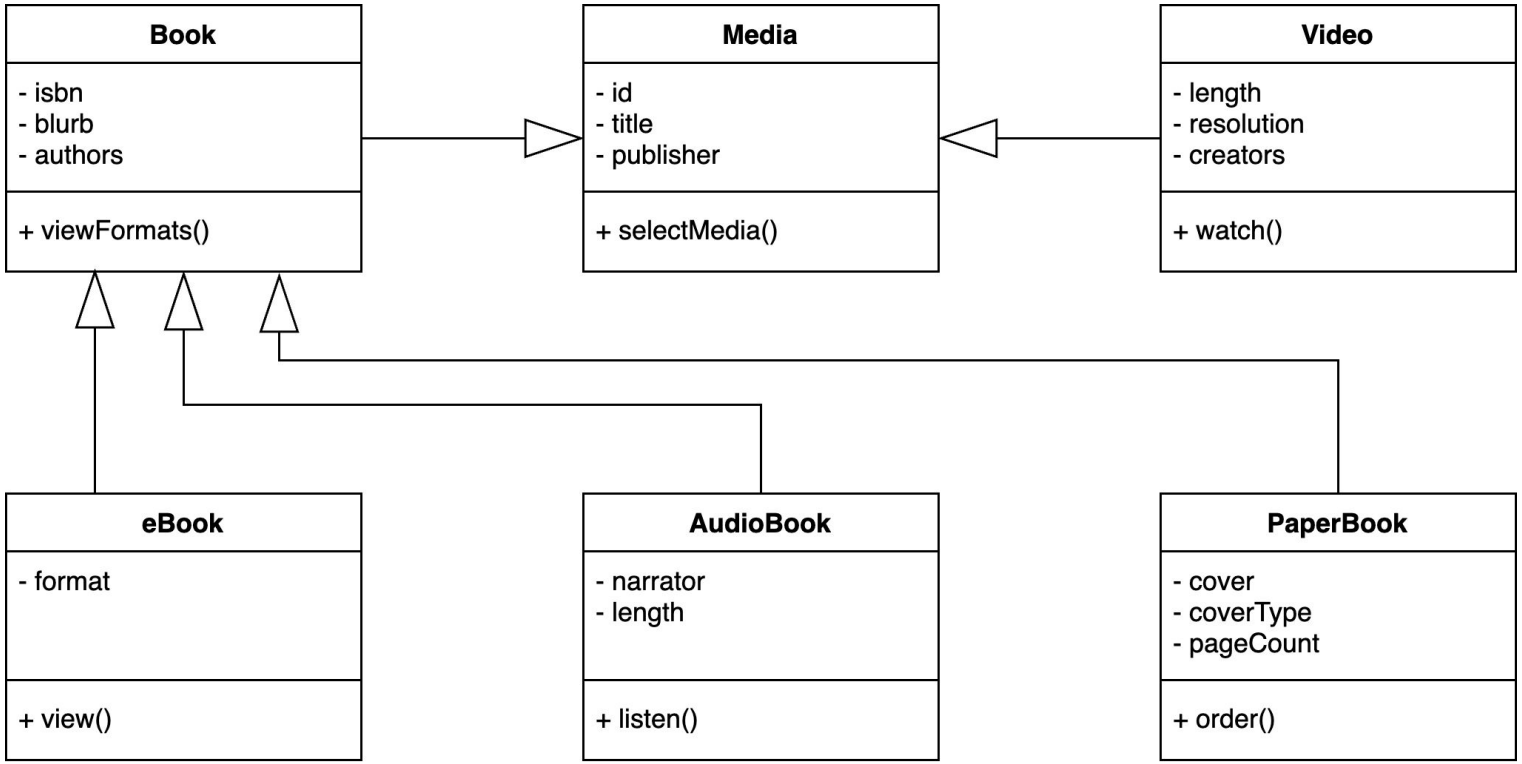
Media

Class Diagram



UML Reminder

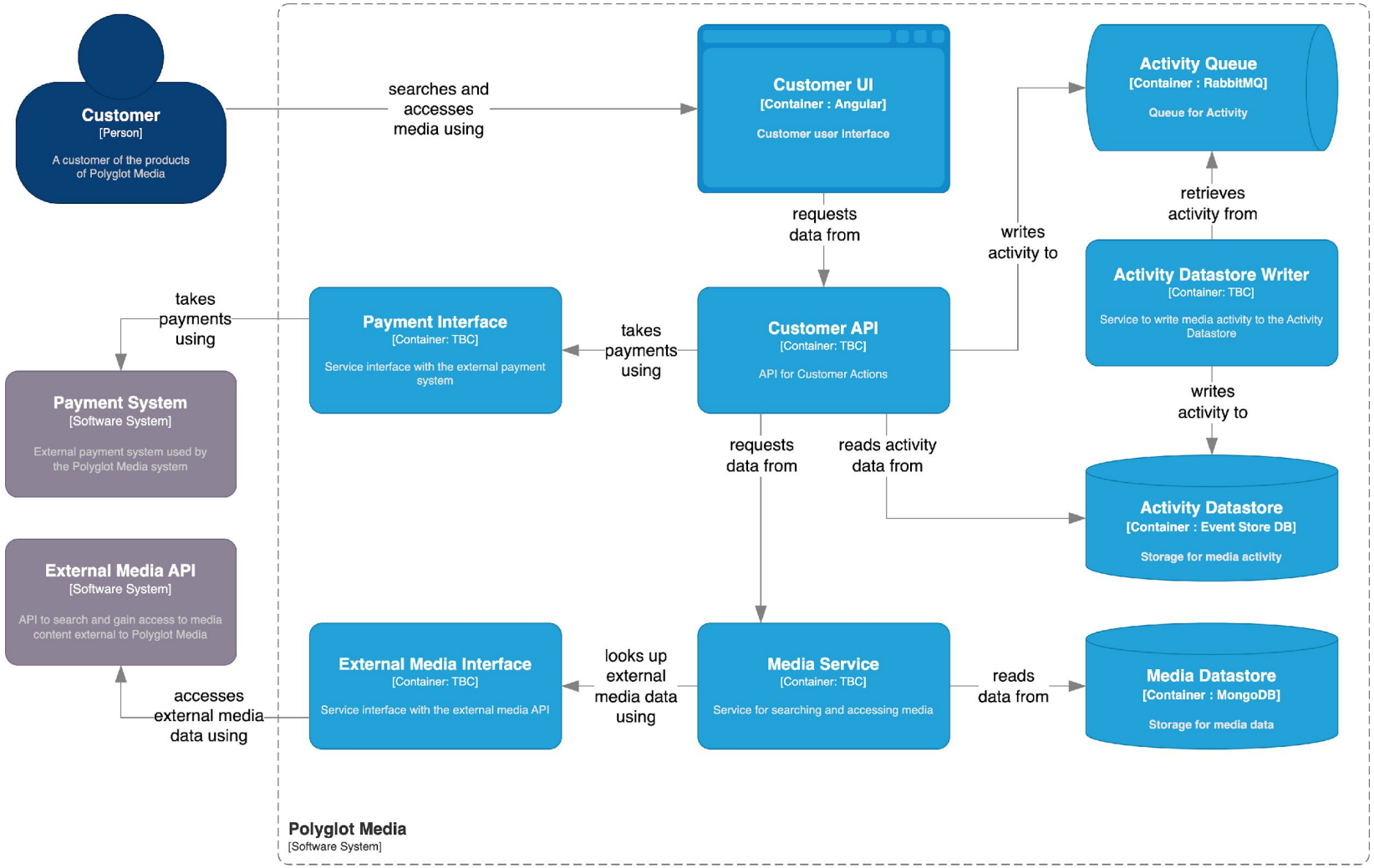
View Class Diagram Key/Legend



Media

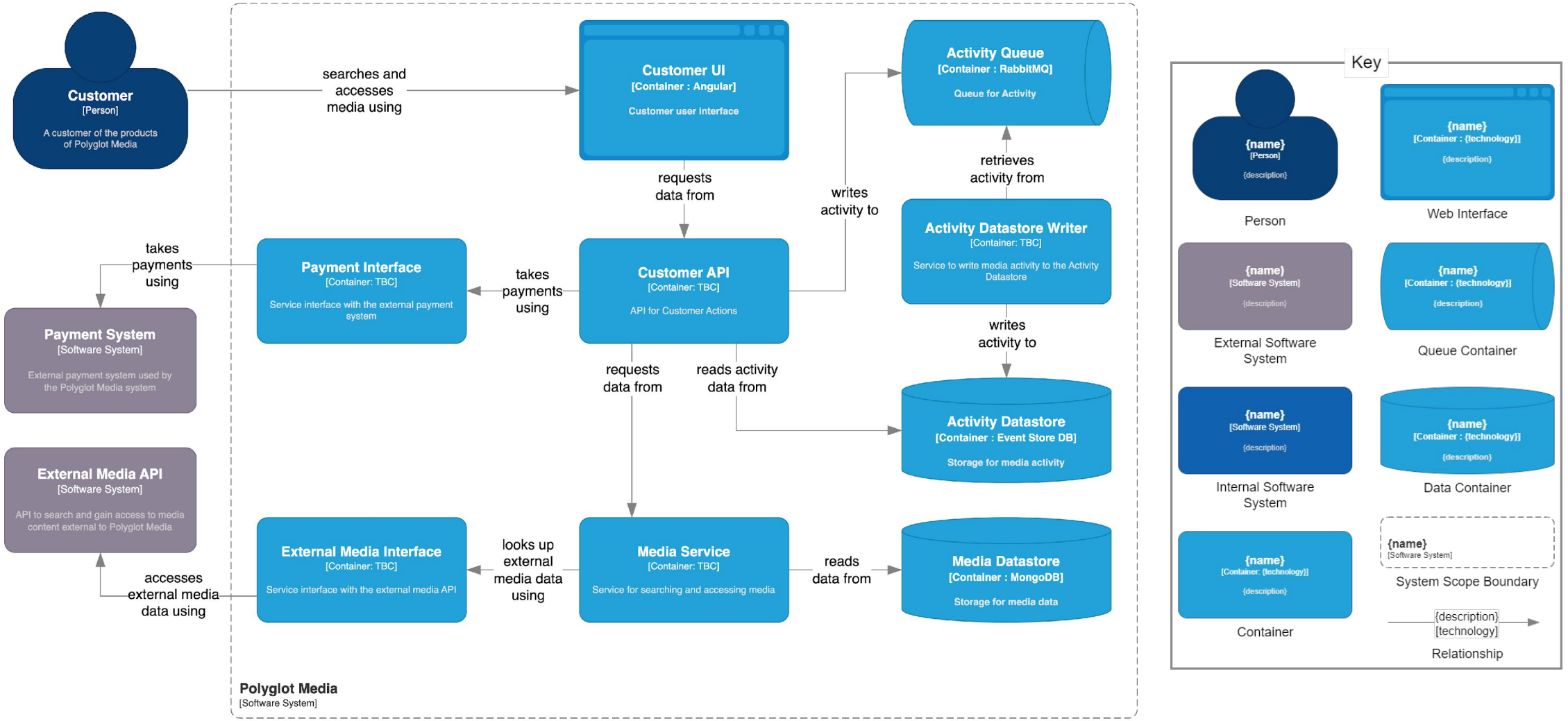
Class Diagram

C4, that's obvious? No.



Container Diagram for Customers using Polyglot Media
Showing the high-level interactions within the Polyglot Media system.

Explained



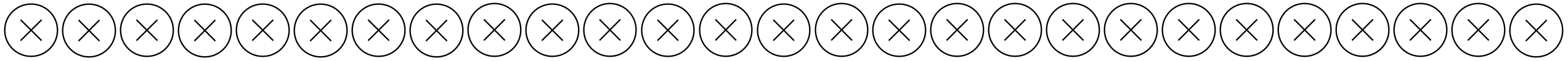
Container Diagram for Customers using Polyglot Media
Showing the high-level interactions within the Polyglot Media system.

Limit your assumptions

Antipattern

MLAH

AKA: Multiple-Letter Acronym Hell



Only use defined acronyms

Do

In speech, say the acronym,
and say the definition straight afterwards

Do

In speech, say the acronym,
and say the definition straight afterwards

In written form, define the acronym the first time you write it, and/or in a key or glossary

A few acronyms you may know...

or not

DRY:

DFD:

SPA:

BLT:

A few acronyms you may know...

or not

DRY:

A few acronyms you may know...

or not

DRY:

Don’t Repeat Yourself

DFD:

A few acronyms you may know...

or not

DRY:

Don't Repeat Yourself

DFD:

Data Flow Diagram

SPA:

A few acronyms you may know...

or not

DRY:

Don't Repeat Yourself

DFD:

Data Flow Diagram

SPA:

Single Page Application

BLT:

A few acronyms you may know...

or not

DRY:

Don't Repeat Yourself

DFD:

Data Flow Diagram

SPA:

Single Page Application

BLT:

Bacon Lettuce & Tomato

BLT?

Business Leadership Team

BLT?

Business Leadership Team

Basic Language Translator

BLT?

Business Leadership Team

Basic Language Translator

Bulk Loading Tool

BLT?

Business Leadership Team

Basic Language Translator

Bulk Loading Tool

Be Like That!

Acronyms can mean different things to different people

It’s easy to fall into thinking that others have the same understanding as you

Next time you use an acronym...

think

SIDI

Next time you use an acronym...

