

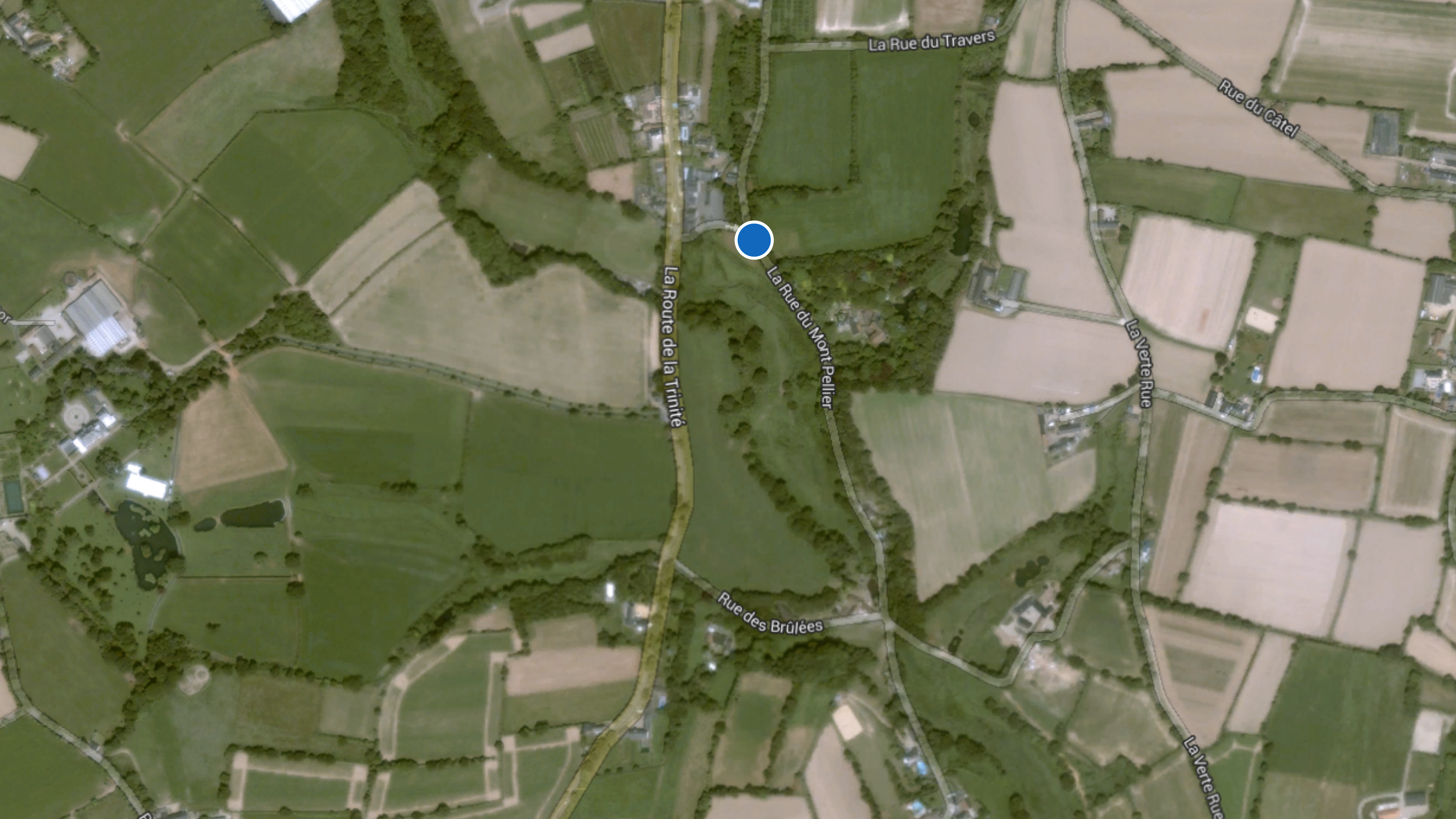
The code doesn't tell  
the whole story

Simon Brown

 @simonbrown

La Rue du Mont...





La Rue du Travers

Rue du Câtel



La Route de la Trinité

La Rue du Mont Pellier

La Verte Rue

Rue des Brûlées

La Verte Rue



Les Mielles  
Nature Reserve

St. John

St. Mary

St. Ouen

Trinity

St. Peter

Jersey

St. Martin

Mont Orgueil Castle

St. Brelade

St. Helier

Grouville

St. Helier, Je - Saint Peter Port, Gg

Granville, FH - St. Helier, JE

Jersey (St. Helier) - Poole

Jersey (St. Helier) - Poole

Jersey (St. Helier) - Poole

St. Malo, FR - Portsmouth, UK

St. Peter Port, Gg - Saint Helier, Je

St. Malo, FR - Portsmouth, UK

St. Peter Port, Gg - Saint Helier, Je

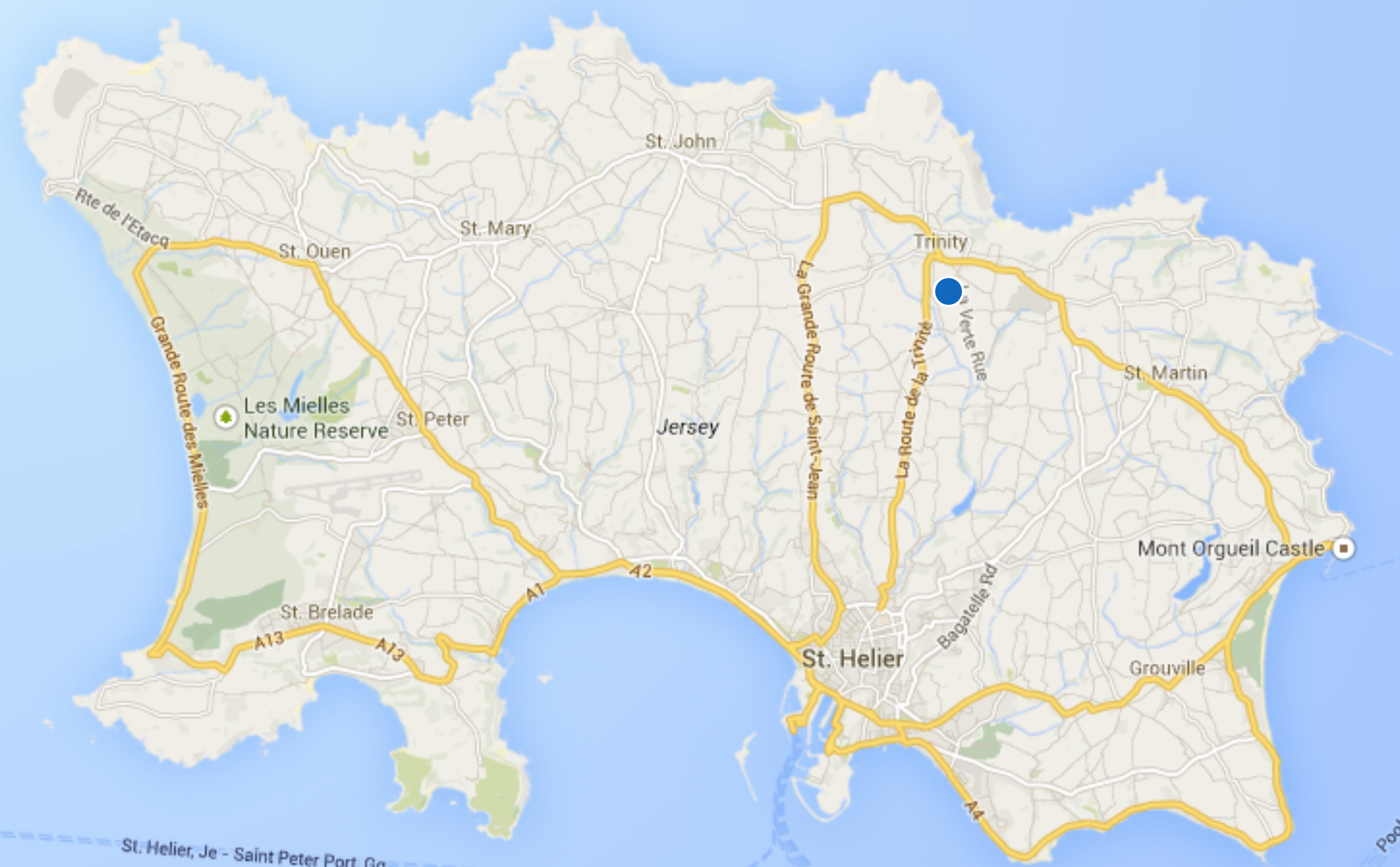
St. Helier, Je - Saint Peter Port, Gg

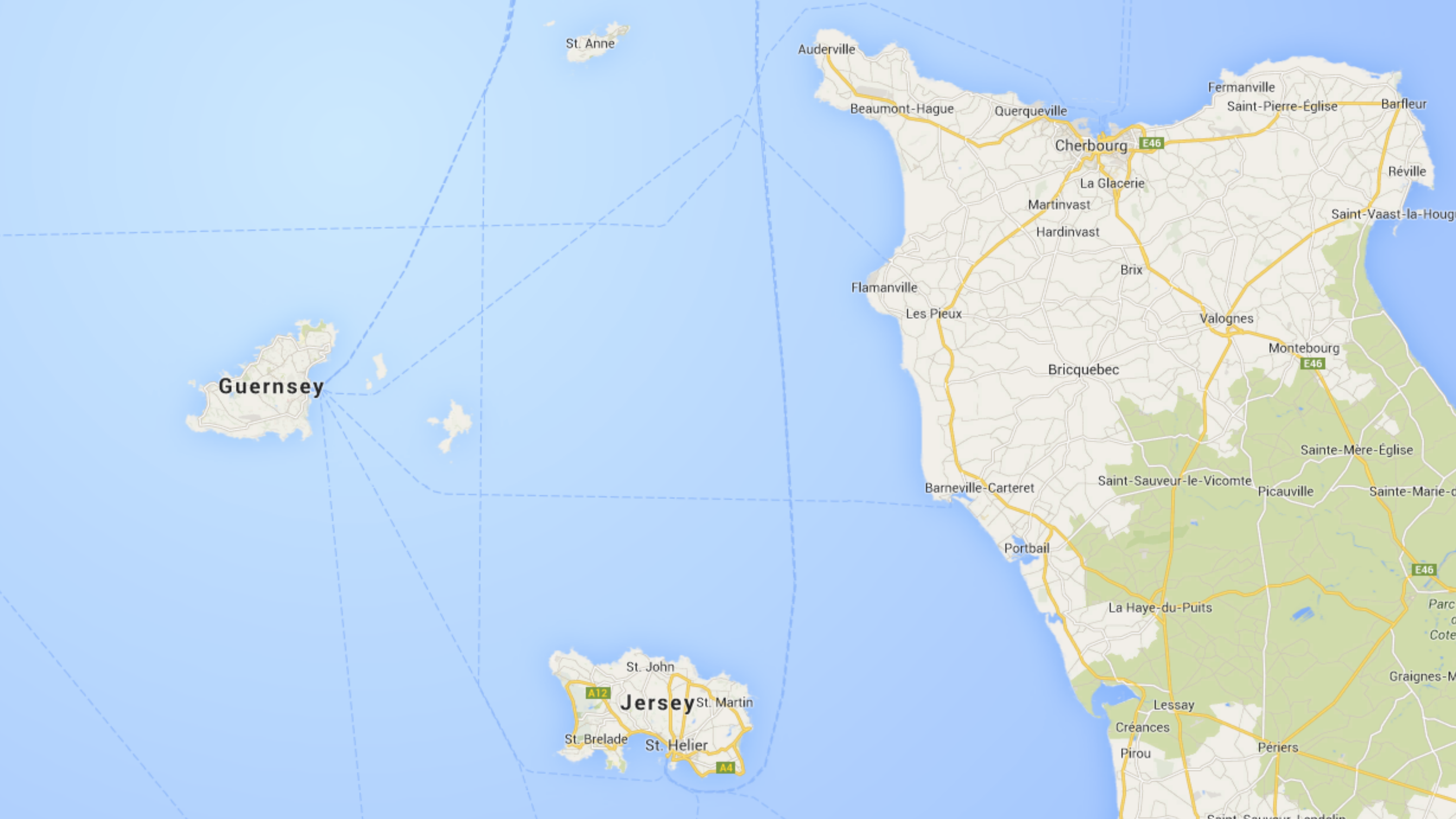
Granville, FR - St. Helier, JE

Poole - Jersey (St. Helier)