think

SIDI

State It

Define It

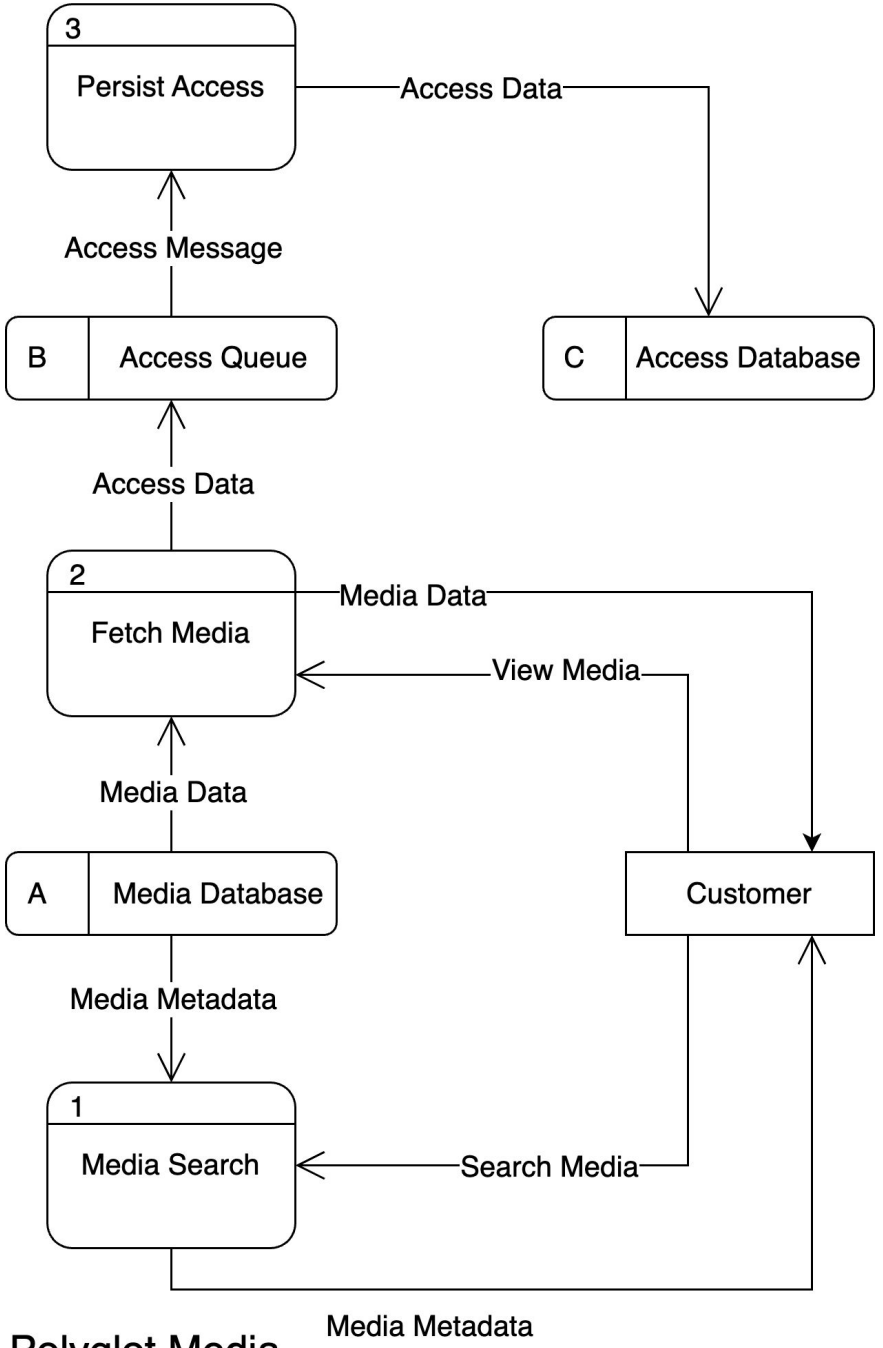
🤣🤣

Pattern

A push in the right direction

AKA: match the diagram flow to expectations

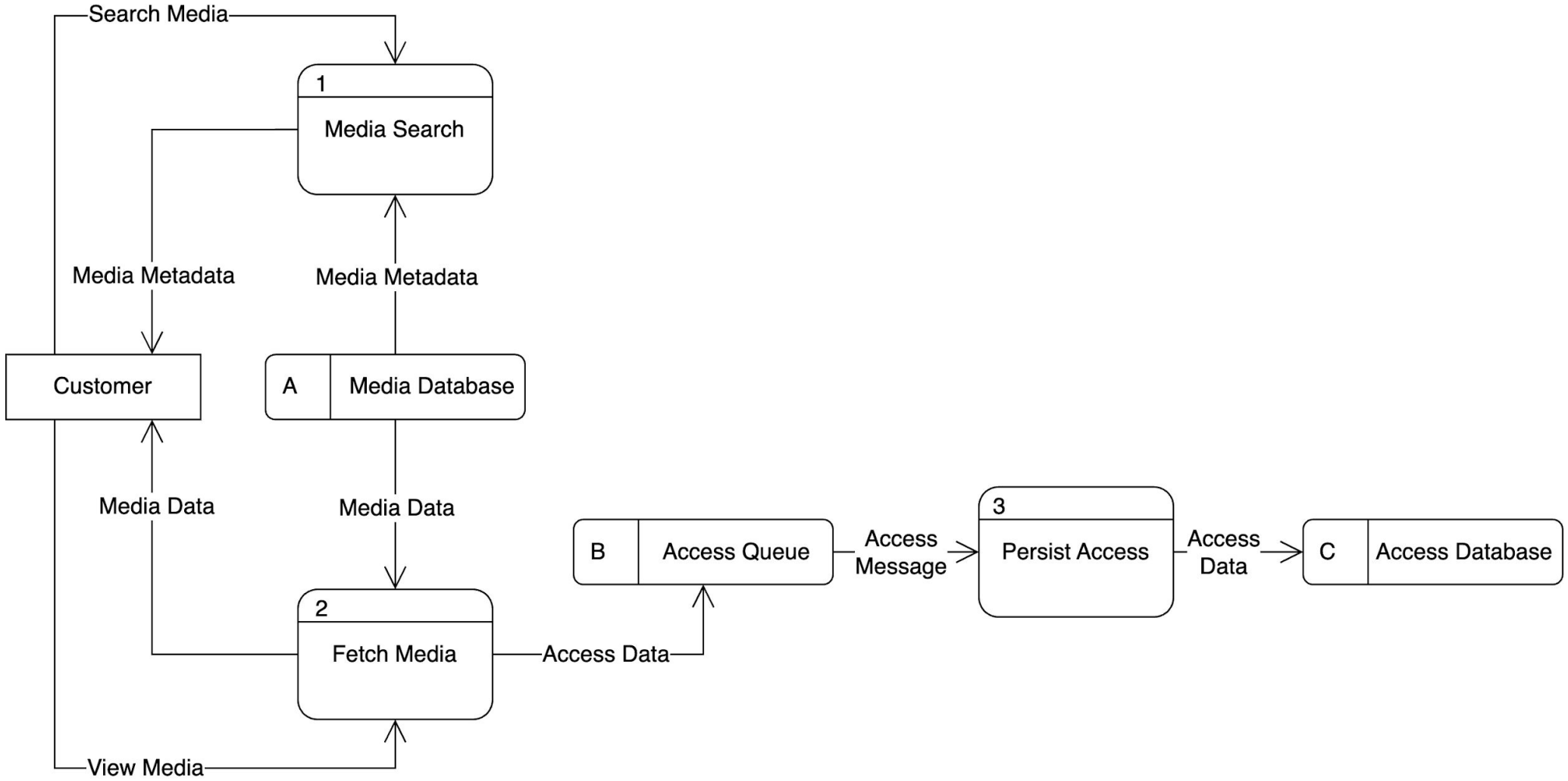
All diagrams have a flow of information



Polyglot Media

Data Flow Diagram: media search, view and access analytics

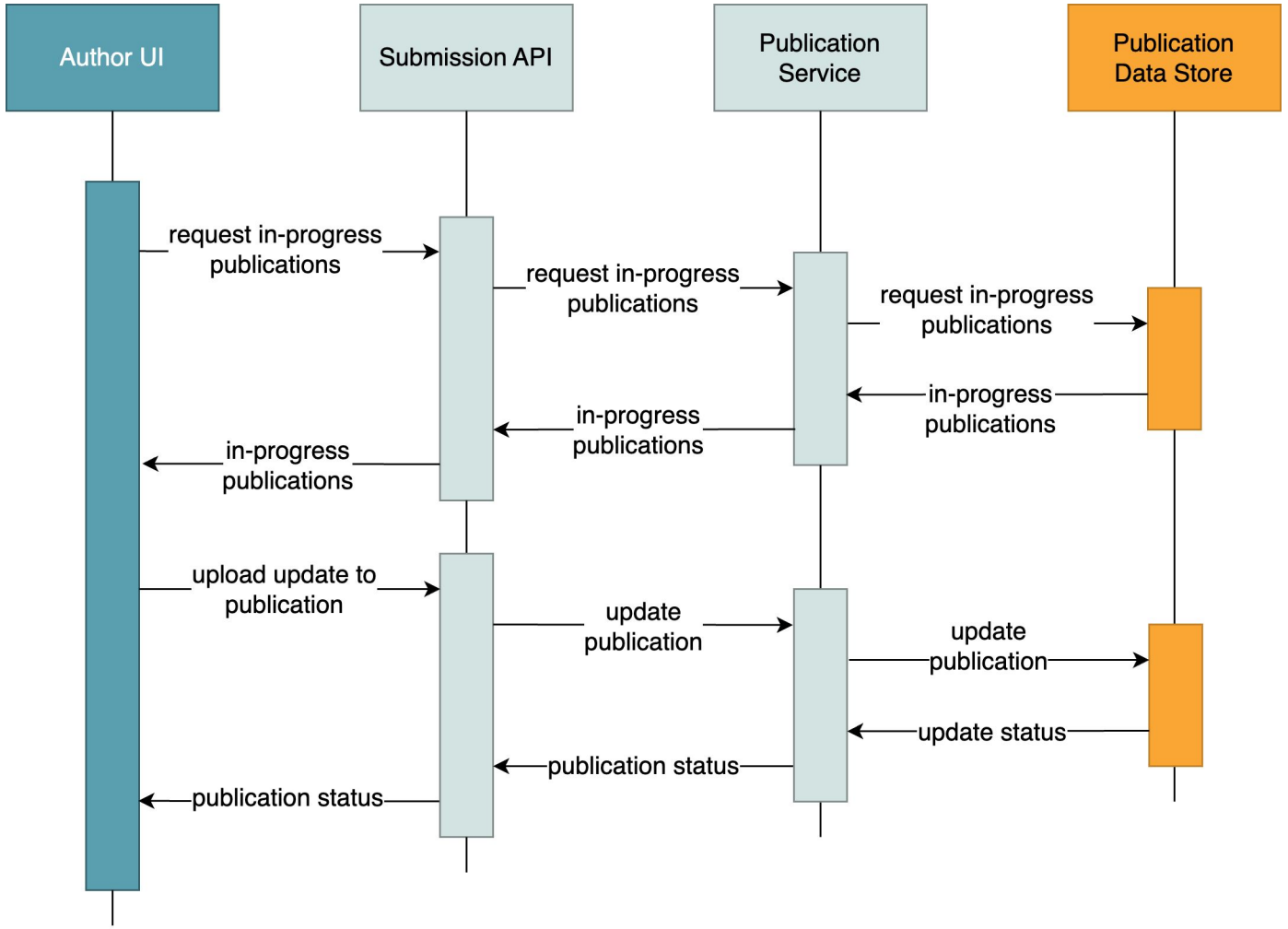
Let's match expectations



Polyglot Media

Data Flow Diagram: media search, view and access analytics

Inputs & Outputs



Polyglot Media

Author submission process, post login

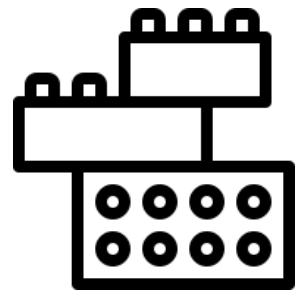
Consider how your audience will read the diagram

Pattern

Show them the pirate ship!

AKA: enthral your audience with context

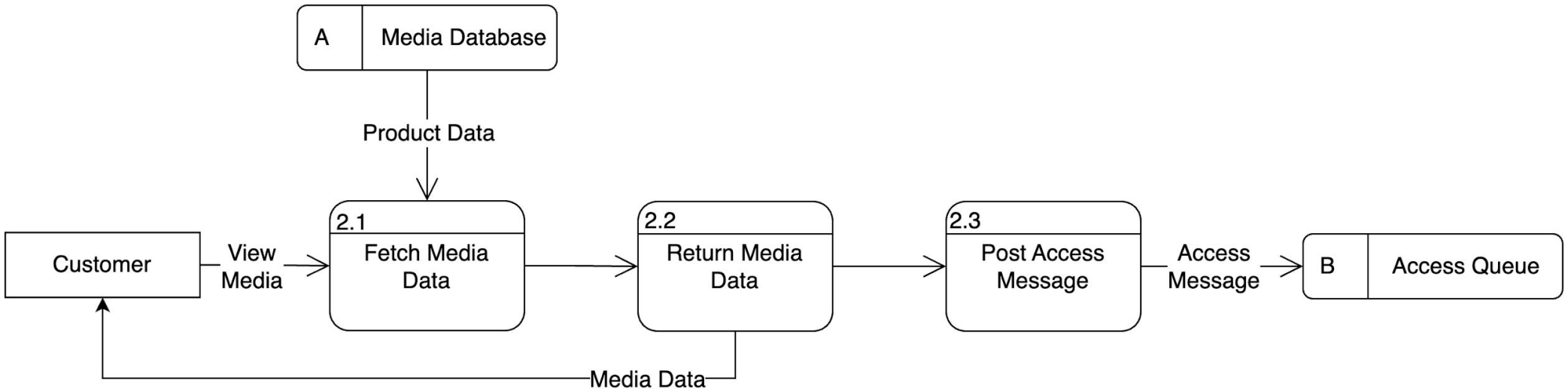

PIRATÃO
PIRATÃO



When you look at the cover of a box of LEGOs you don't see a picture of each individual brick that's inside. Instead, you see the picture of an exciting, fully assembled model, … positioned in a life-like pirate's bay with cliffs and sharks.

Gregor Hohpe, The Software Architect Elevator

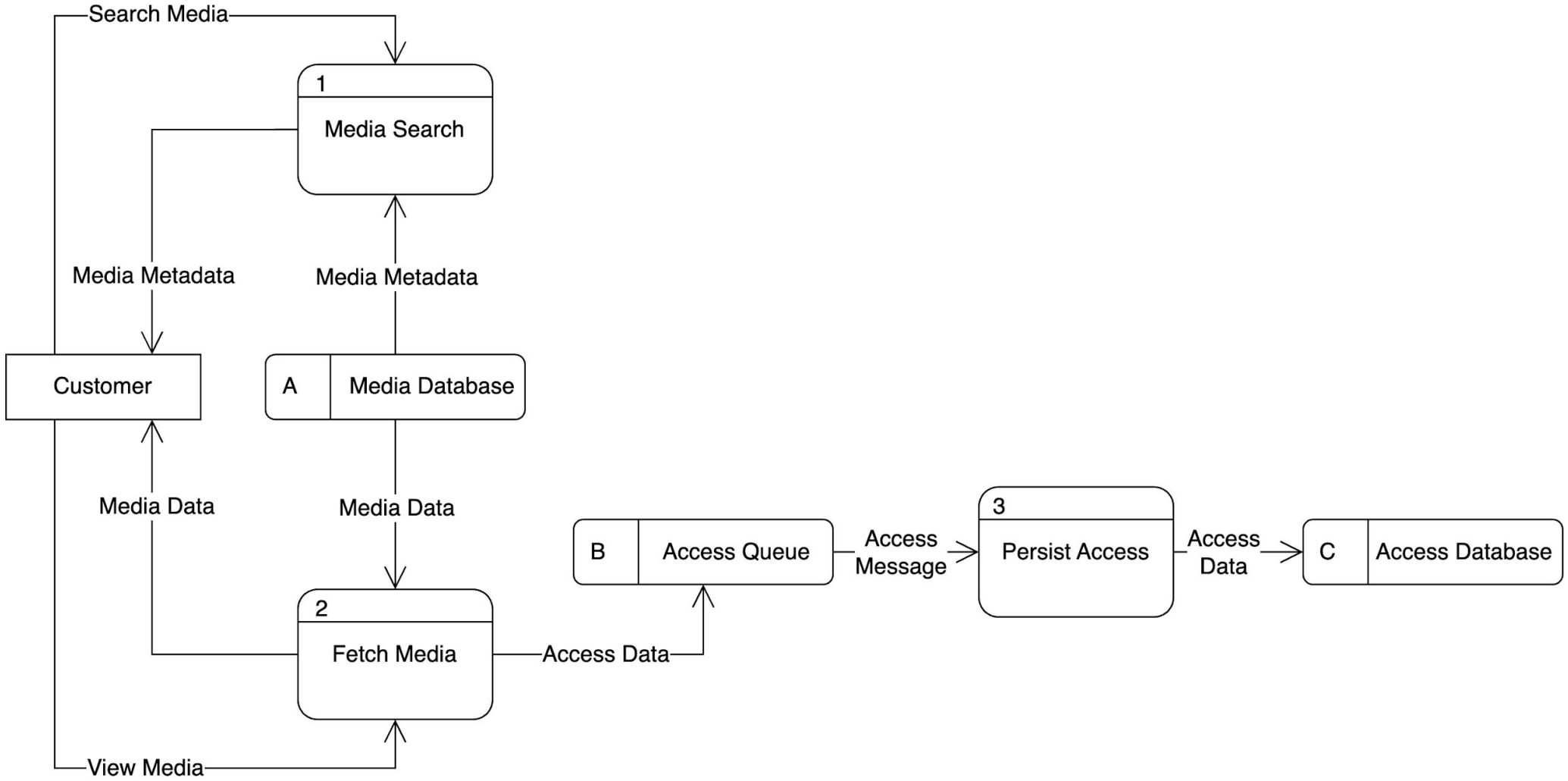
First impressions?



Polyglot Media

Data Flow Diagram: media search, view and access analytics - 2. Fetch Media

Top Level DFD

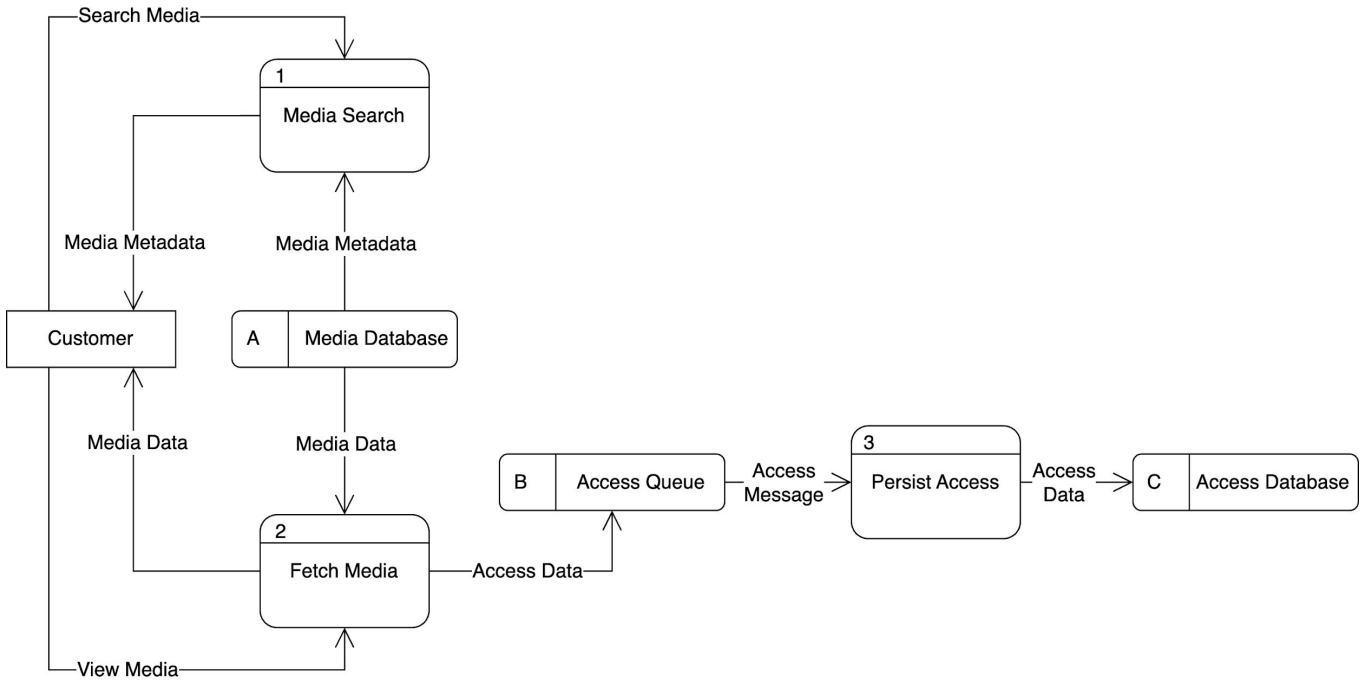


Polyglot Media

Data Flow Diagram: media search, view and access analytics

DFD Order

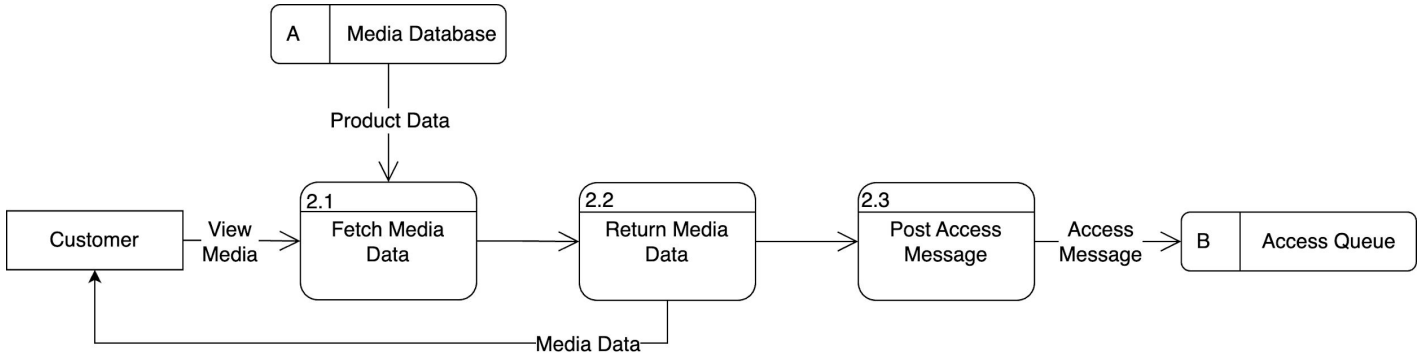
1



Polyglot Media

Data Flow Diagram: media search, view and access analytics

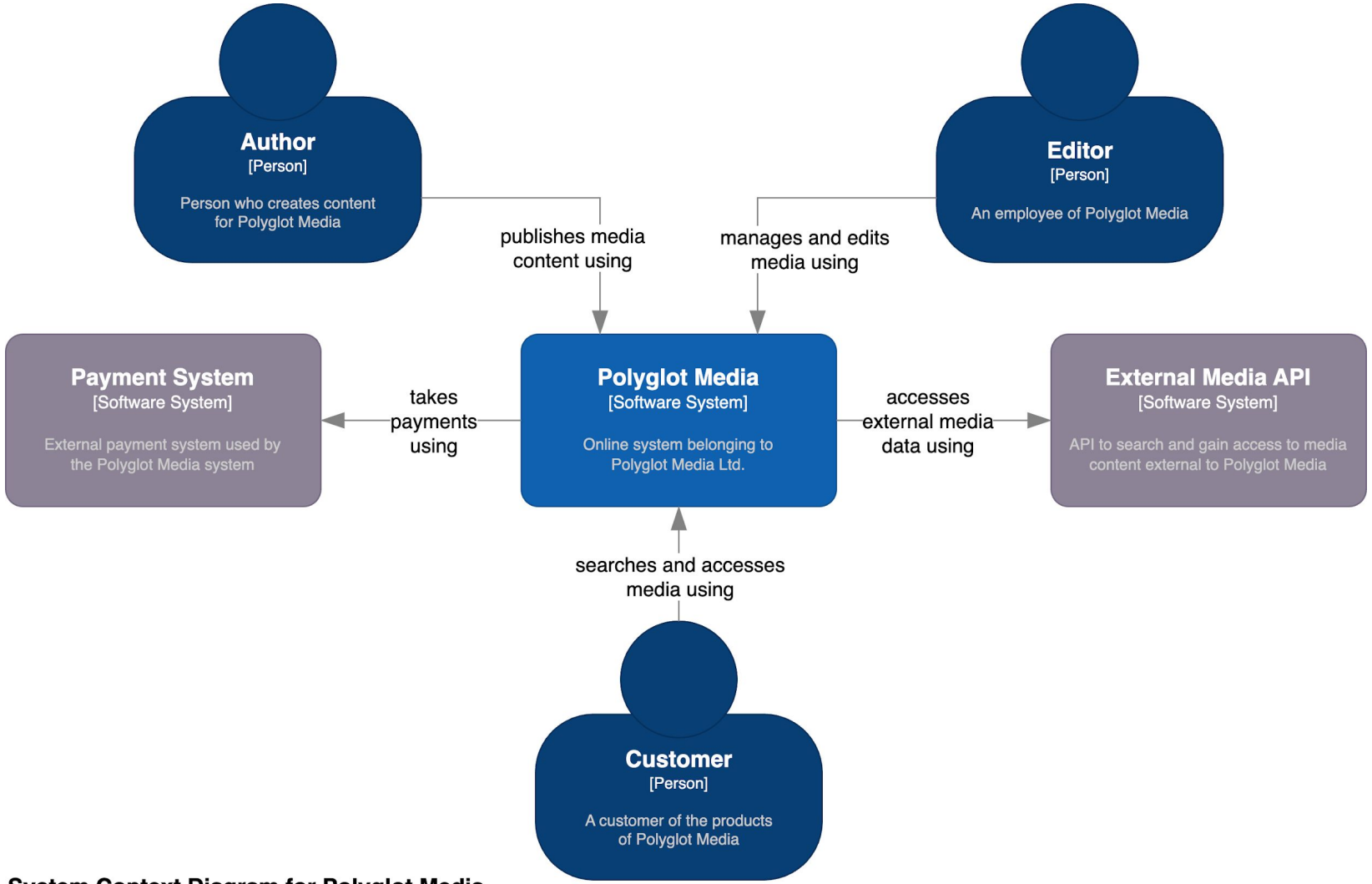
2



Polyglot Media

Data Flow Diagram: media search, view and access analytics - 2. Fetch Media

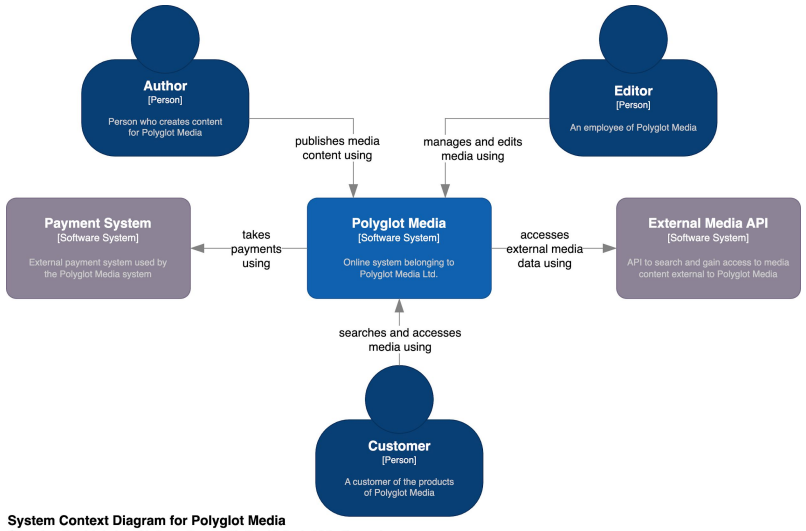
Context? Go for C4!



System Context Diagram for Polyglot Media
Showing the high-level interactions with the Polyglot Media system.

Create Narrative

1



System Context Diagram for Polyglot Media
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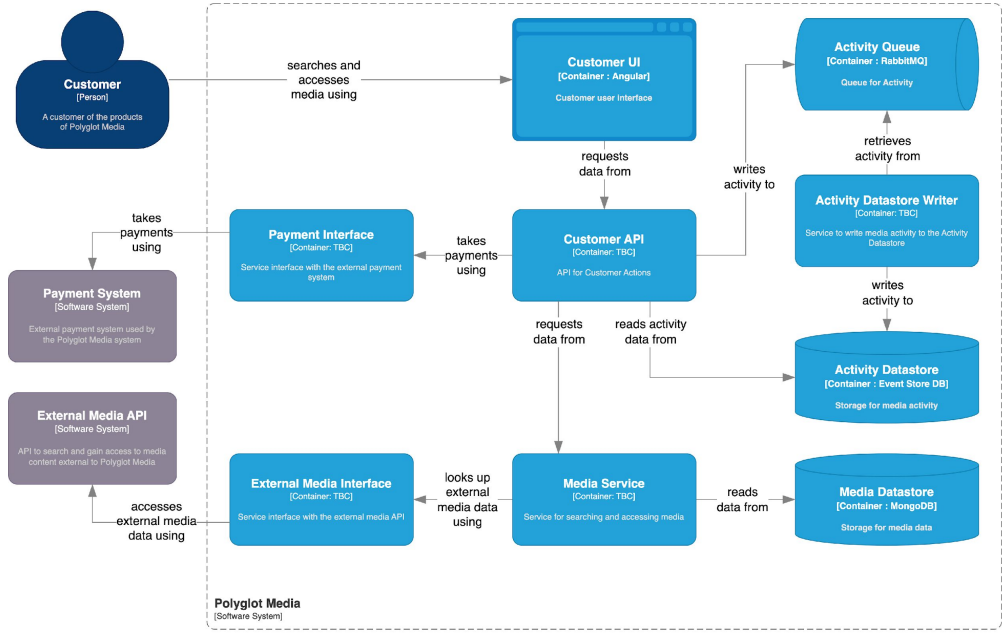
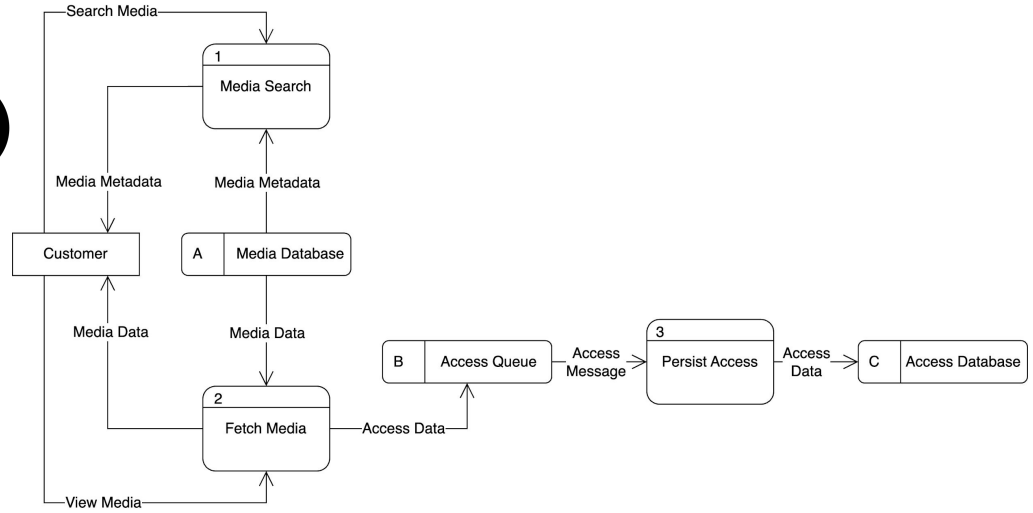
2



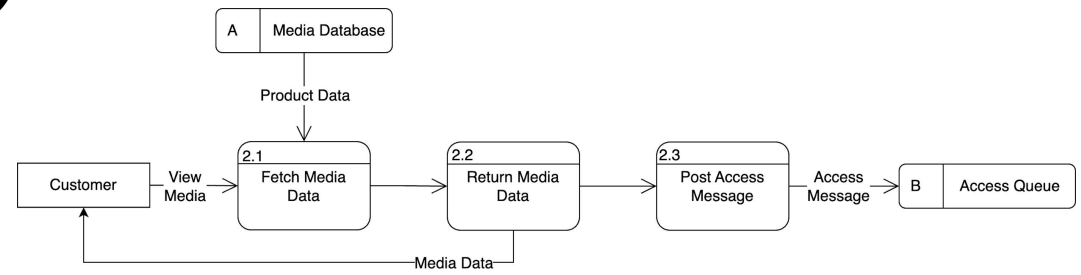
Container Diagram for Customers using Polyglot Media
Showing the high-level interactions within the Polyglot Media system.