Jersey (St. Helier) - Poole

Poole - Jersey (St. Helier)





**Guernsey**

**Jersey**

E46

E46

E46

A12

A4



Ireland

England

Wales

Guernsey

Jersey

English Channel

Celtic Sea

Limerick

Cork

Kinsale

Waterford

Dungarvan

Mallow

Fermoy

Ennis

Portlaoise

Carlow

Gorey

Wicklow

Enniscorthy

Newcastle West

Clonmel

Waterford

Dungarvan

Fermoy

Mallow

Cork

Midleton

Bandon

Kinsale

Enniscorthy

Wexford

Gorey

Wicklow

Ennis

Portlaoise

Carlow

Gorey

Wicklow

Enniscorthy

Wexford

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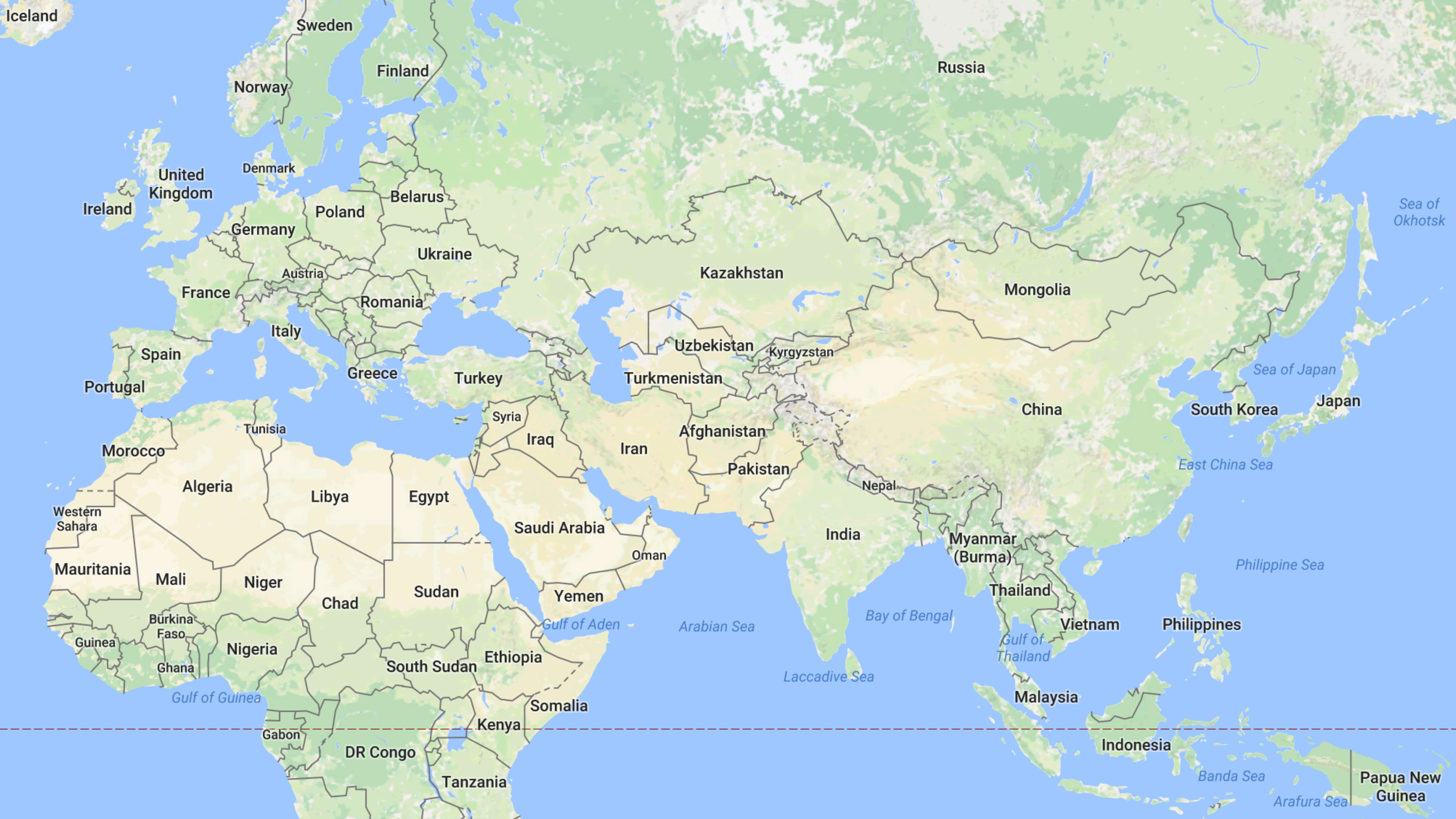
Wicklow

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Portlao







Iceland

Sweden

Finland

Russia

Norway

United Kingdom

Denmark

Ireland

Poland

Belarus

Germany

Ukraine

Austria

Kazakhstan

France

Romania

Mongolia

Spain

Italy

Uzbekistan

Kyrgyzstan

Portugal

Greece

Turkey

Turkmenistan

Sea of Japan

South Korea

Japan

Tunisia

Syria

Iraq

Iran

Afghanistan

China

East China Sea

Morocco

Algeria

Libya

Egypt

Pakistan

Nepal

Western Sahara

Saudi Arabia

Oman

India

Myanmar (Burma)