3



Polyglot Media
Data Flow Diagram: media search, view and access analytics

4



Polyglot Media
Data Flow Diagram: media search, view and access analytics - 2. Fetch Media

Fill in the narrative gaps

Antipattern

Not-So-Unified Modelling Language

AKA: using UML when it's not useful

UML is useful

UML Diagram Types

Structural

Behavioural

UML Diagram Types

Structural

- Profile
- Class
- Deployment
- Object
- Package
- Component
- Composite Structure

Behavioural

- State Machine
- Timing
- Communication
- Sequence
- Usecase
- Activity
- Interaction Overview

UML Diagram Types

Structural

- Profile
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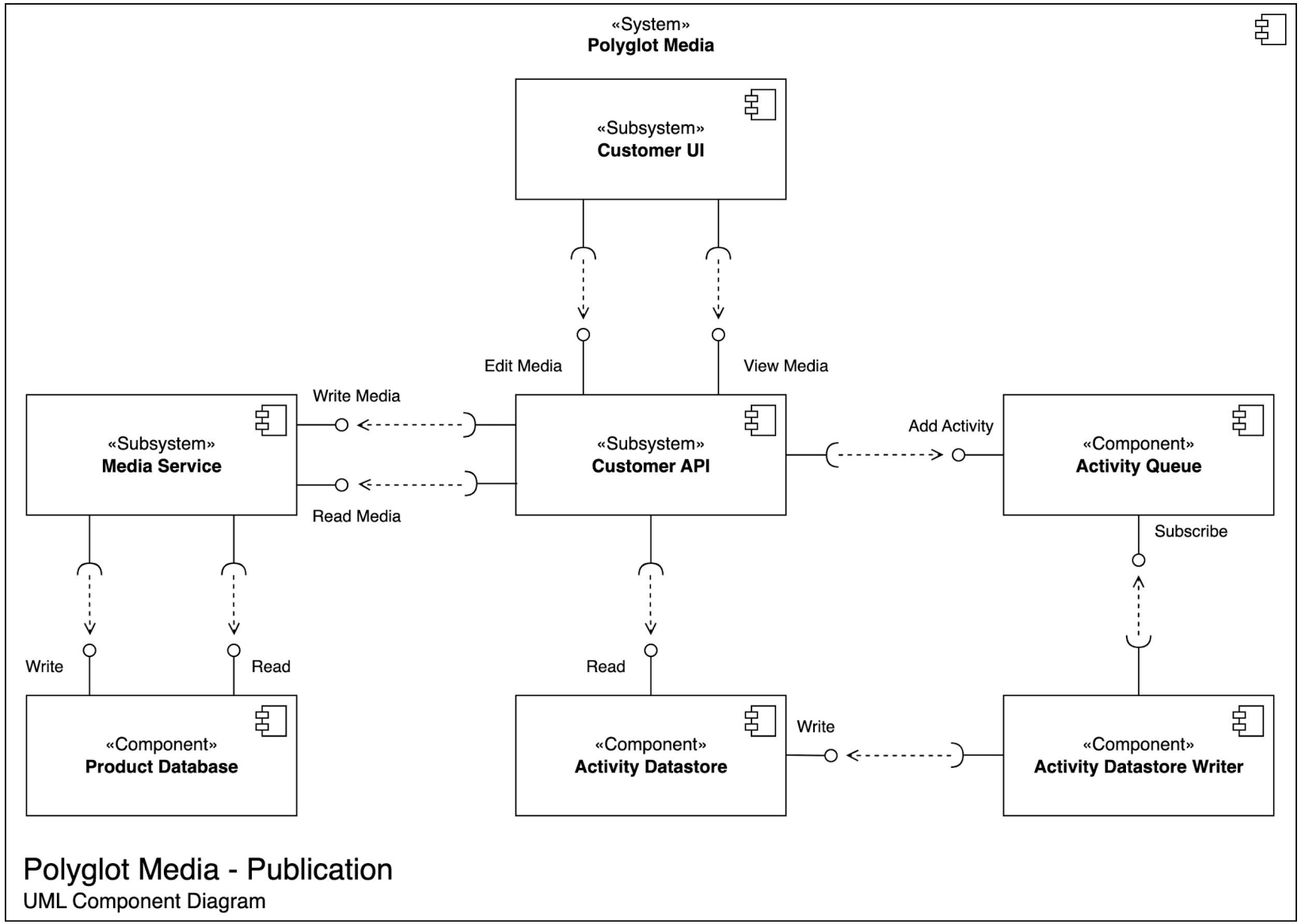
Behavioural

- State Machine
- Timing
- Communication
- Sequence
- Usecase
- Activity
- Interaction Overview

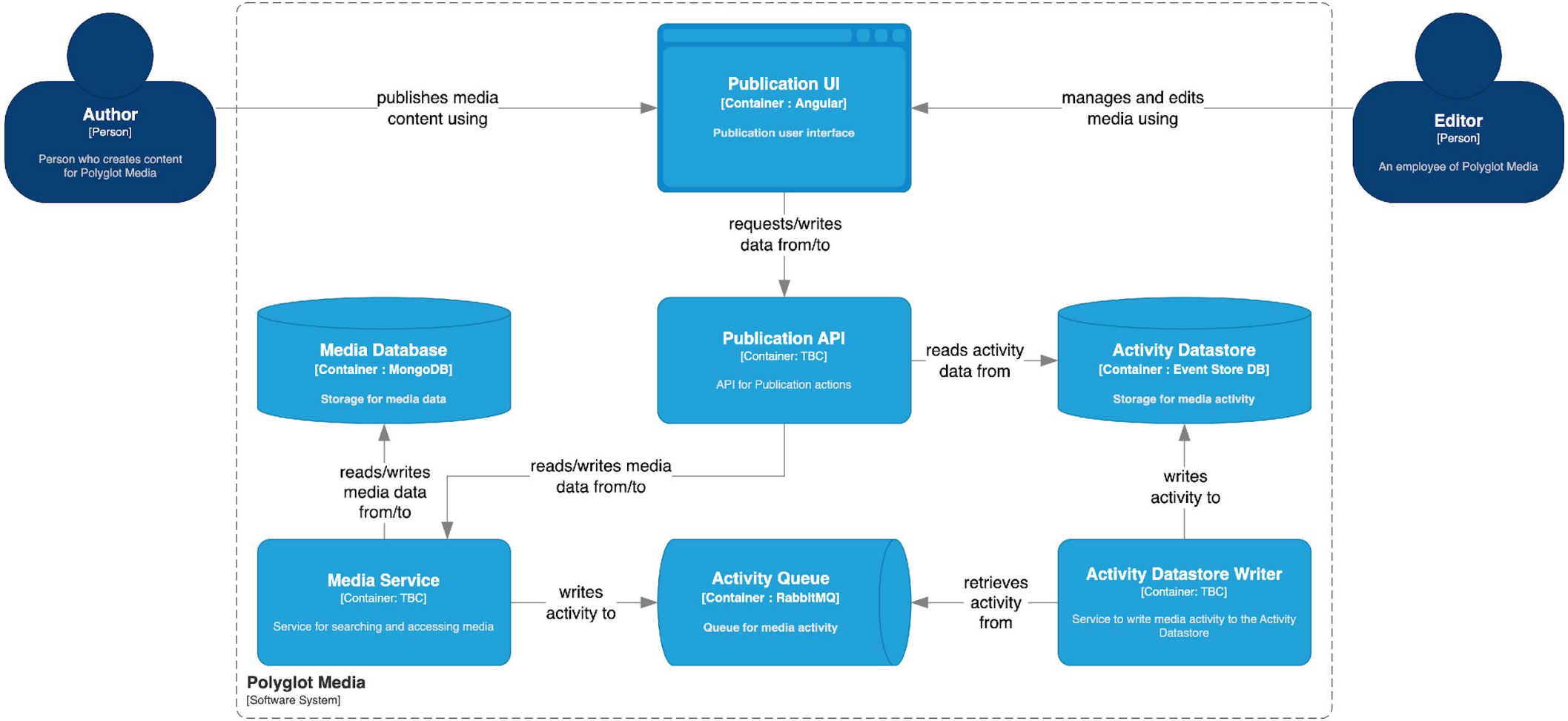
What does your audience need?

UML Component



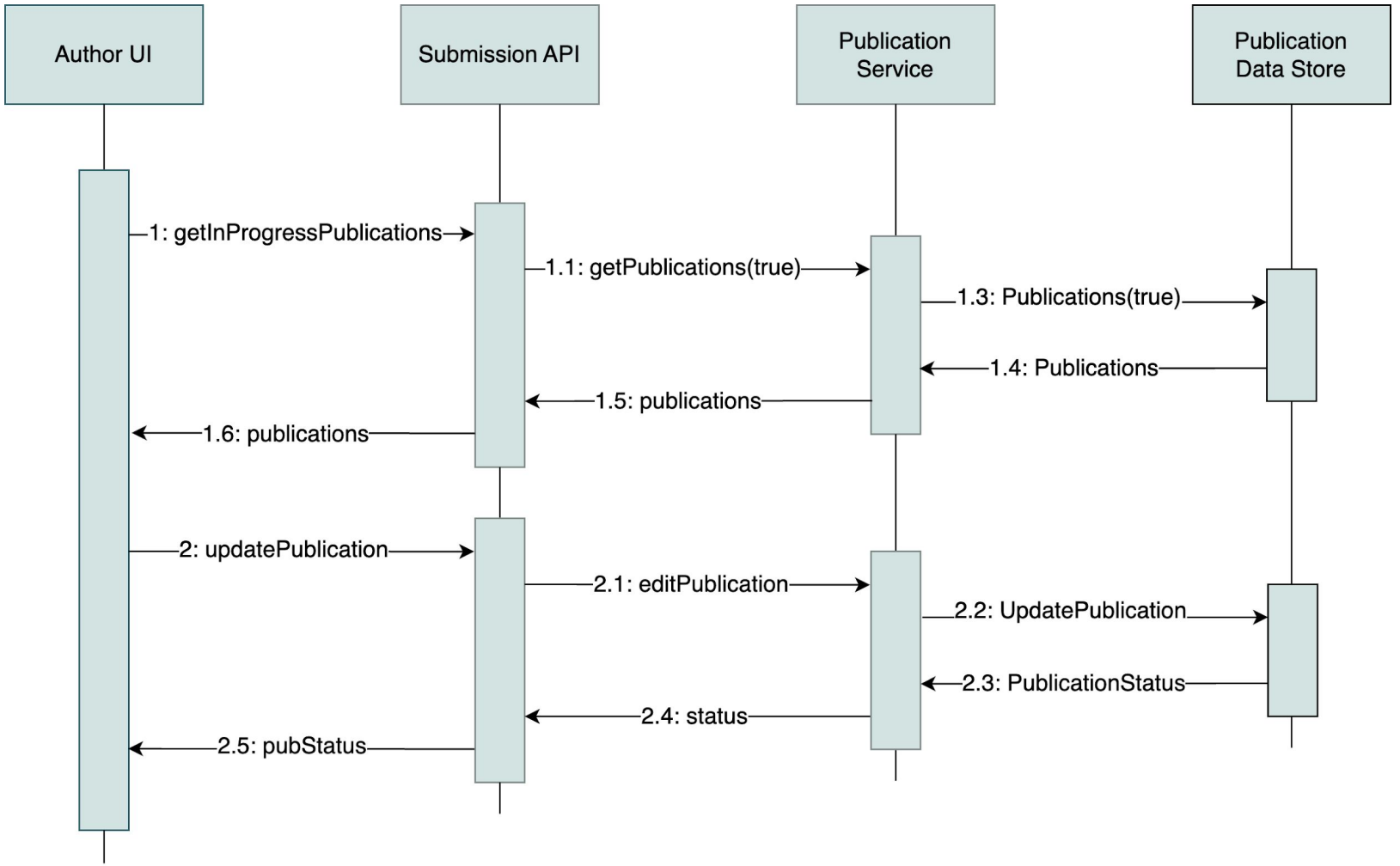
Keep it simple and straightforward

C4 Container Diagram



Container Diagram for Publications in Polyglot Media
Showing the high-level interactions within the Polyglot Media system.

UML Sequence

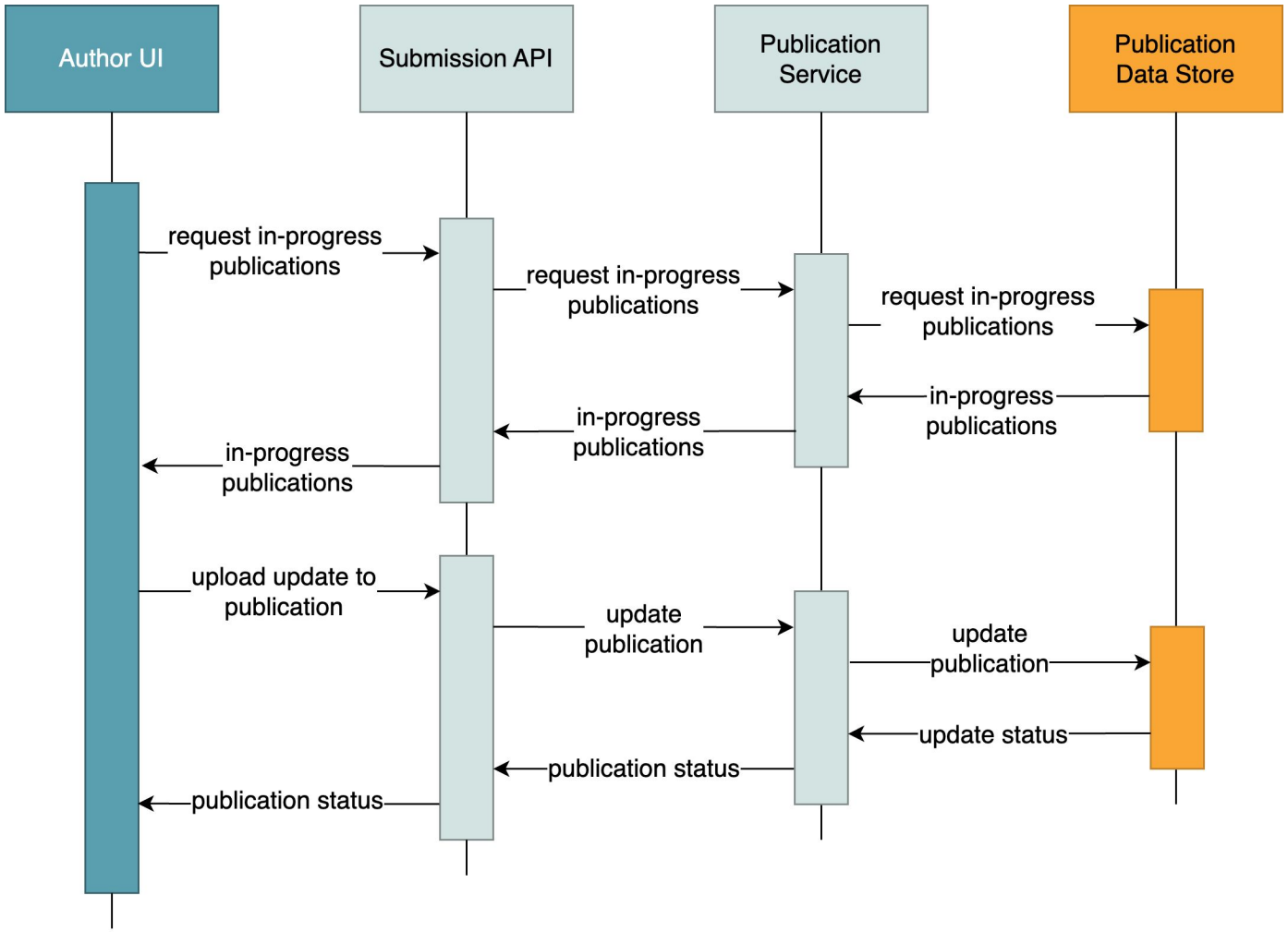


Polyglot Media

Author submission process, post login

How long until it is out-of-date?

Simplified Sequence



Polyglot Media

Author submission process, post login

Use UML for good reason

Antipattern

Structures Behaving Badly

AKA: mixing structure and behaviour

UML Diagram Types

Structural

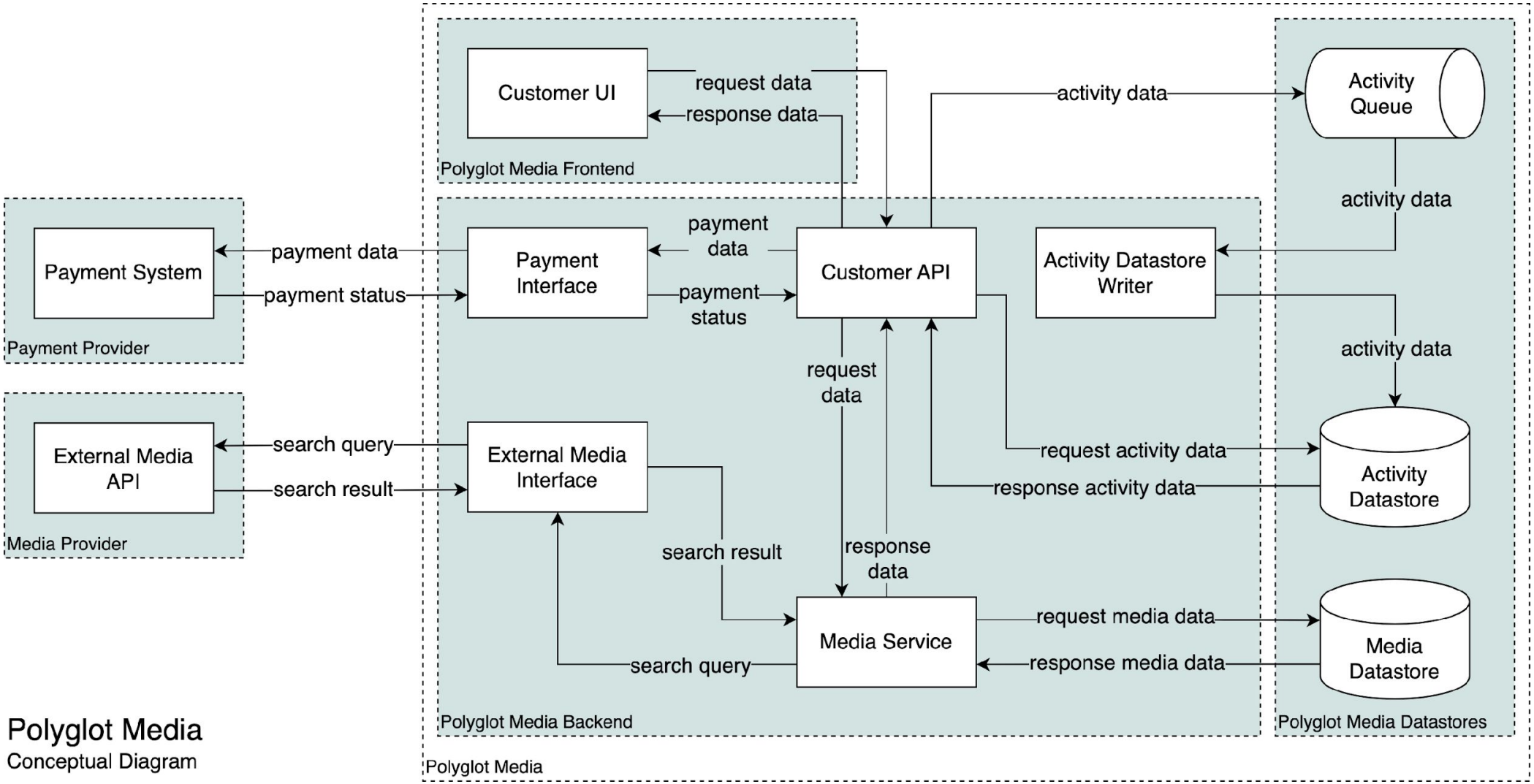
- Profile
- Class
- Deployment
- Object
- Package
- Component
- Composite Structure

Behavioural

- State Machine
- Timing
- Communication
- Sequence
- Usecase
- Activity
- Interaction Overview

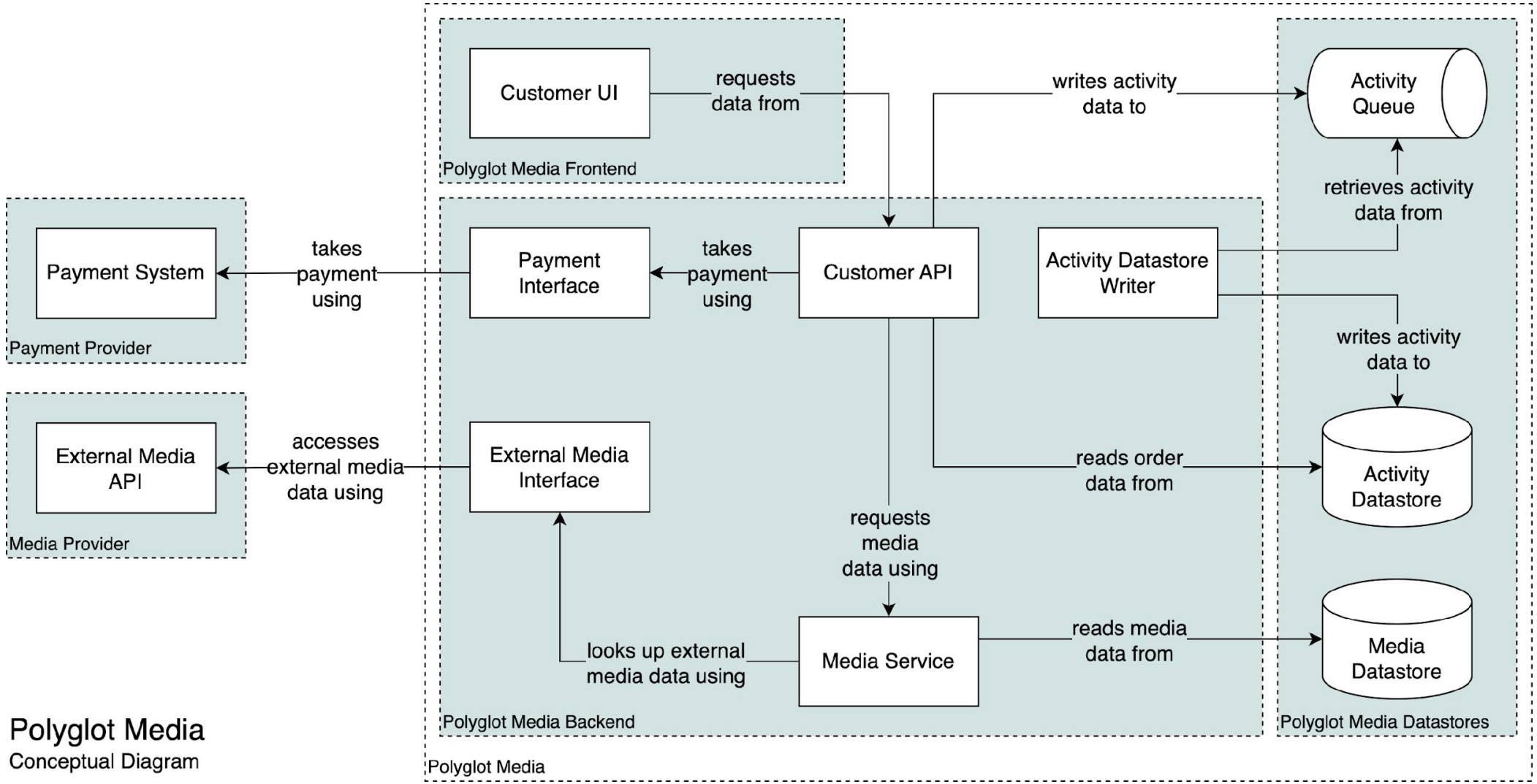
Structure and behaviour in one diagram is confusing