Philippine Sea

Mauritania

Mali

Niger

Sudan

Yemen

Laccadive Sea

Thailand

Vietnam

Philippines

Guinea

Burkina Faso

Nigeria

Chad

South Sudan

Ethiopia

Somalia

Bay of Bengal

Gulf of Thailand

Gulf of Guinea

Gabon

DR Congo

Kenya

Tanzania

Malaysia

Indonesia

Banda Sea

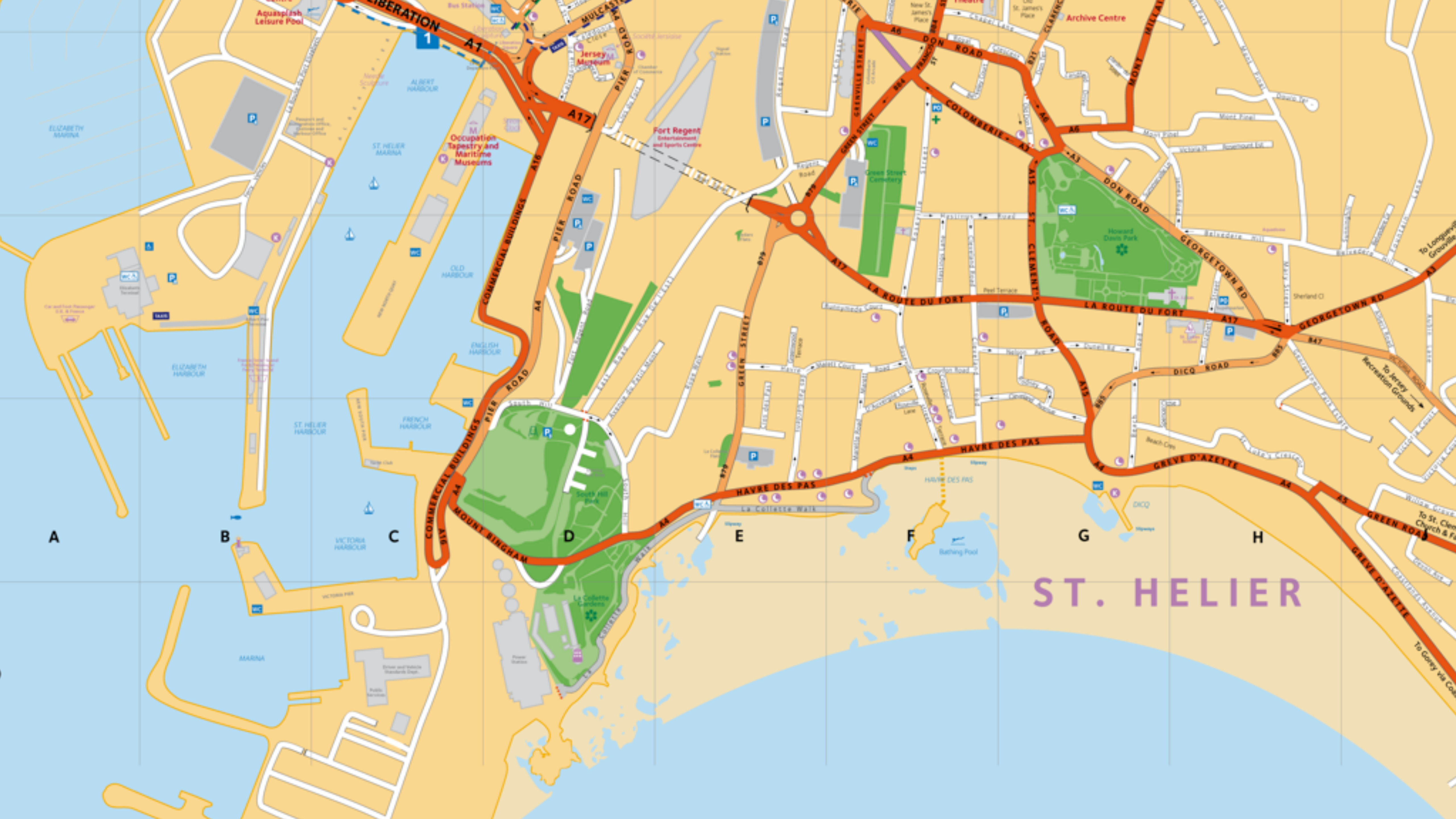
Arafura Sea

Papua New Guinea



Enough detail to  
start **exploring**





Aquasplash Leisure Pool

ELIZABETH MARINA

ALBERT HARBOUR

ST. HELIER MARINA

Occupation Tapestry and Maritime Museums

OLD HARBOUR

ENGLISH HARBOUR

ST. HELIER HARBOUR

FRENCH HARBOUR

VICTORIA HARBOUR

MARINA

Fort Regent Entertainment and Sports Centre

Green Street Cemetery

Howard Davis Park

# ST. HELIER

A

B

C

D

E

F

G

H

LIBERATION 1

A1

A17

A4

A4

A6

A6

A3

A6

A1

A17

A17

A17

A17

A4

A4

A4

A4

A3

A3

A3

COMMERCIAL BUILDINGS PIER ROAD

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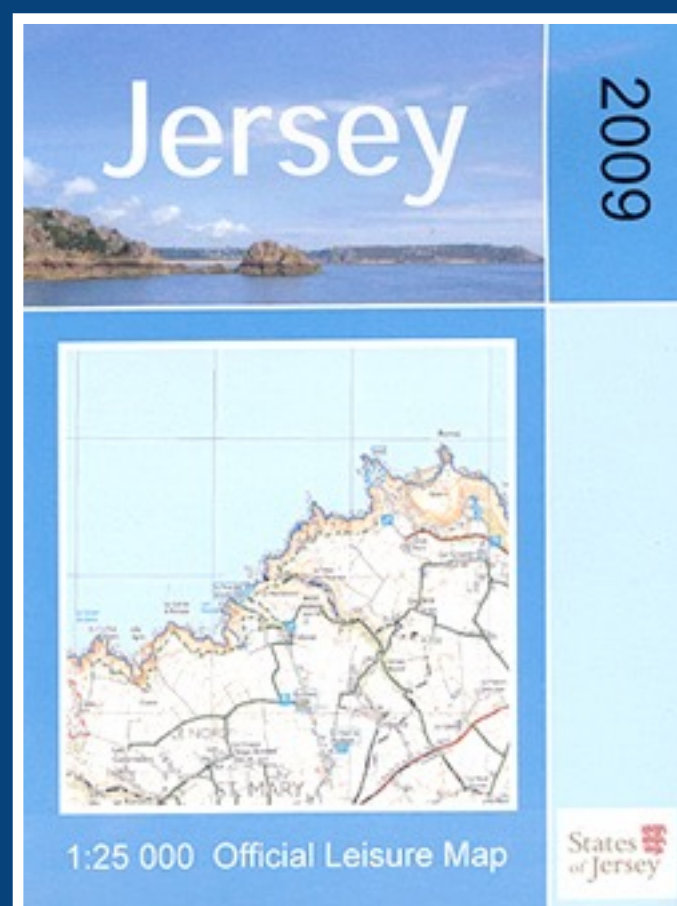
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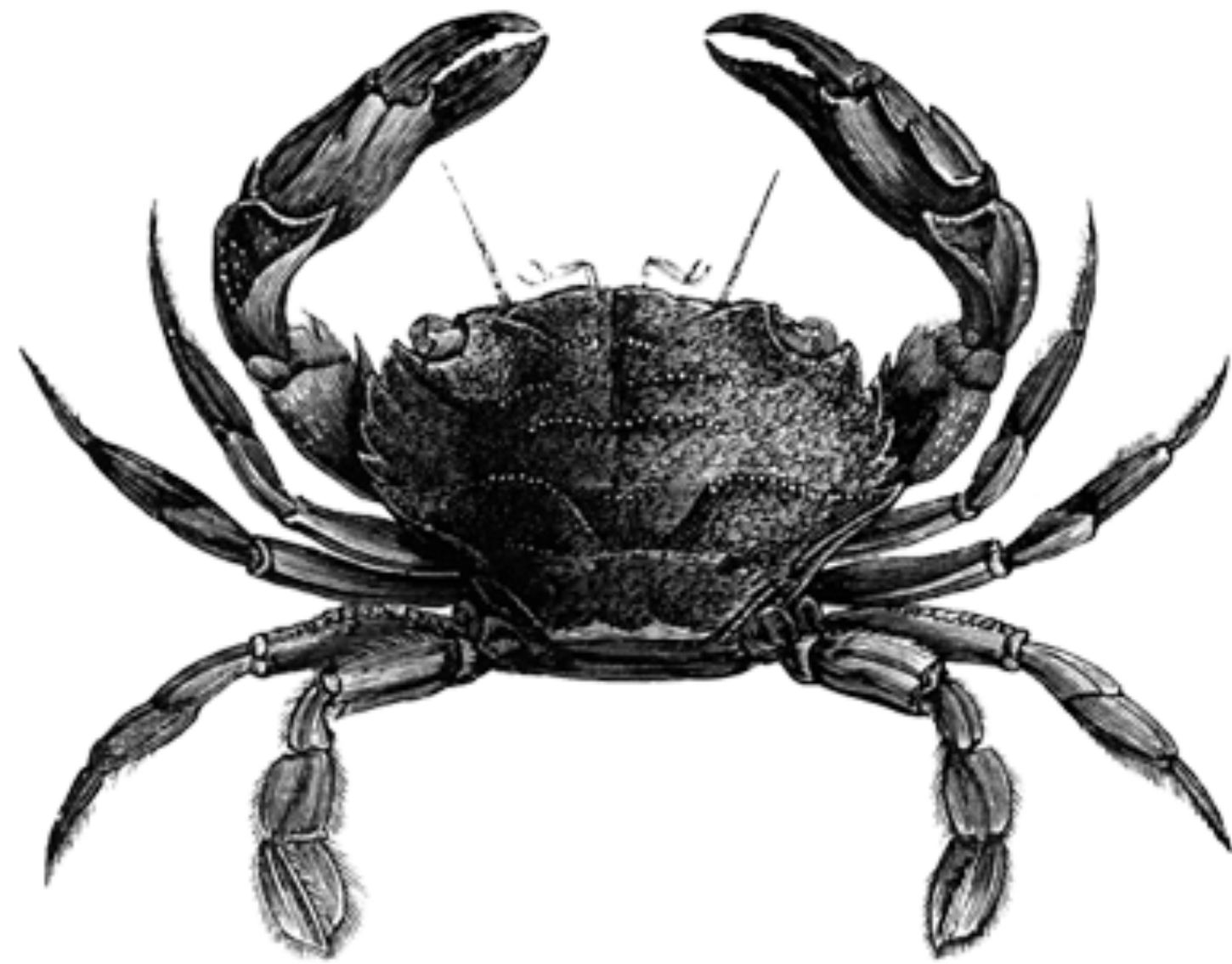
Very detailed and precise  
(terrain, buildings, etc)

Different maps for  
different audiences and  
different purposes

We've spent the past 20 years figuring  
out how to visualise our process

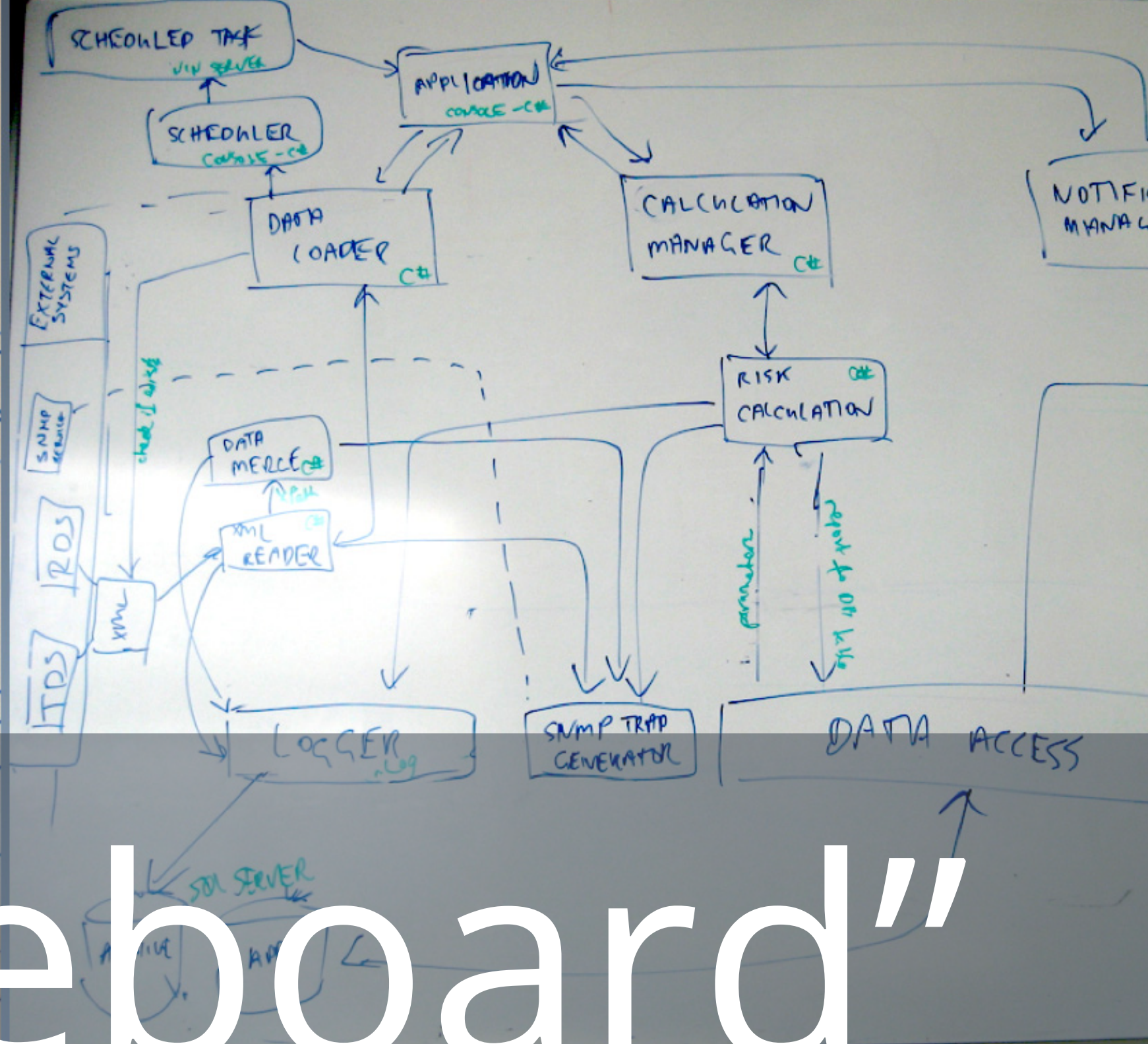
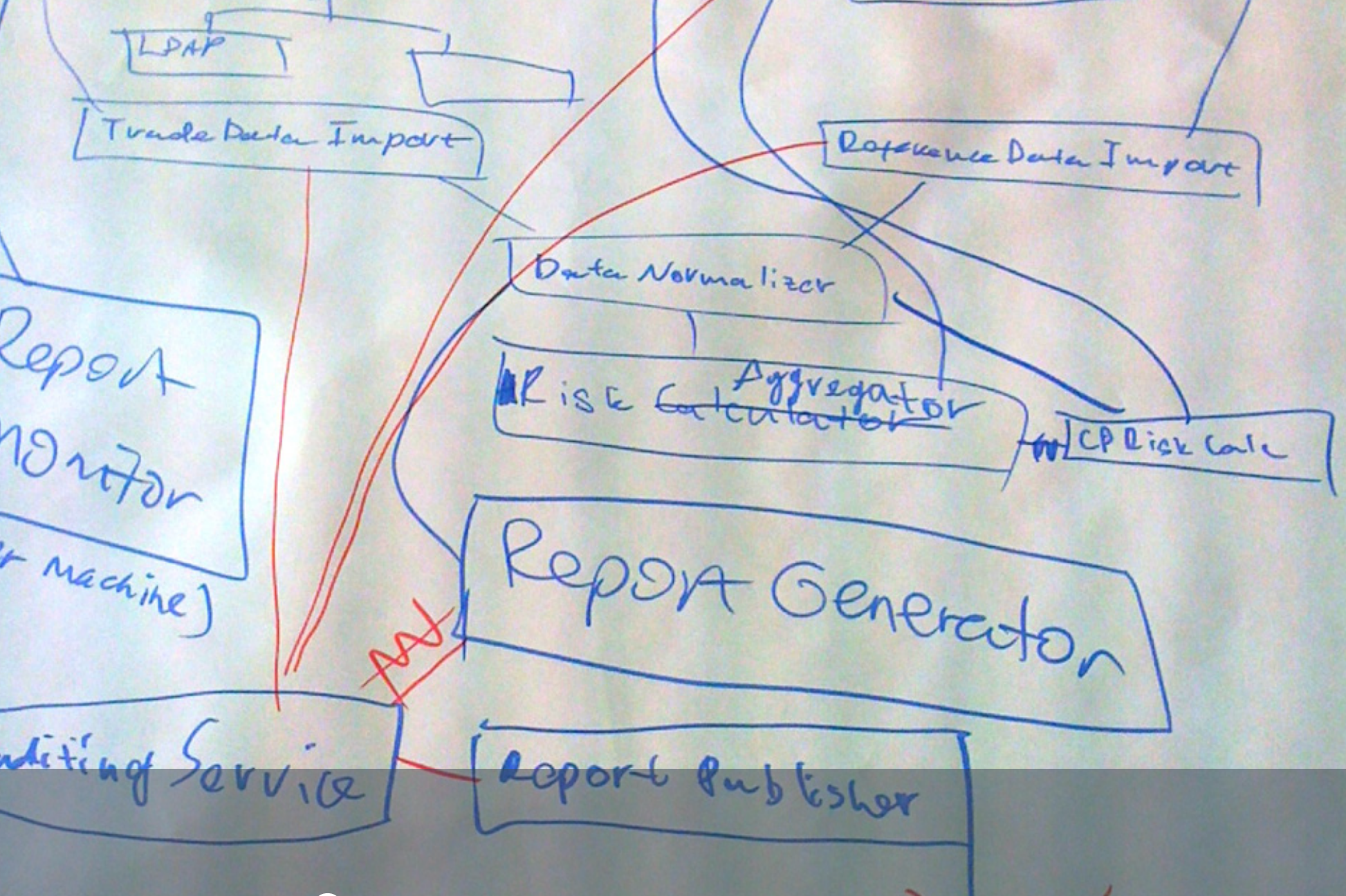
But we've forgotten how to visualise  
the actual software we're building 🤔