Mixed Messages



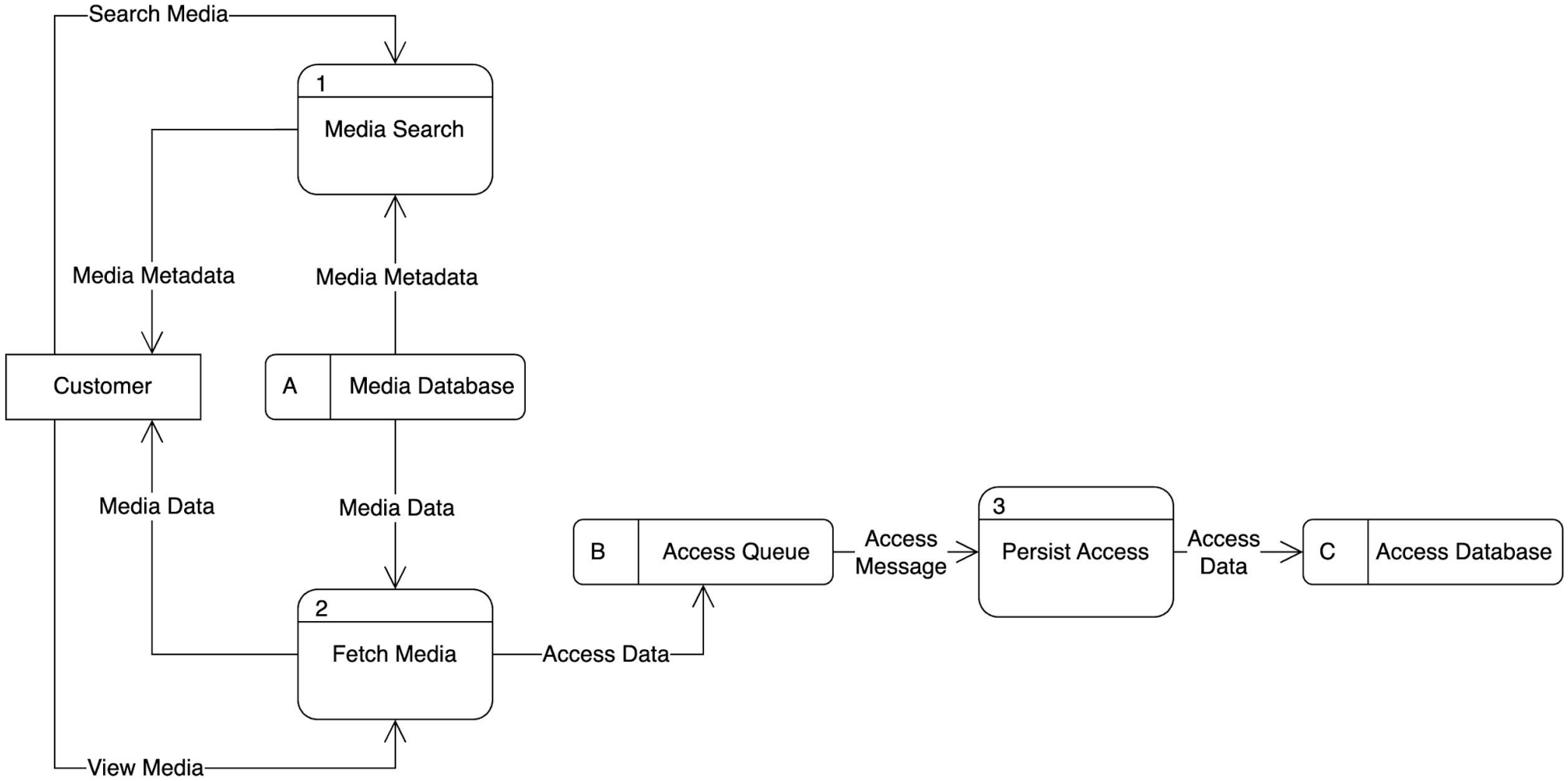
Polyglot Media
Conceptual Diagram

Structure



Polyglot Media
Conceptual Diagram

Behaviour



Polyglot Media

Data Flow Diagram: media search, view and access analytics

Apply the single responsibility principle to diagrams

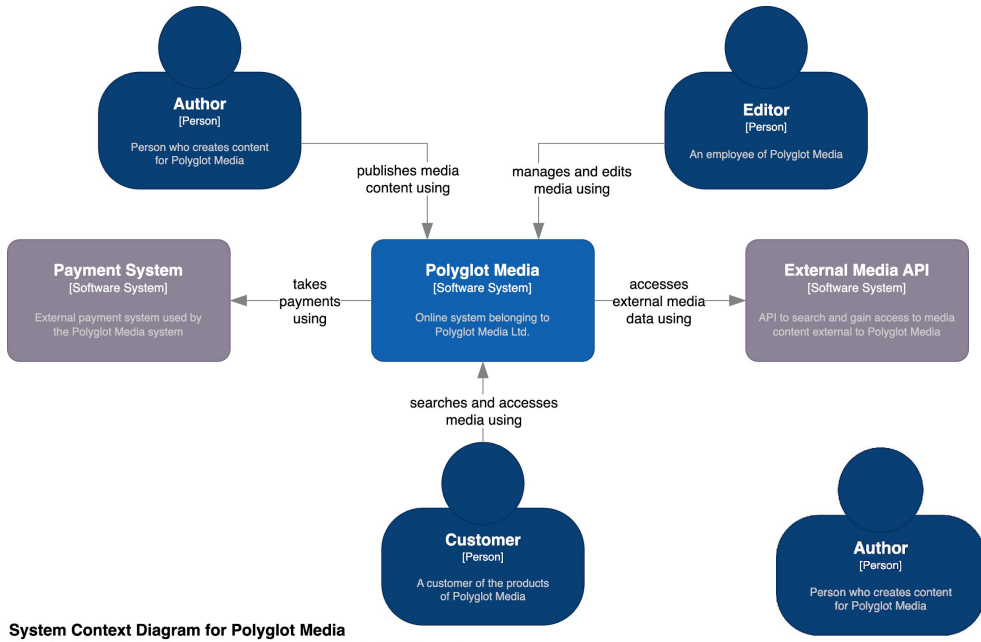
Pattern

Connect the Dots

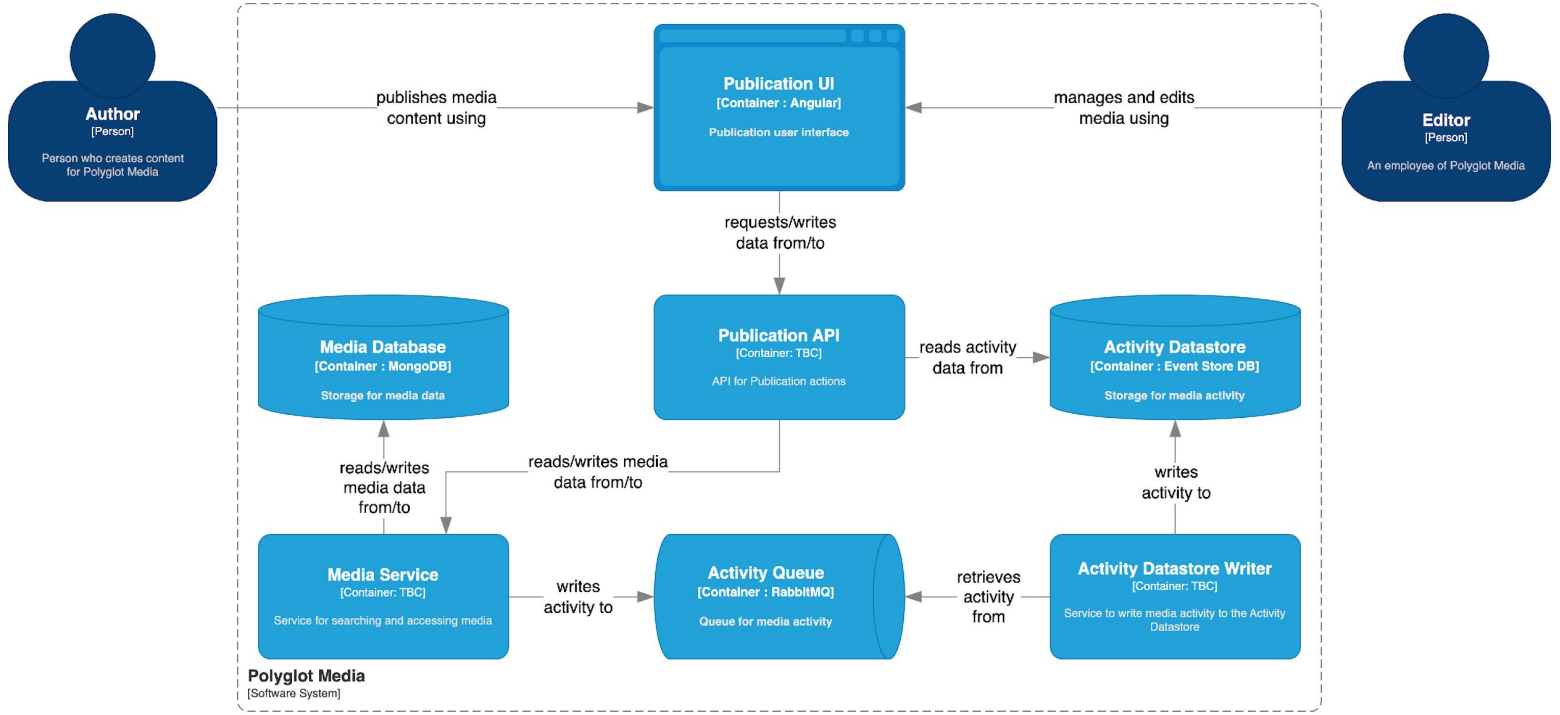
AKA: Representational Consistency – connecting levels of abstraction

Navigating between levels of abstraction must be easy

C4 Levels



System Context Diagram for Polyglot Media
Showing the high-level interactions with the Polyglot Media system.



Container Diagram for Publications in Polyglot Media
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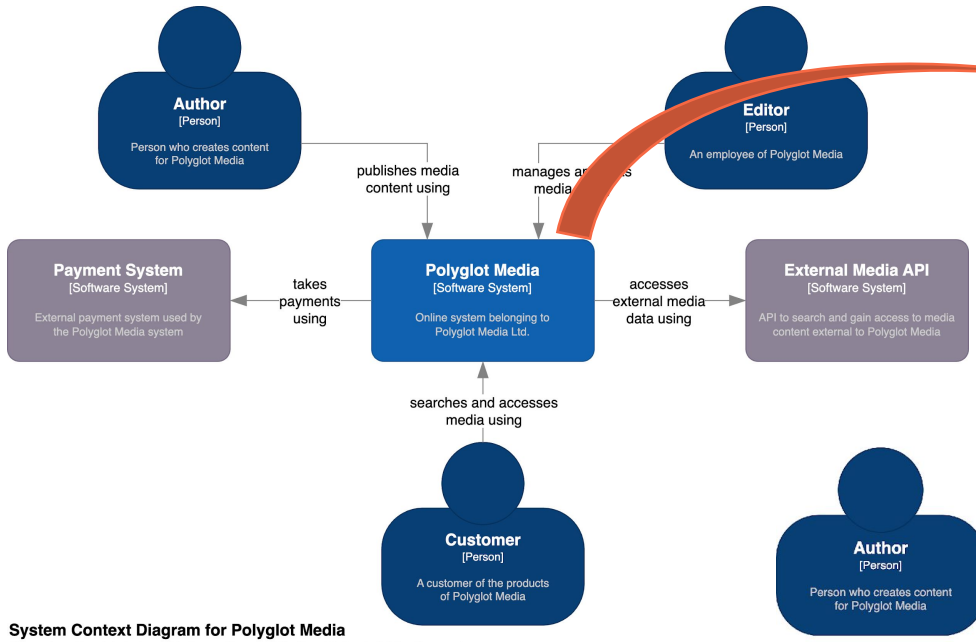
C4 Levels



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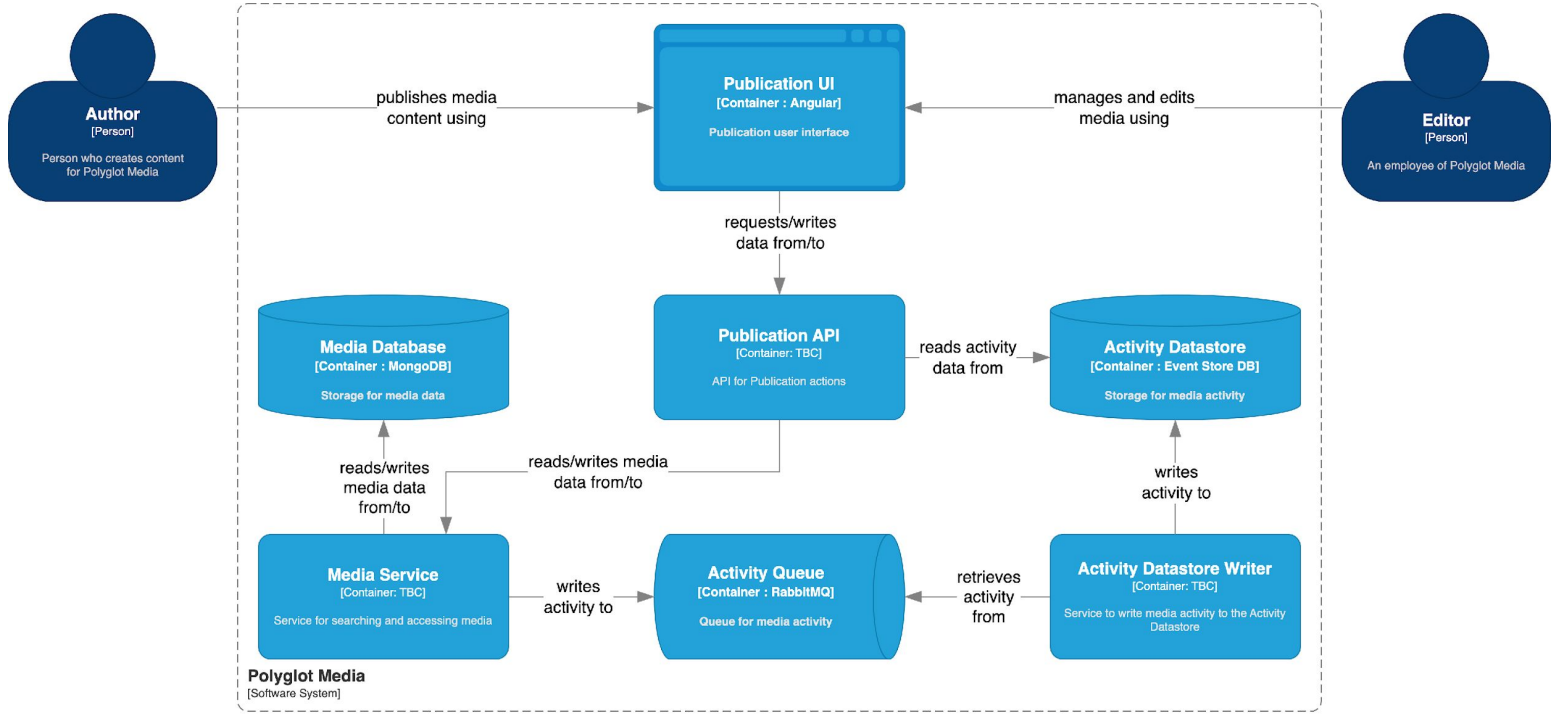

Container Diagram for Publications in Polyglot Media
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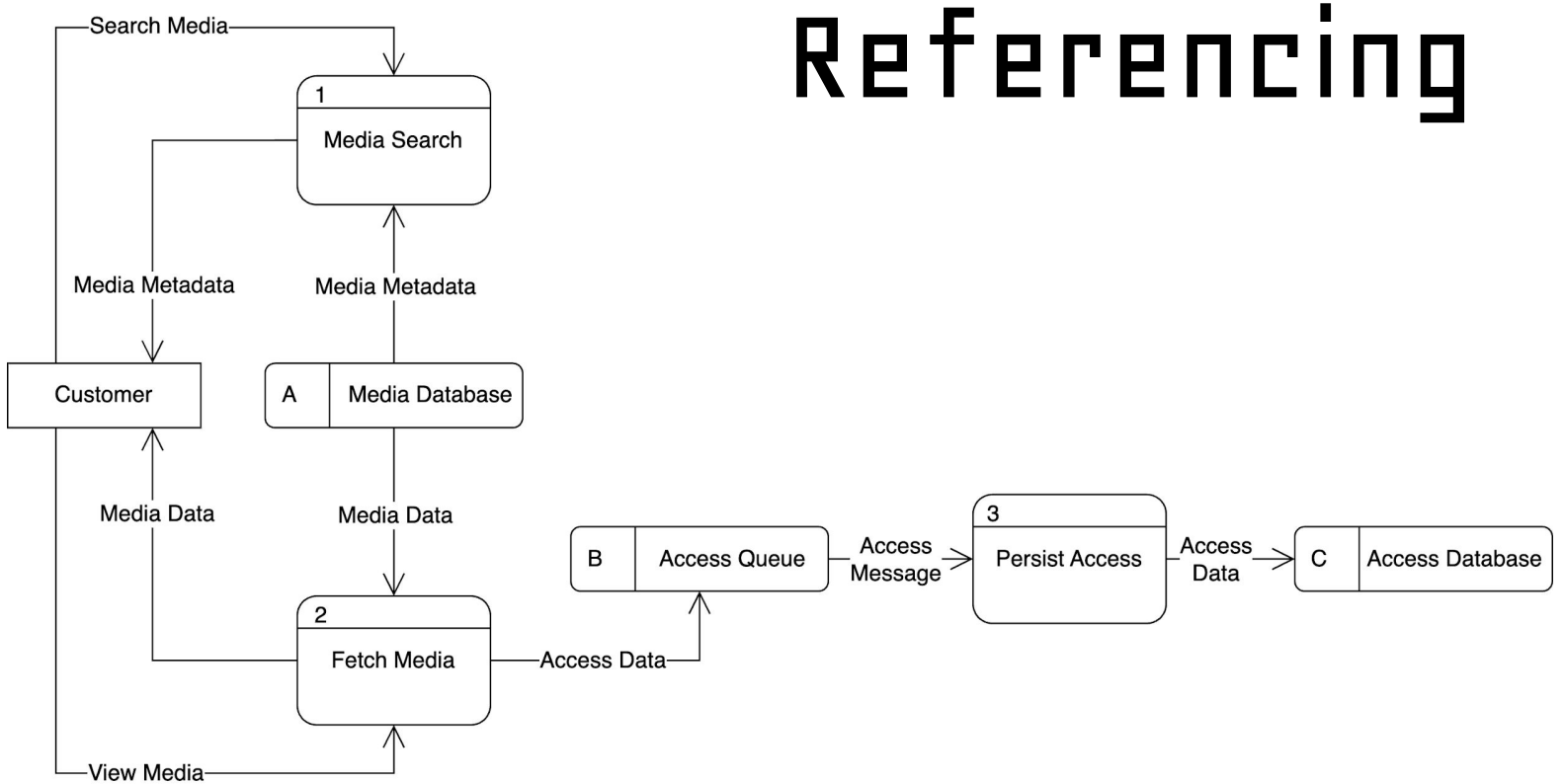
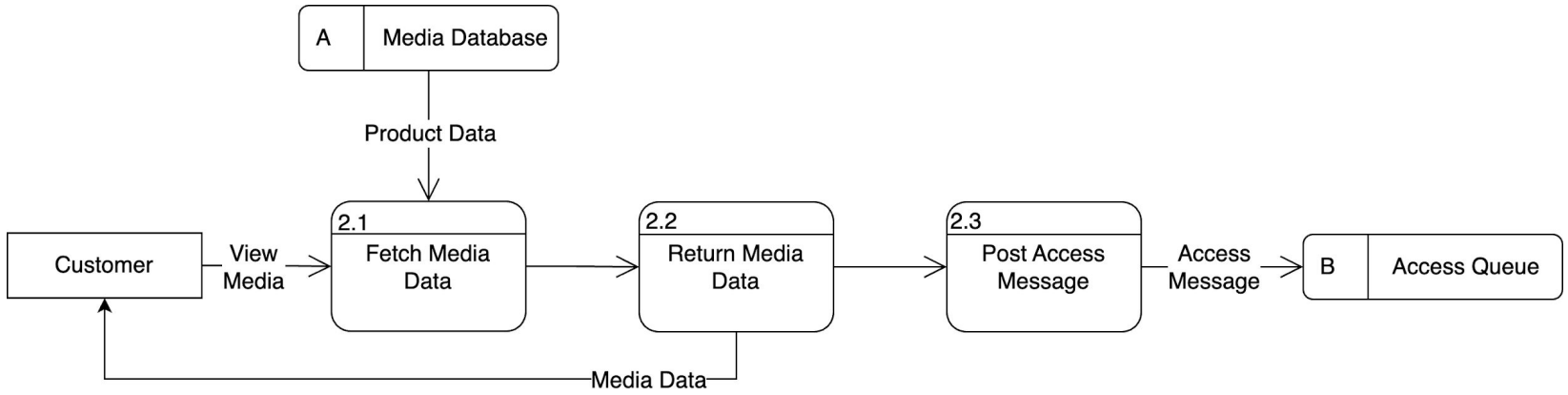
Referencing



Polyglot Media

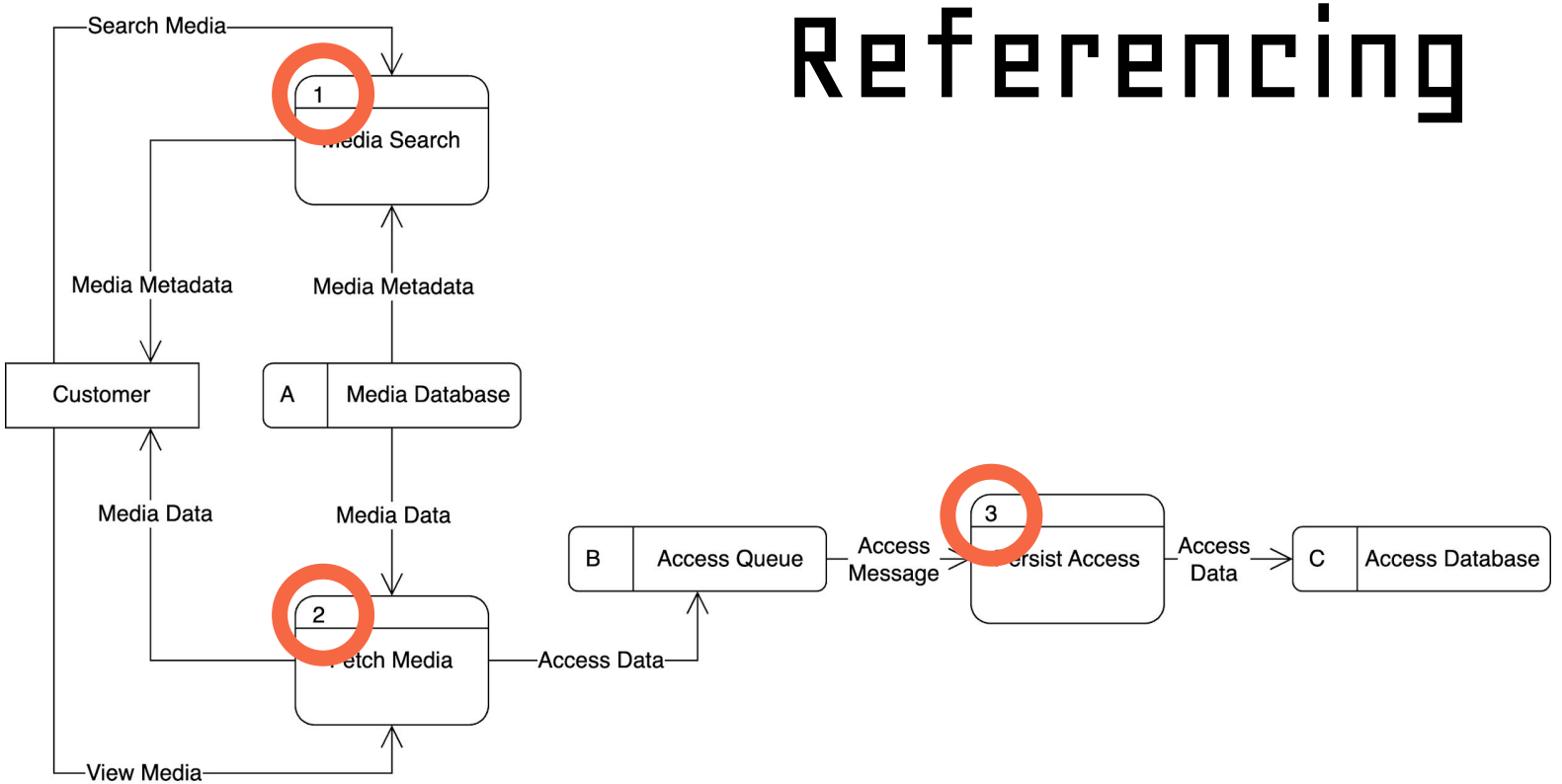
Data Flow Diagram: media search, view and access analytics



Polyglot Media

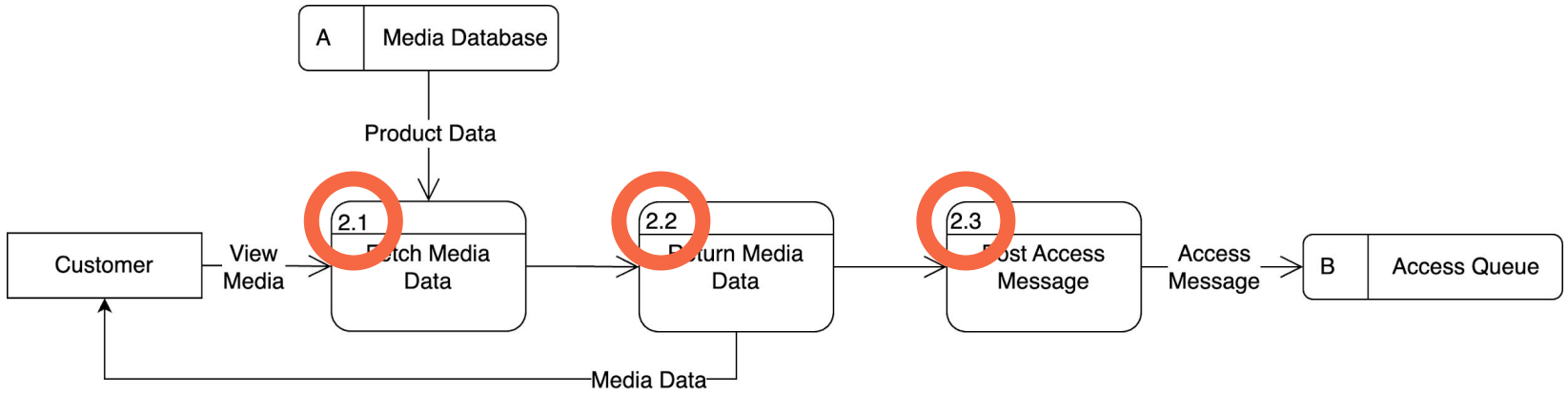
Data Flow Diagram: media search, view and access analytics - 2. Fetch Media

Referencing



Polyglot Media

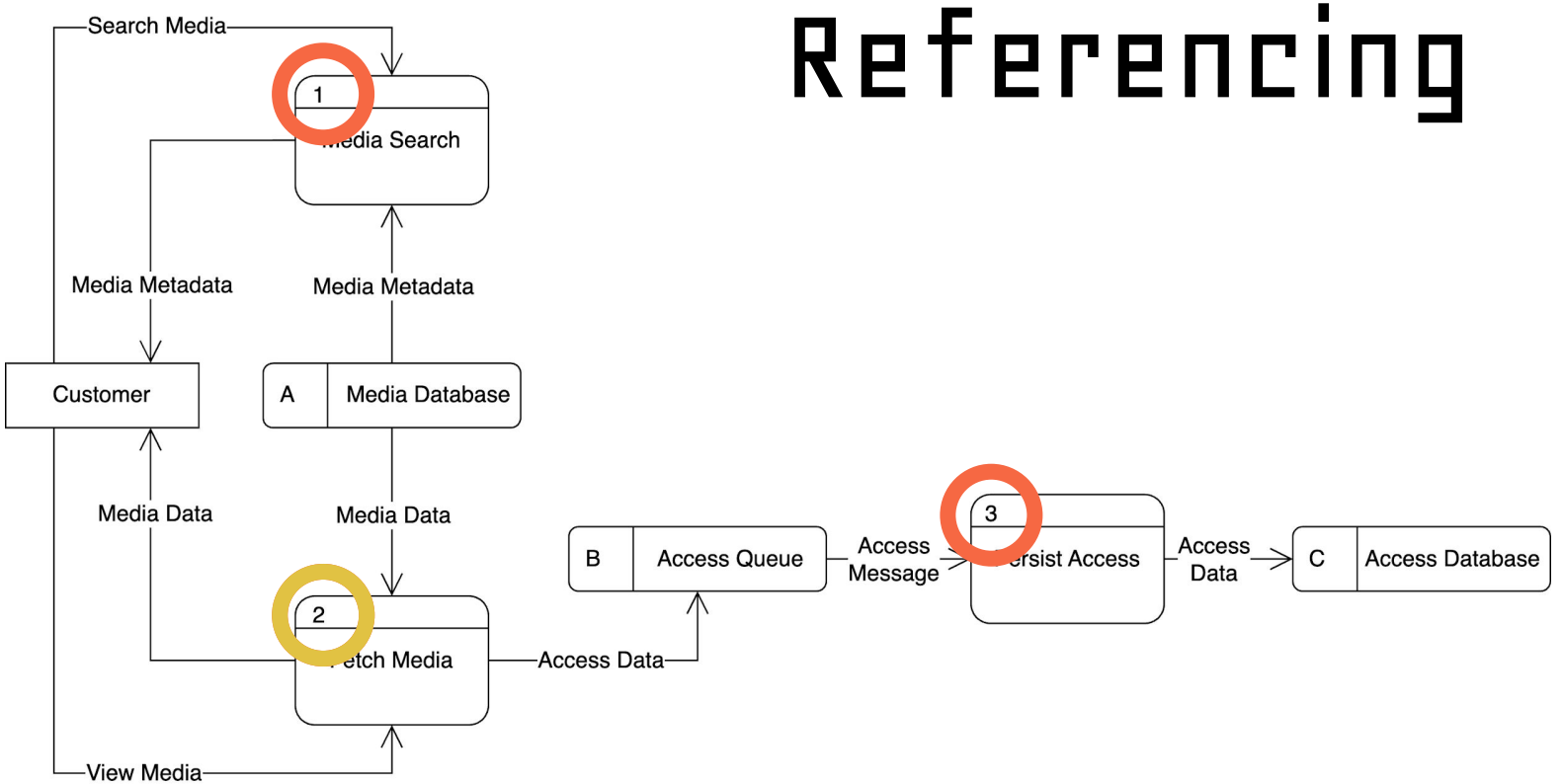
Data Flow Diagram: media search, view and access analytics



Polyglot Media

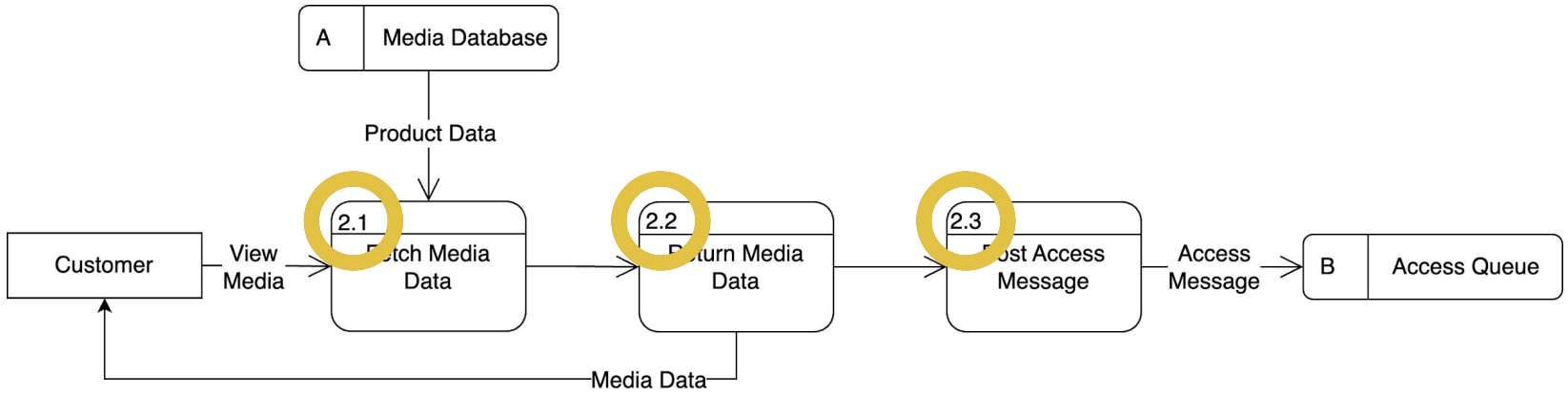
Data Flow Diagram: media search, view and access analytics - 2. Fetch Media

Referencing



Polyglot Media

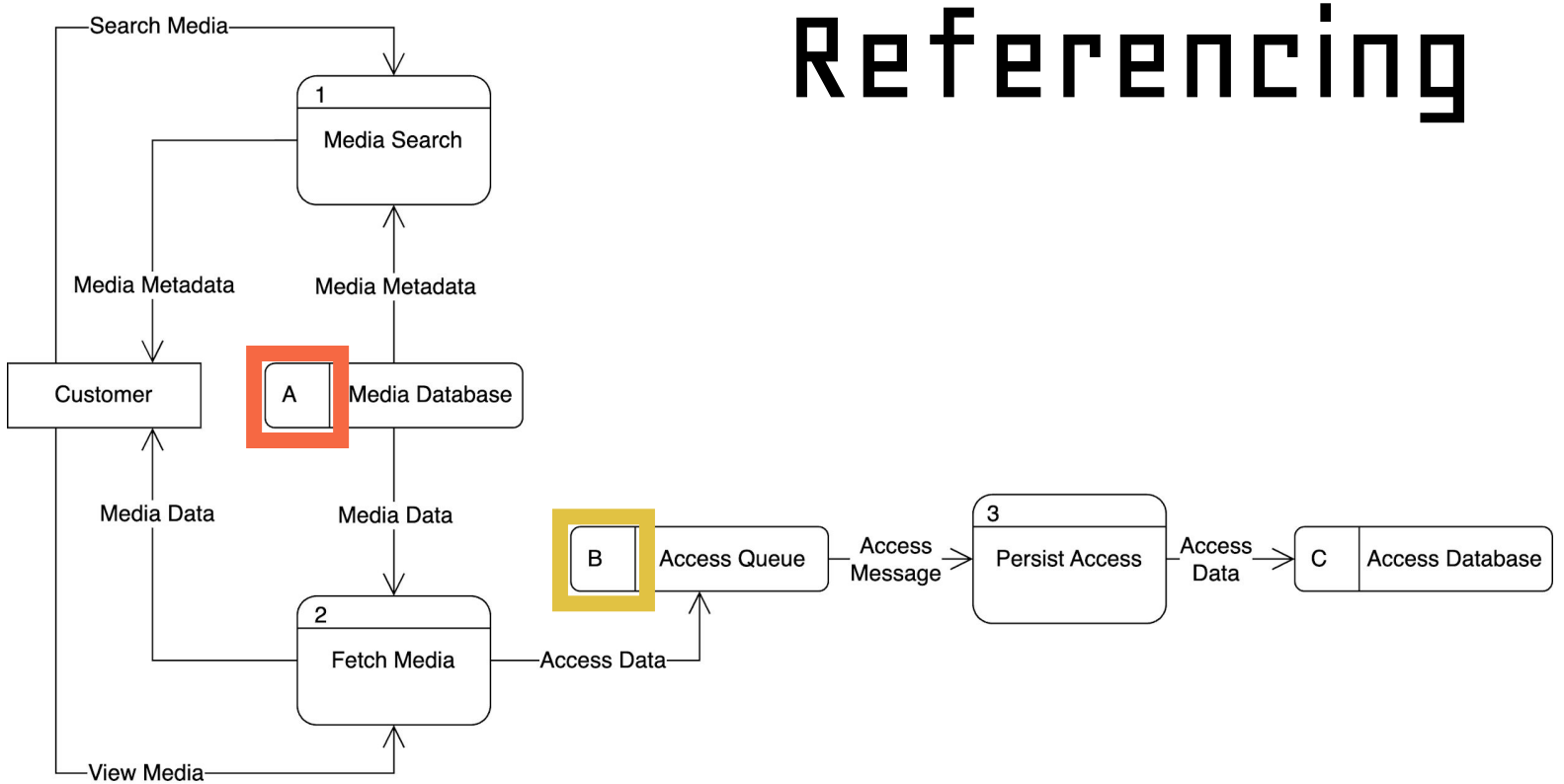
Data Flow Diagram: media search, view and access analytics