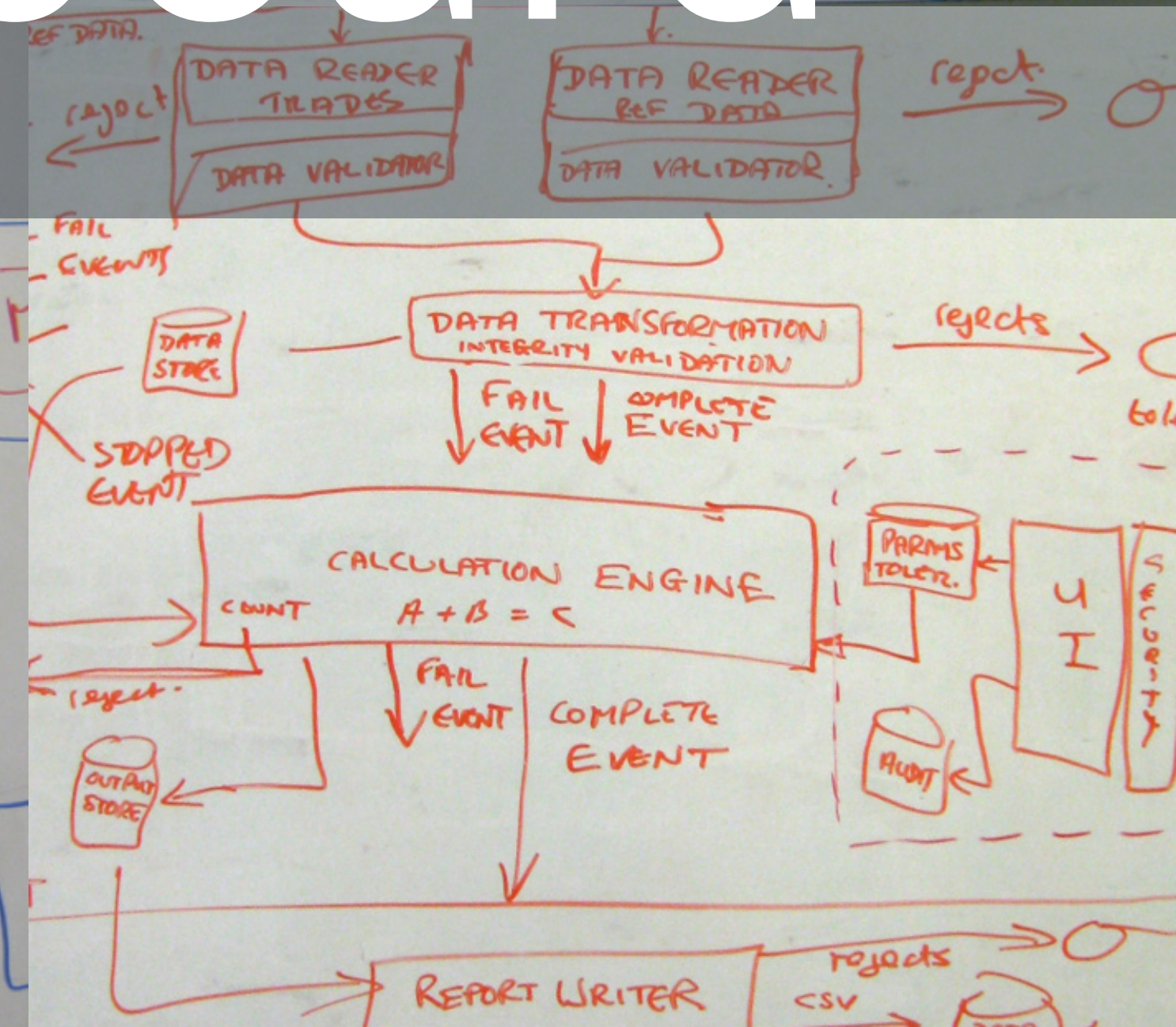
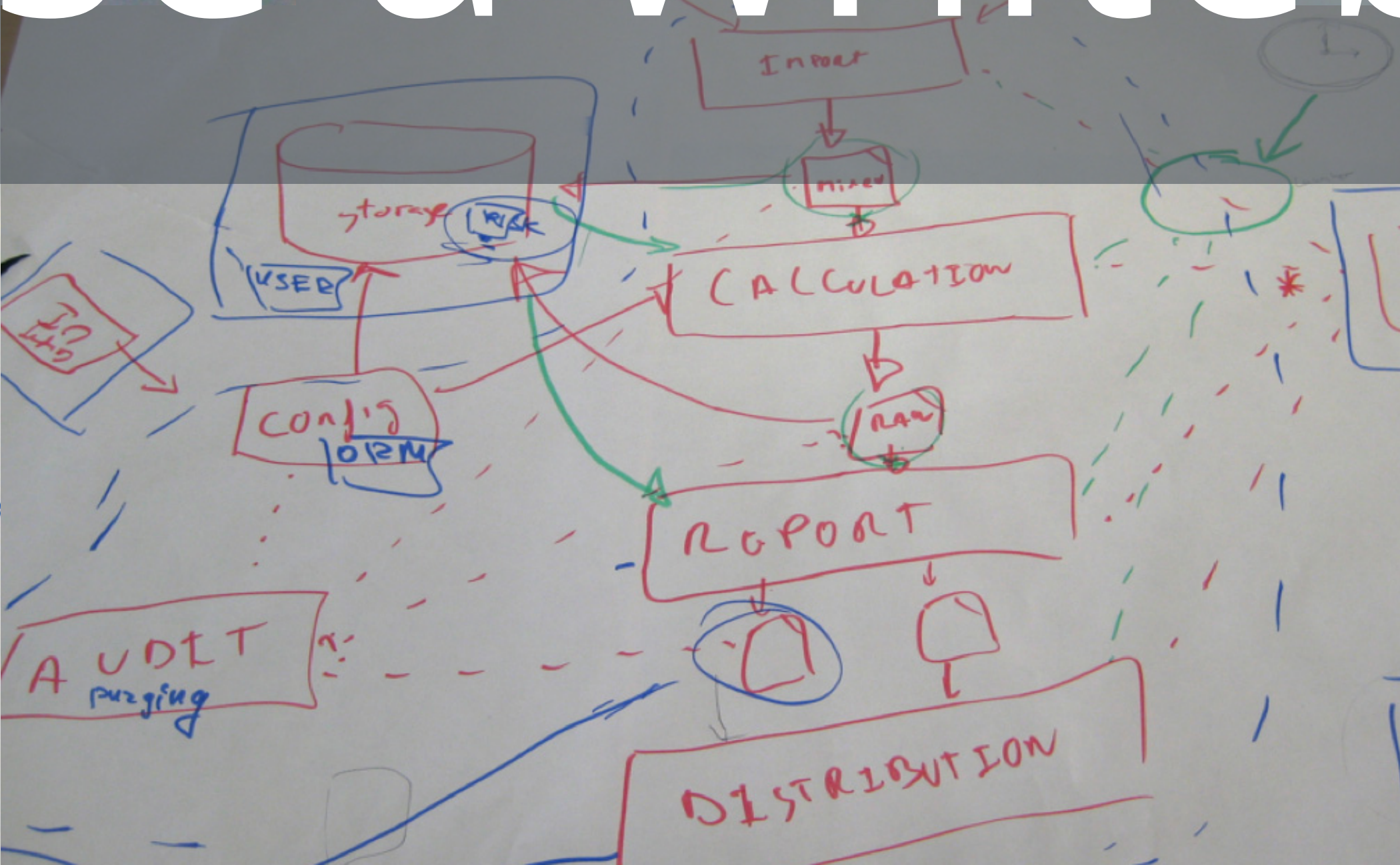
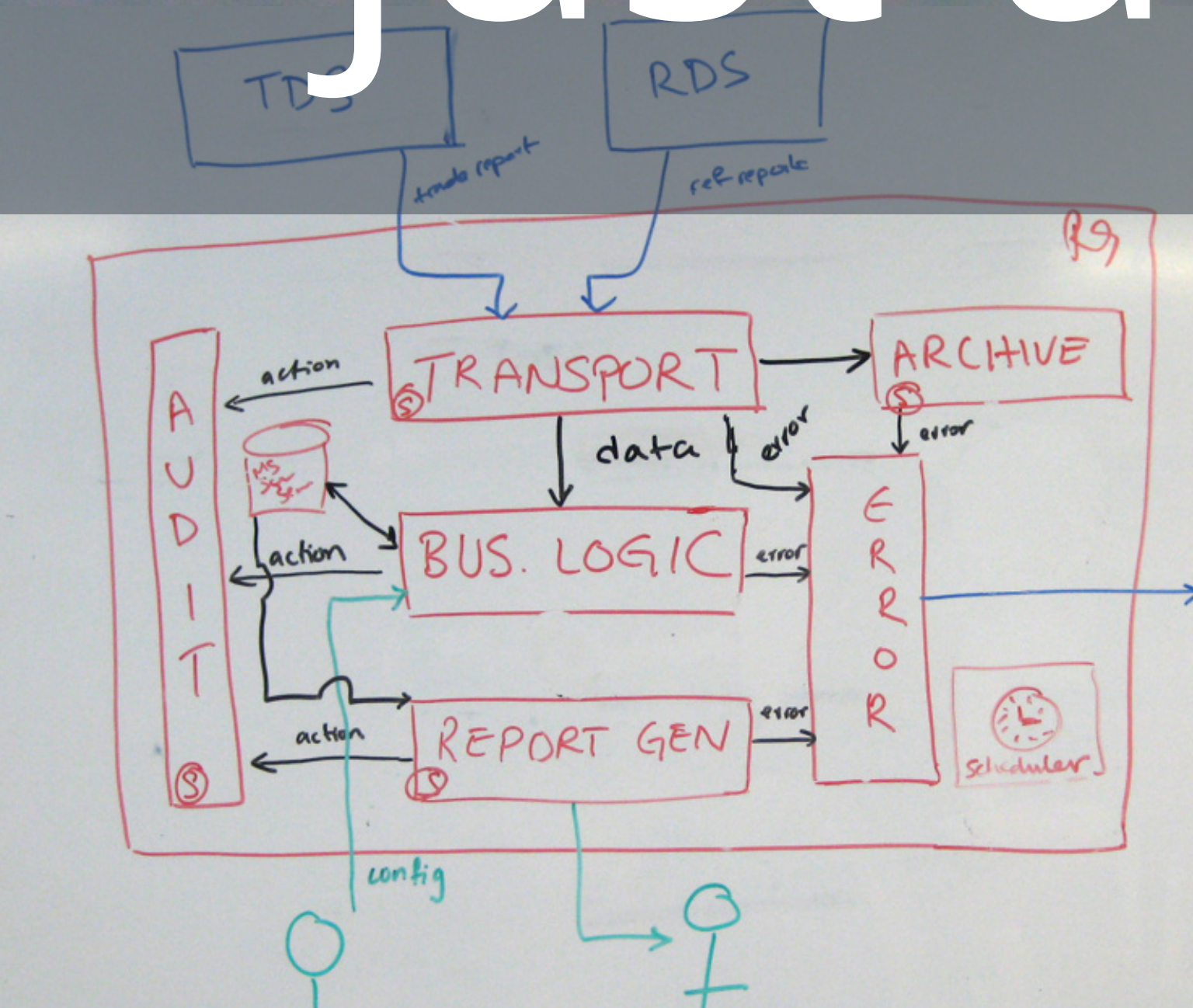