Polyglot Media

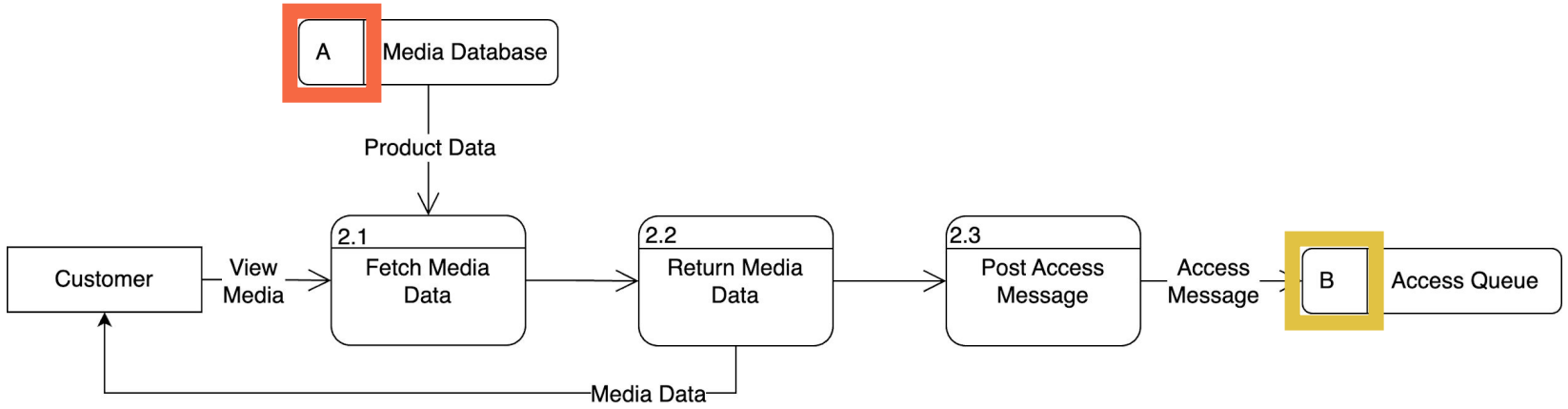
Data Flow Diagram: media search, view and access analytics - 2. Fetch Media

Referencing



Polyglot Media

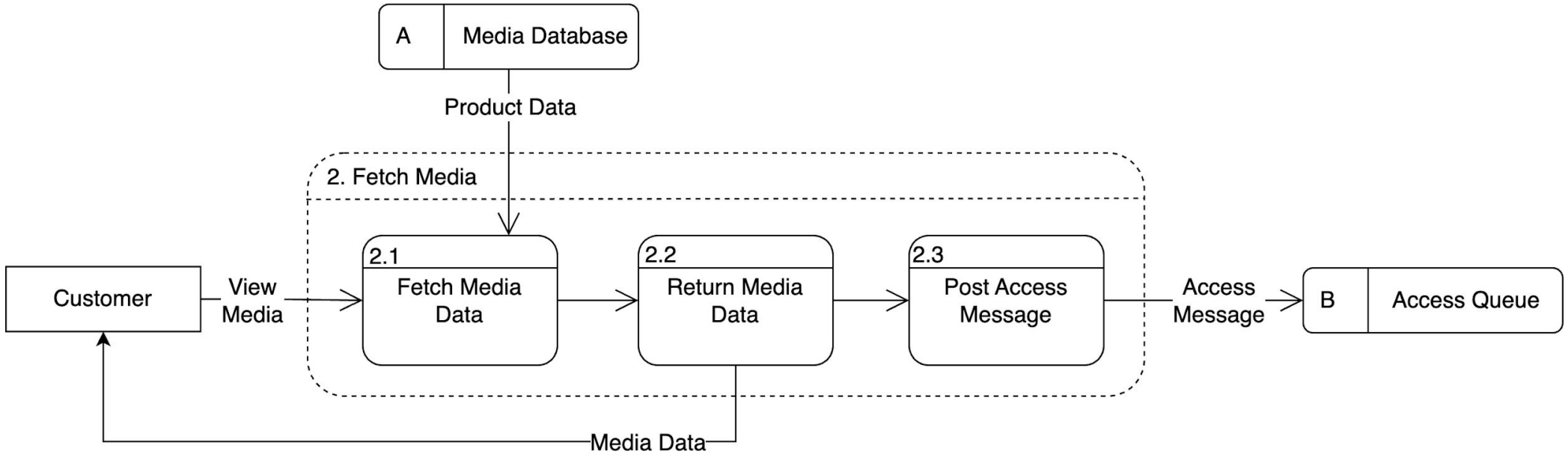
Data Flow Diagram: media search, view and access analytics



Polyglot Media

Data Flow Diagram: media search, view and access analytics - 2. Fetch Media

C4-like Reference



Polyglot Media

Data Flow Diagram: media search, view and access analytics - 2. Fetch Media

Make explicit references to other levels of abstraction

Pattern

Strike a Balance

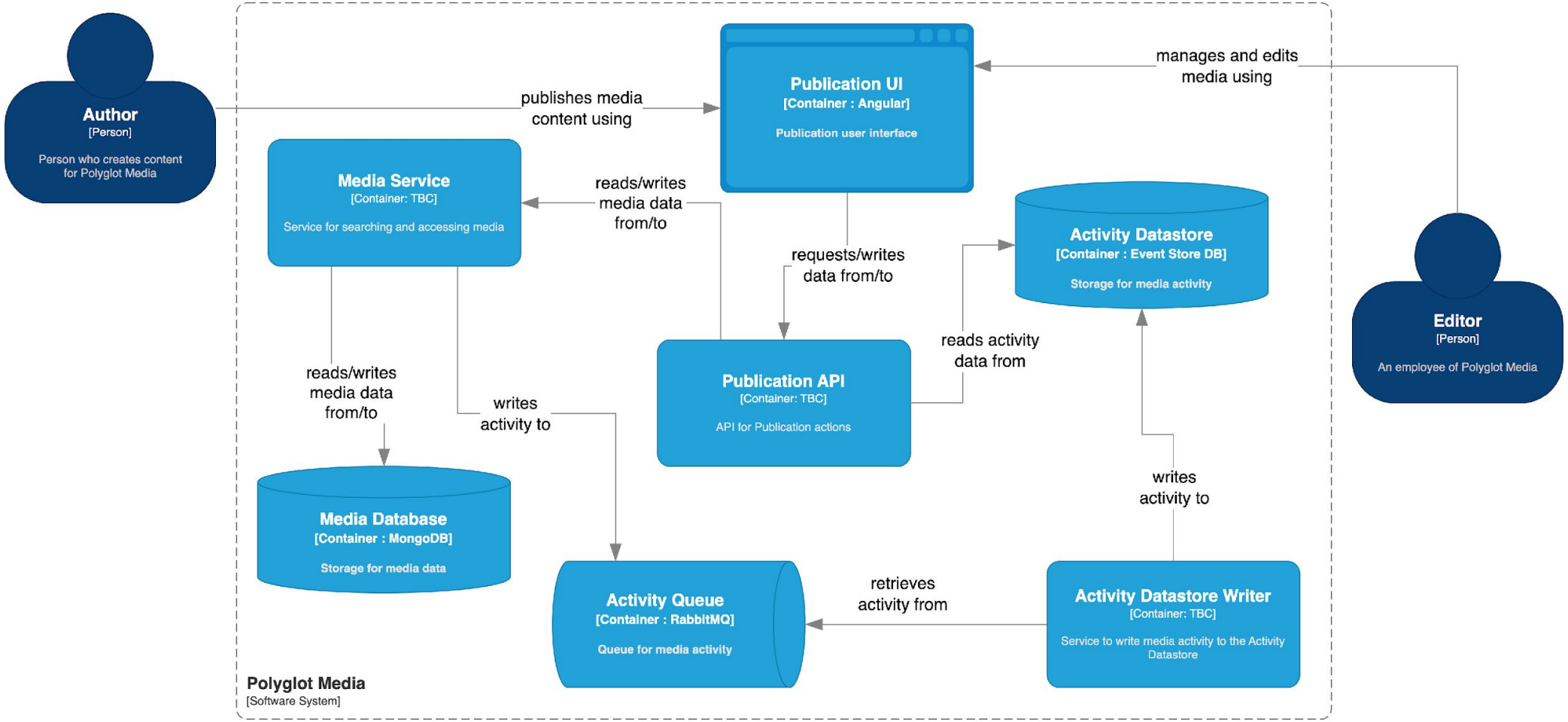
AKA: create a visual balance

Balance is an innate, fundamental human expectation.

– Alvalyn Lundgren

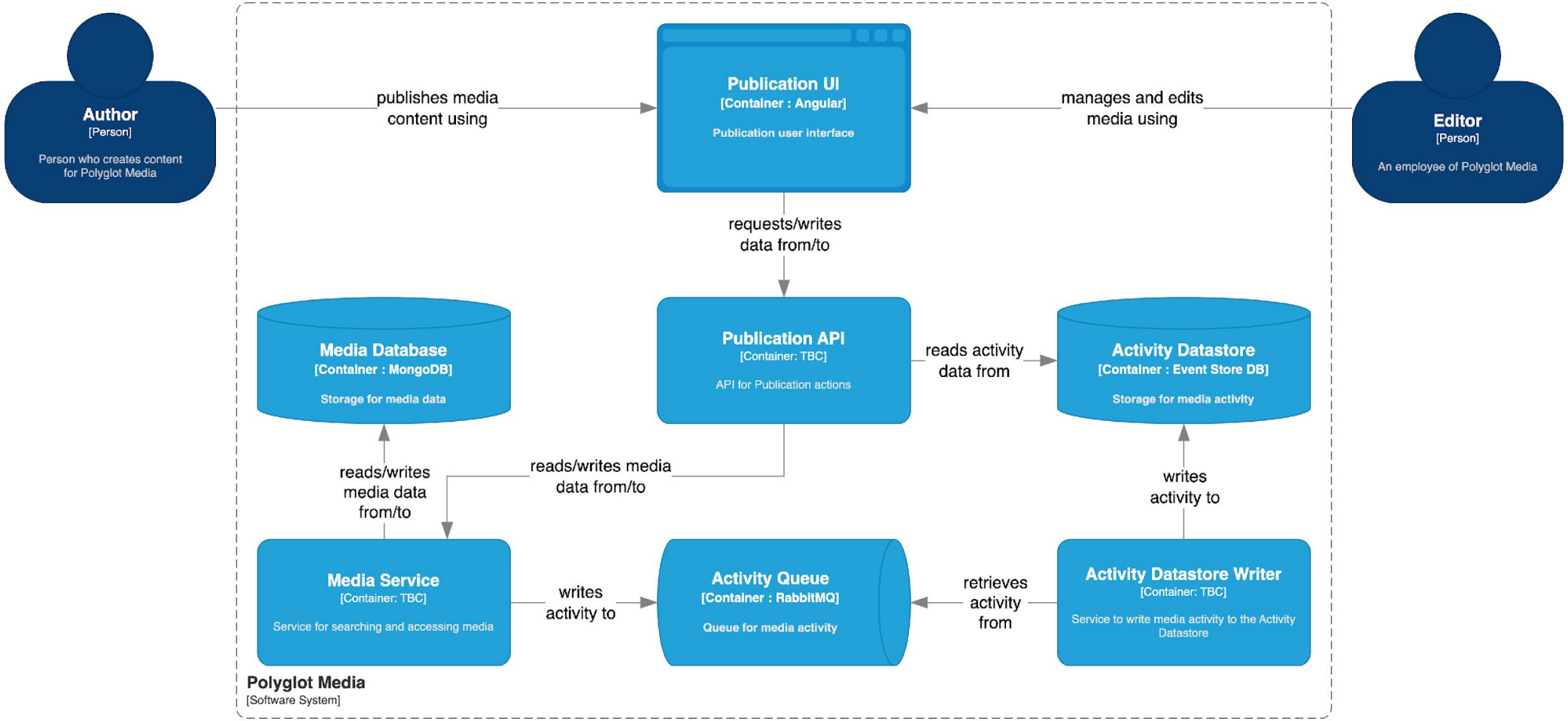
Balance is not all about symmetry

Unbalanced C4



Container Diagram for Publications in Polyglot Media
Showing the high-level interactions within the Polyglot Media system.

Satisfying C4



Container Diagram for Publications in Polyglot Media
Showing the high-level interactions within the Polyglot Media system.

Don’t sacrifice clarity for balance

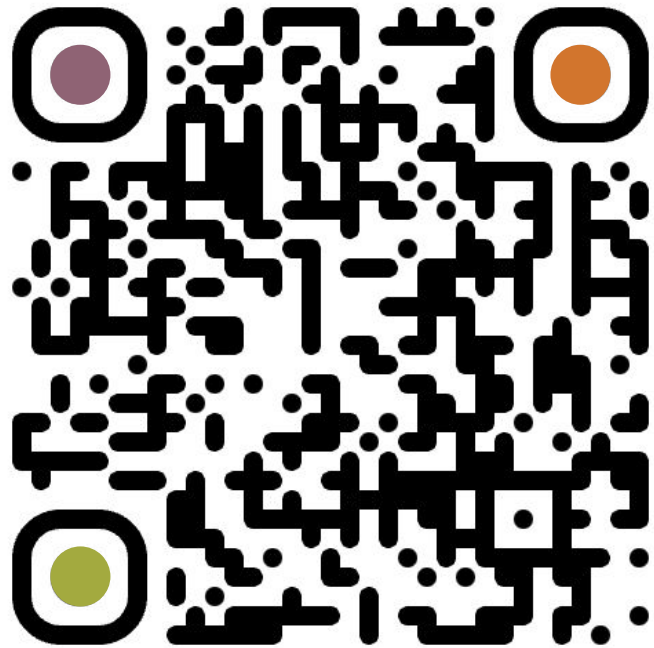
Use balance to enhance clarity

O'REILLY®

Communication Patterns

A Guide for Developers and Architects

CommunicationPatternsBook.com

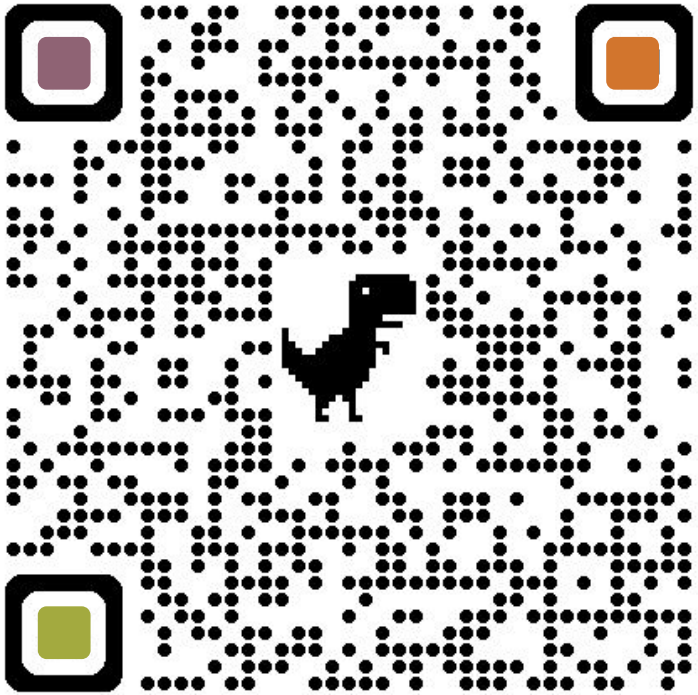


Jacqui Read

I

❤️

Feedback



O'REILLY

Communication Patterns

A Guide for Developers and Architects

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