# 97 Ways to Sidestep UML

- #2 "Not everybody else on the team knows it."
- #3 "I'm the only person on the team who knows it."
  - #36 "You'll be seen as old."
  - #37 "You'll be seen as old-fashioned."
  - #66 "The tooling sucks."
  - #80 "It's too detailed."
- #81 "It's a very elaborate waste of time."
  - #92 "It's not expected in agile."
  - #97 "The value is in the conversation."



“just use a whiteboard”



If you're going to use "boxes & lines",  
at least do so in a **structured way**,  
using a **self-describing notation**



There are many **different audiences** for diagrams and documentation, all with **different interests**

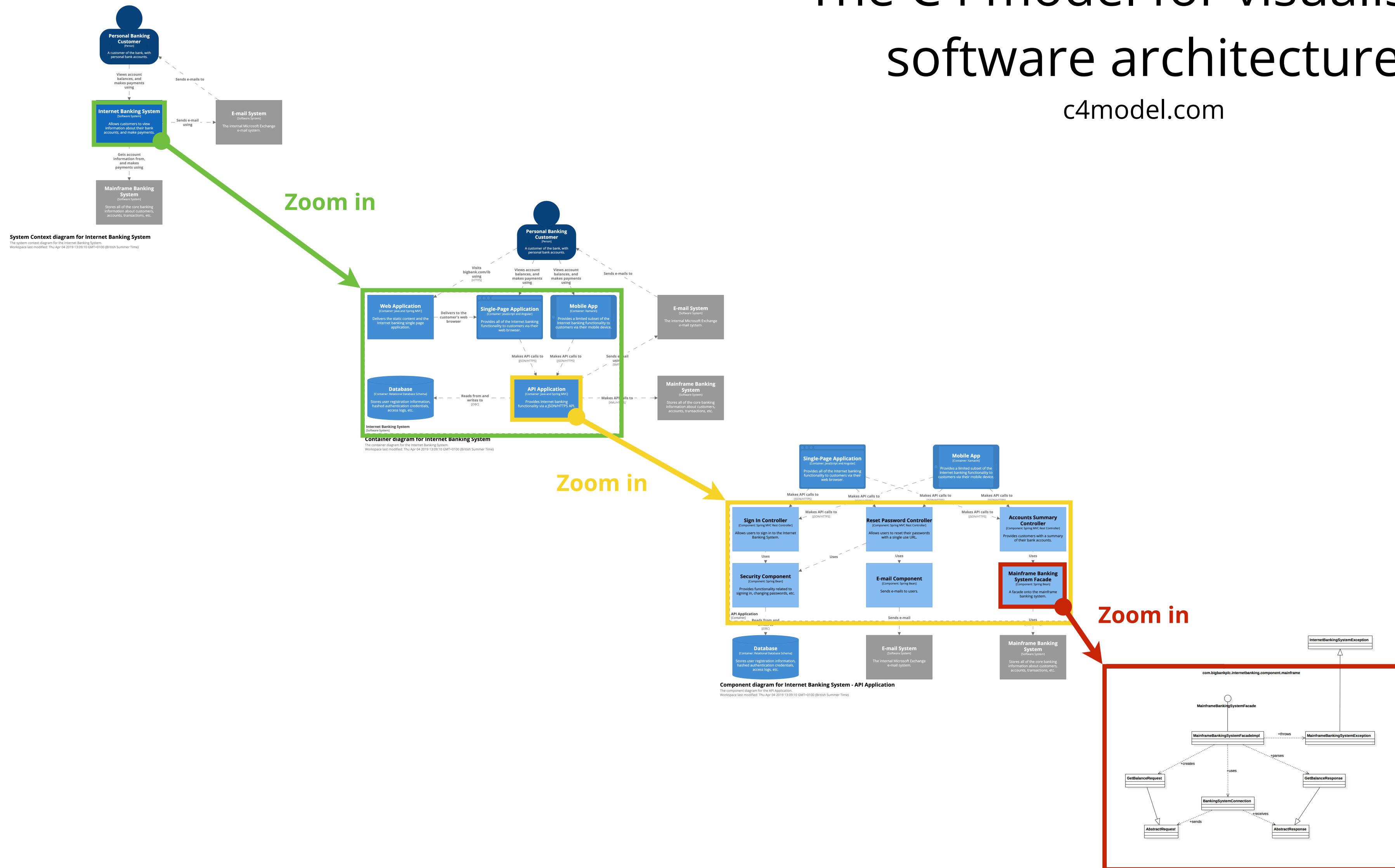
(software architects, software developers, operations and support staff, testers, Product Owners, project managers, Scrum Masters, users, management, business sponsors, potential customers, potential investors, ...)

C4

[c4model.com](http://c4model.com)

# The C4 model for visualising software architecture

c4model.com

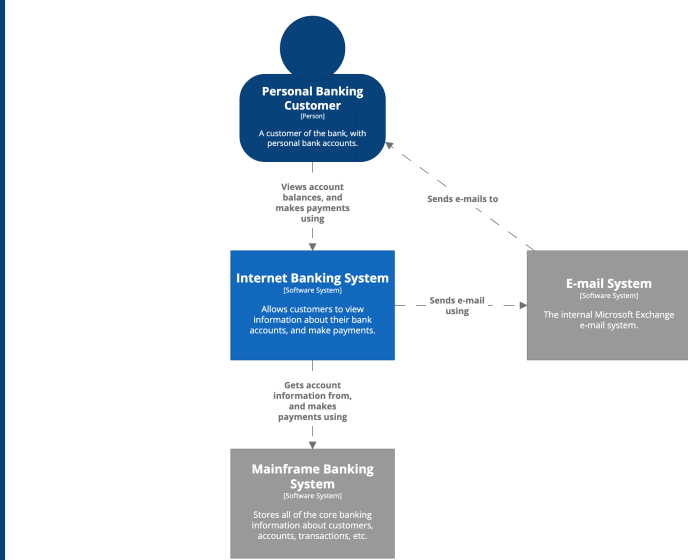
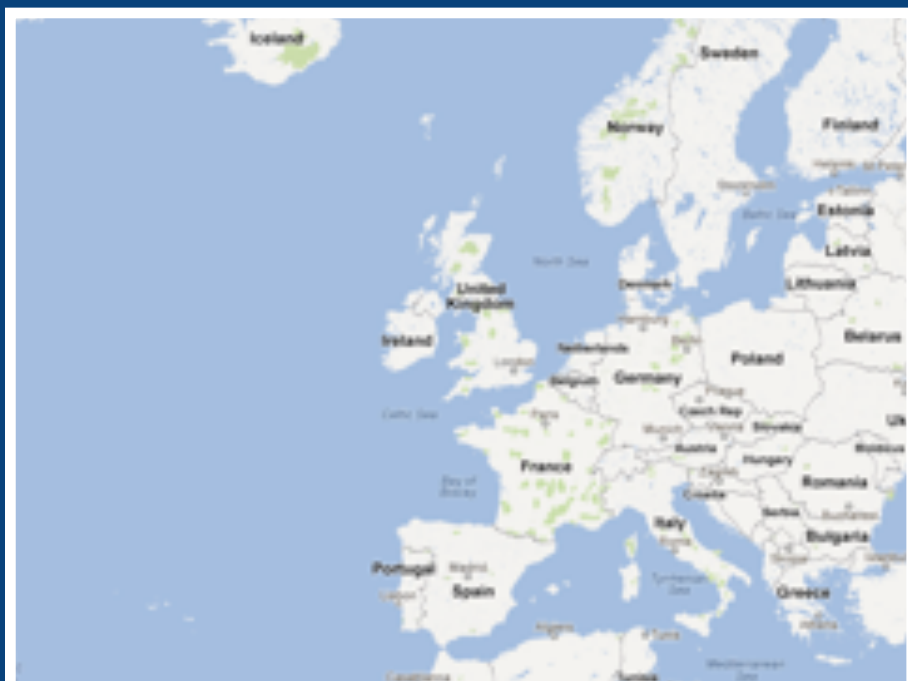


Level 1  
Context

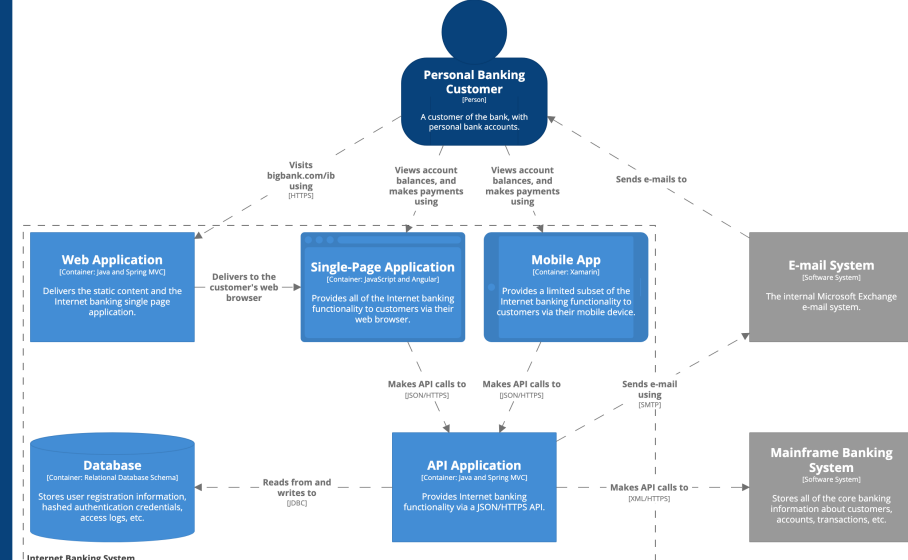
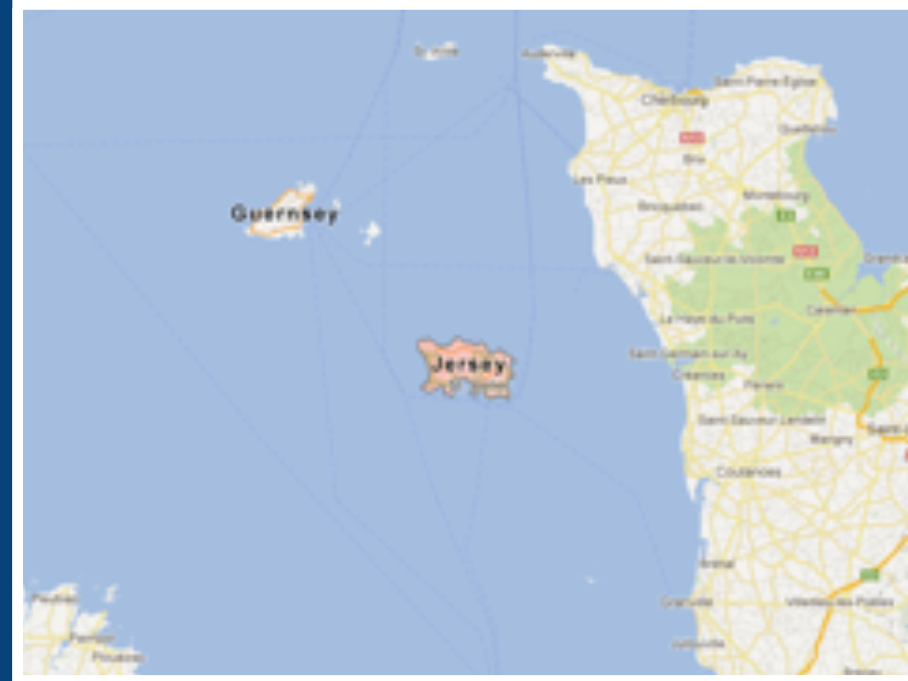
Level 2  
Containers

Level 3  
Components

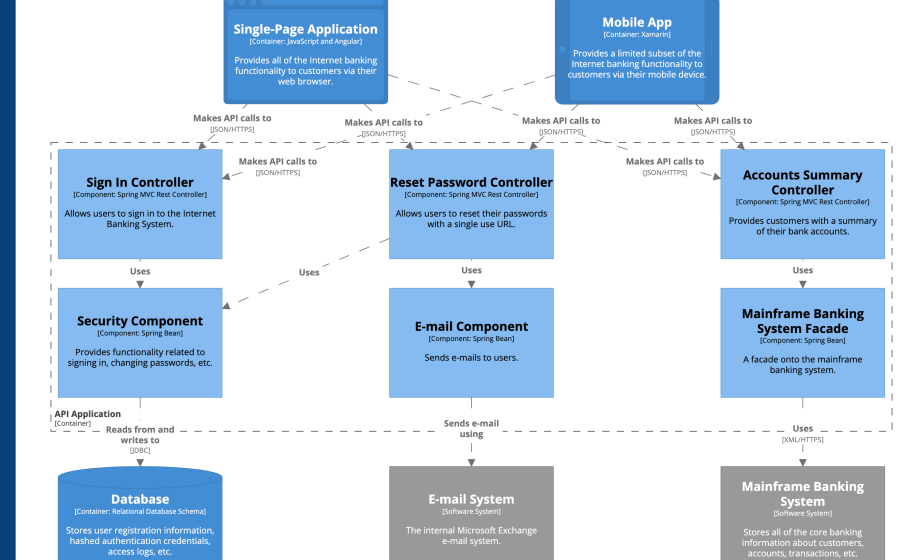
Level 4  
Code



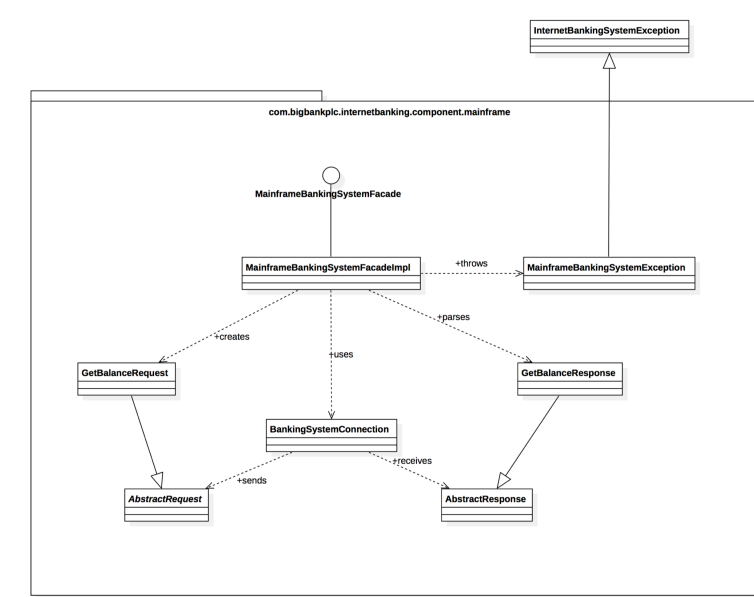
System Context diagram for Internet Banking System  
The system context diagram for the Internet Banking System.  
Workspace last modified: Thu Apr 04 2019 13:08:13 GMT+0100 (British Summer Time)



Container diagram for Internet Banking System  
The container diagram for the Internet Banking System.  
Workspace last modified: Thu Apr 04 2019 13:08:13 GMT+0100 (British Summer Time)



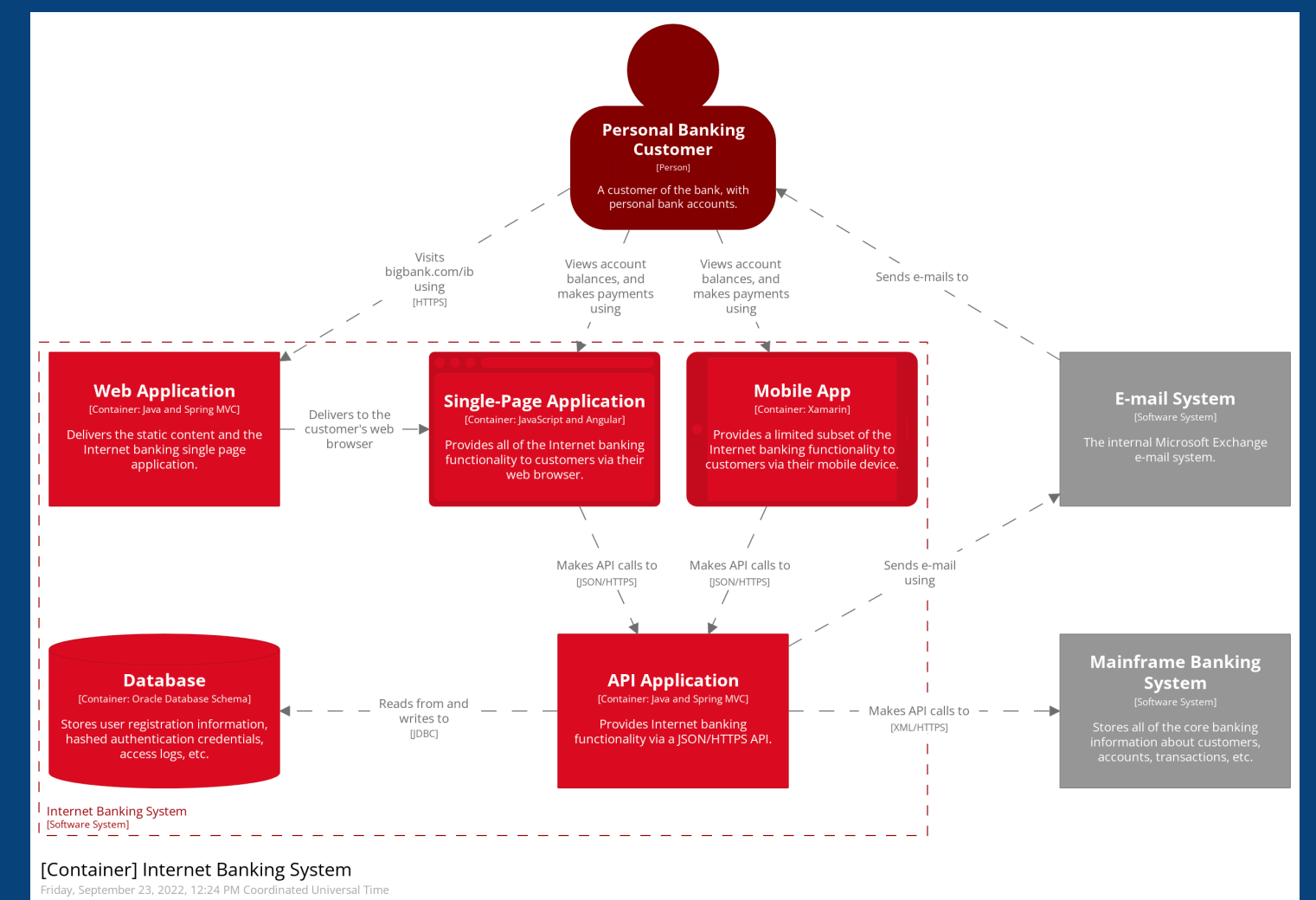
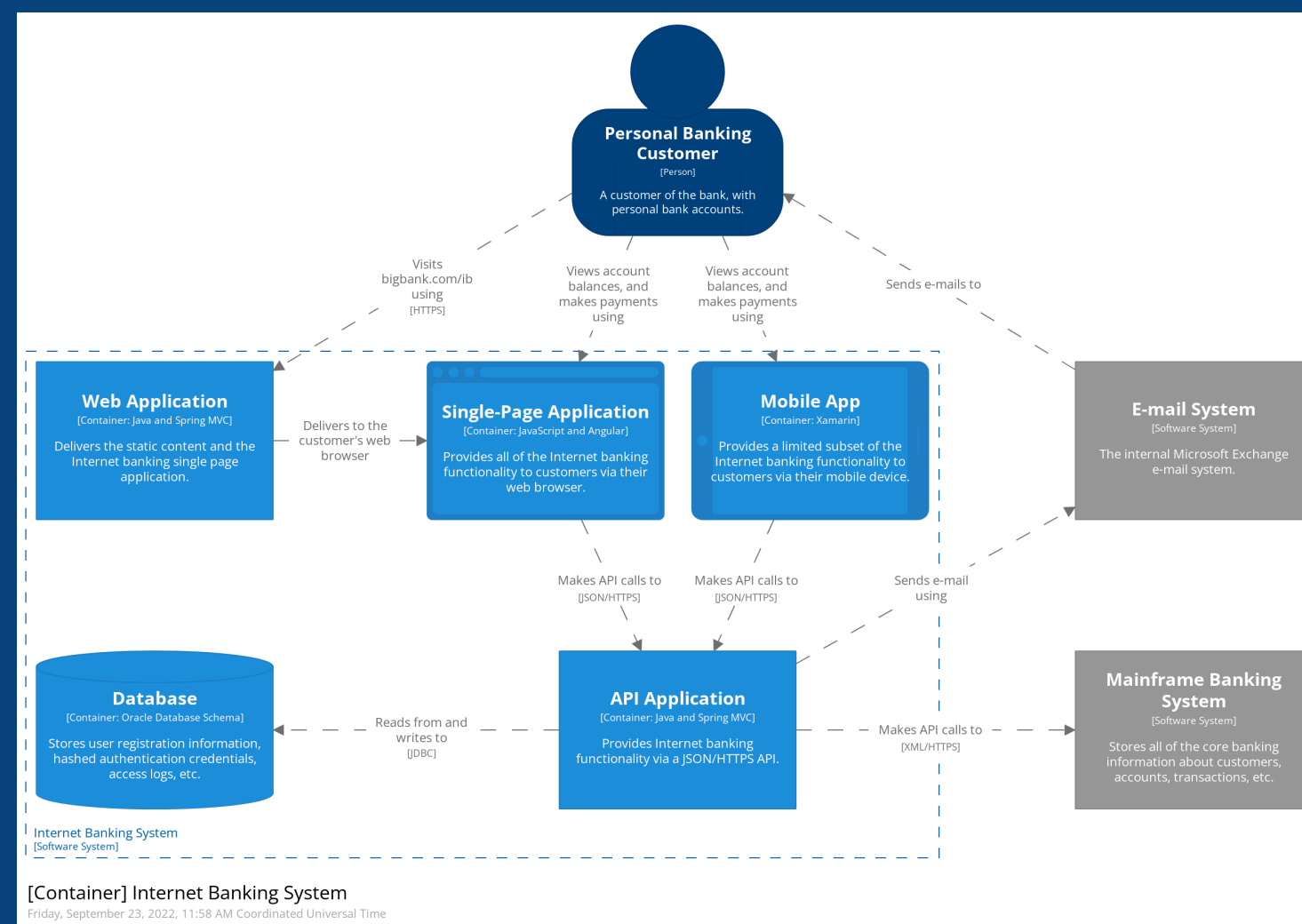
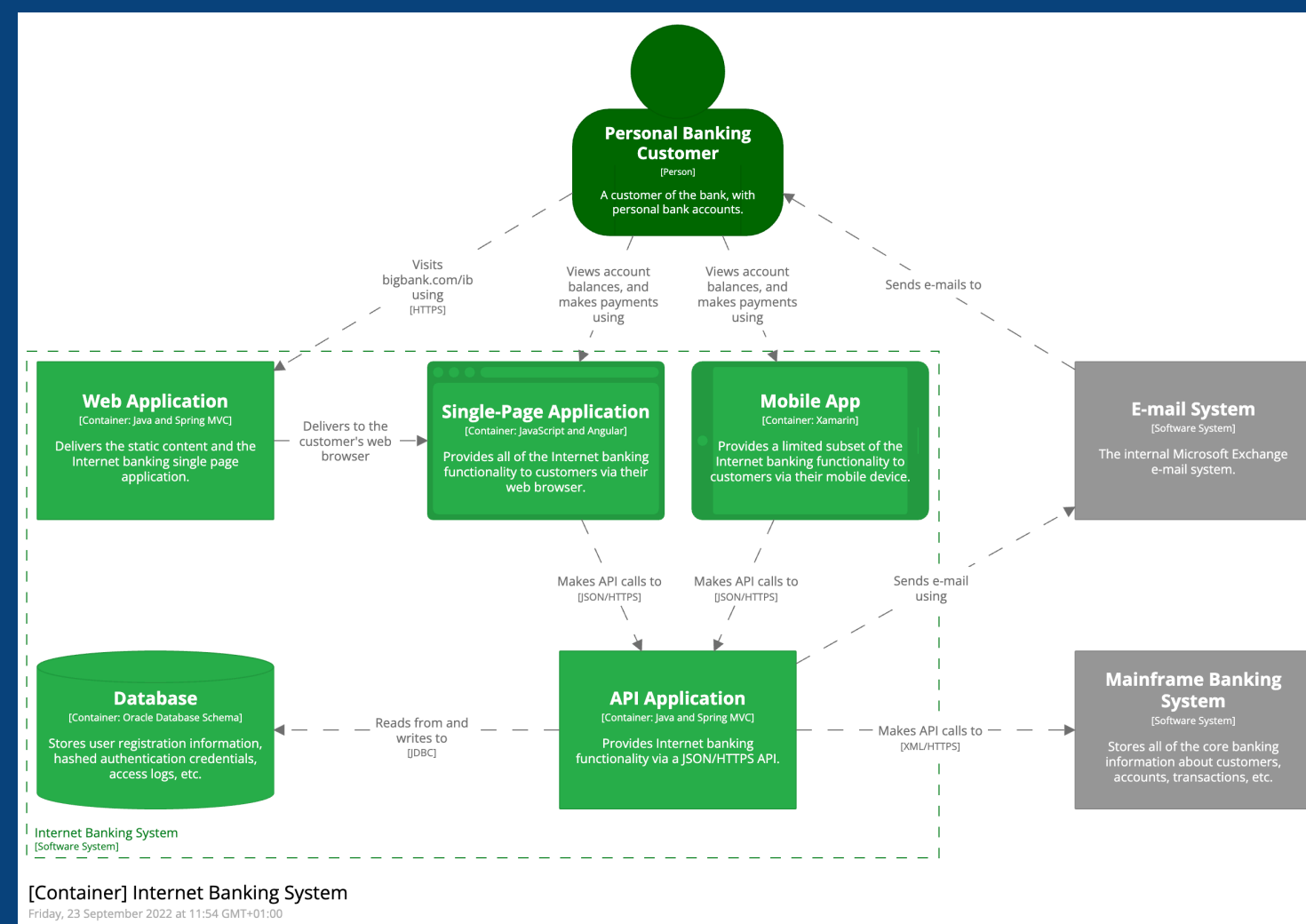
Component diagram for Internet Banking System - API Application  
The component diagram for the API Application.  
Workspace last modified: Thu Apr 04 2019 13:08:13 GMT+0100 (British Summer Time)



# Diagrams are maps

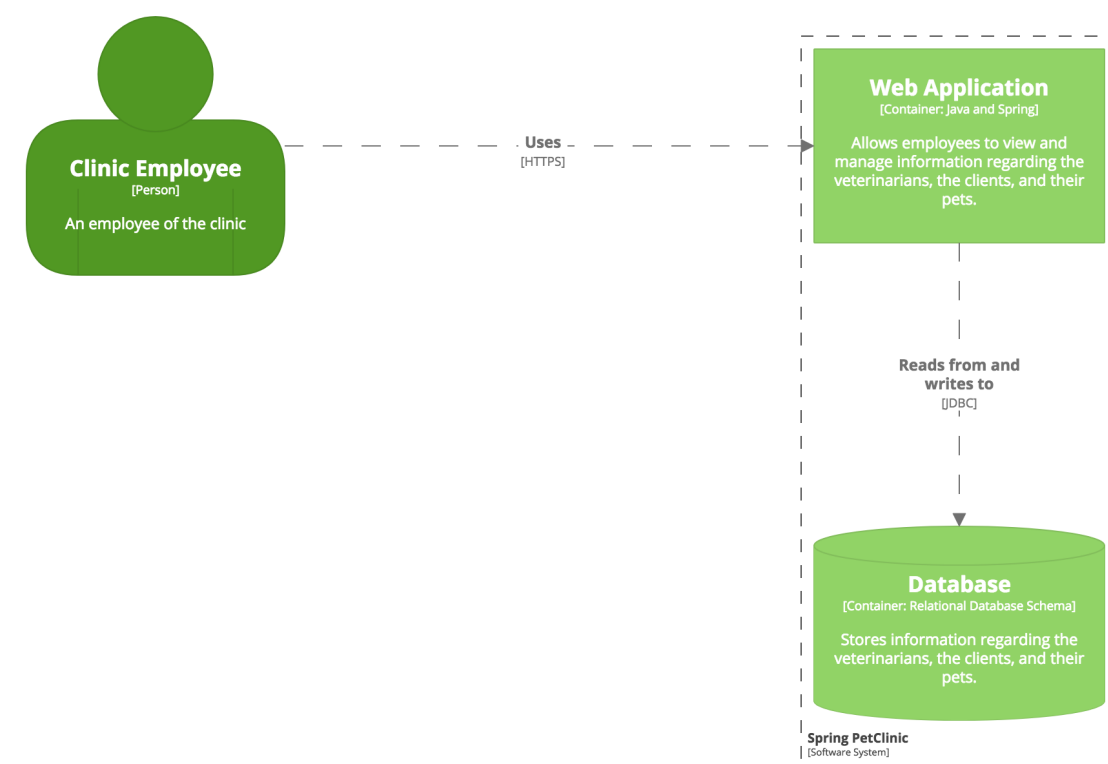
that help software developers navigate a large and/or complicated codebase

# The C4 model is notation independent

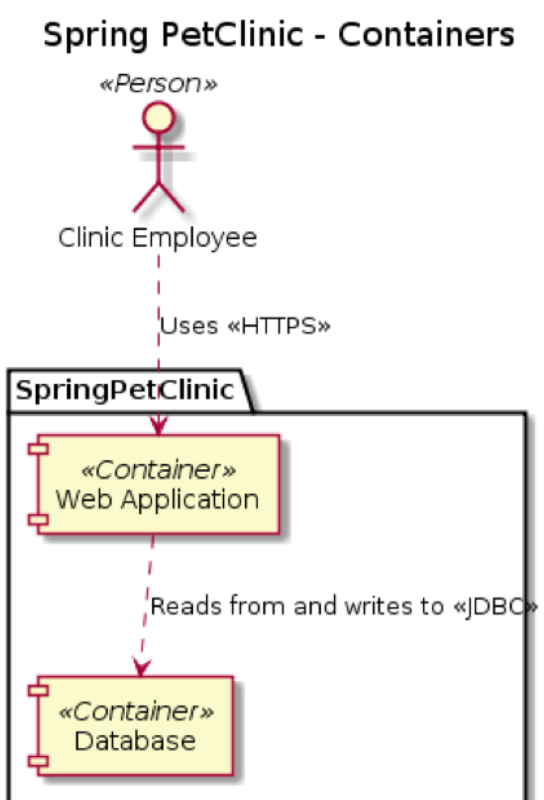
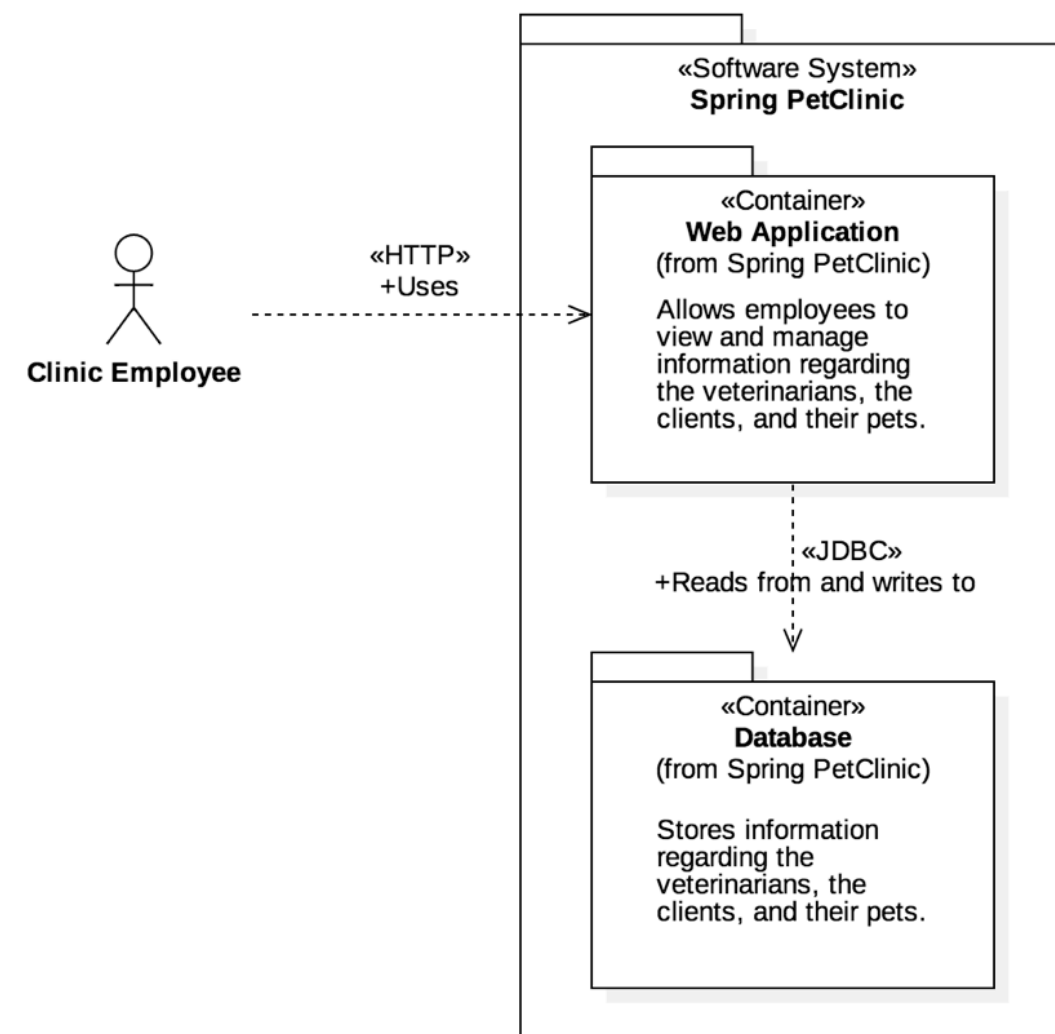




# The C4 model is notation independent



Container diagram for Spring PetClinic  
The Containers diagram for the Spring PetClinic system.  
Last modified: Thursday 17 August 2017 10:15 UTC | Version: 95de1d9f8b63560915331664b27a4a75ce1f1f6



The Container diagram for the Spring PetClinic system.



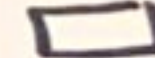

# System Context diagram

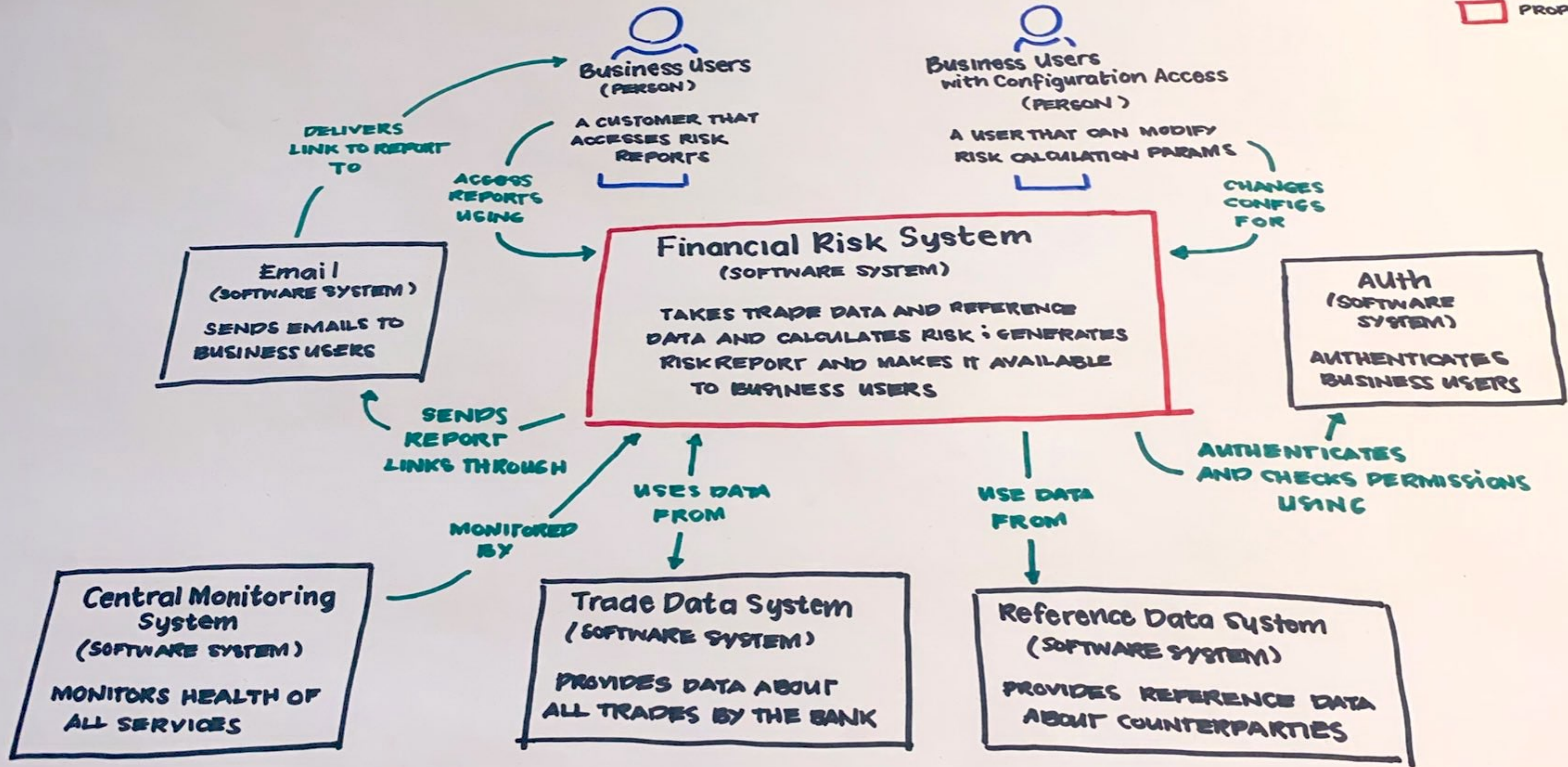
What is the scope of the software system we're building?

Who is using it? What are they doing?

What system integrations does it need to support?

# Financial Risk System: Context Diagram

-  USER
-  INTERACTION
-  PRE-EXISTING SYSTEM
-  PROPOSED SYSTEM



# Container diagram

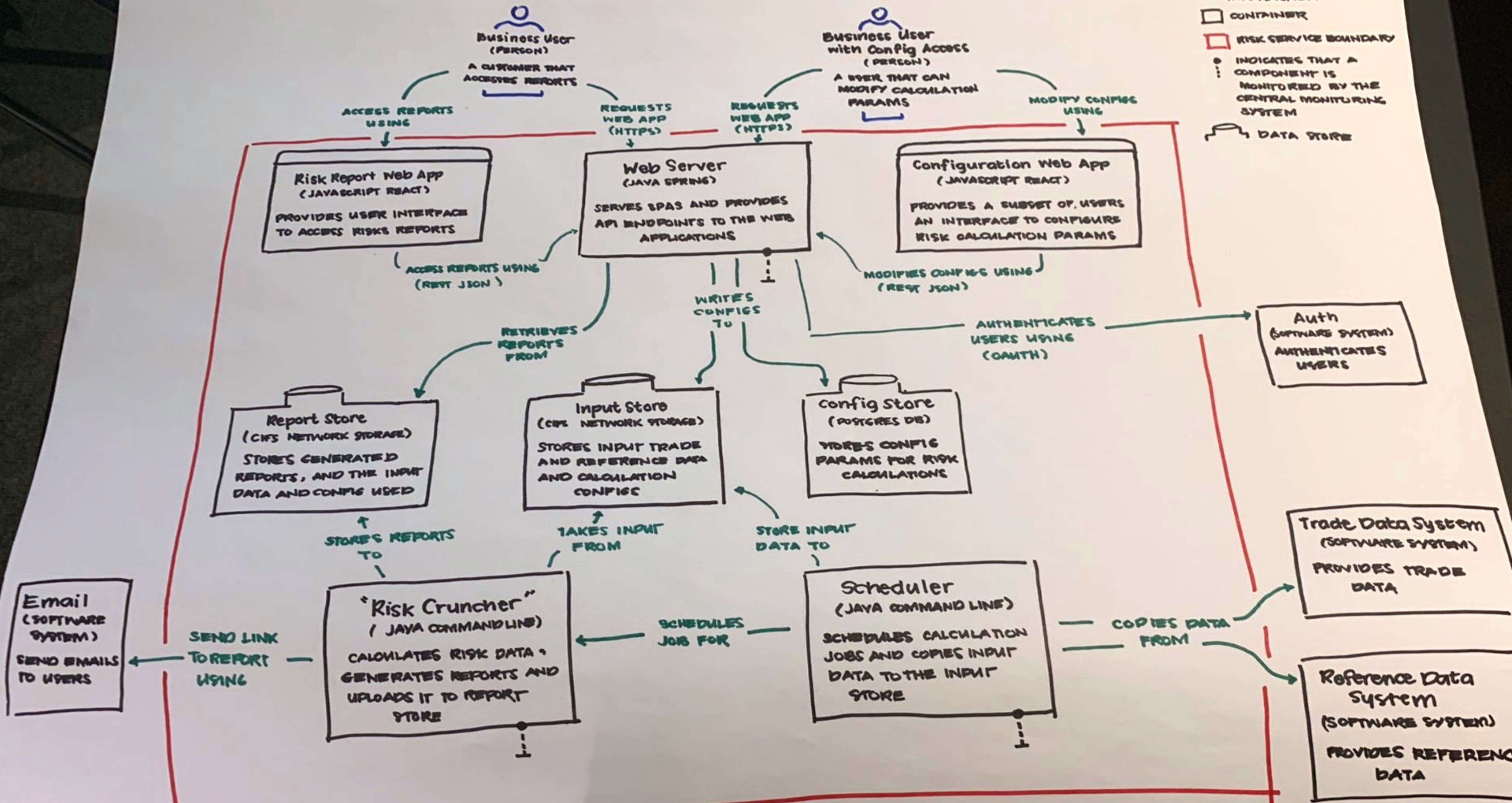
What are the major technology building blocks?

What are their responsibilities?

How do they communicate?

# Financial Risk System: Container Diagram

- USER
- INTERACTION
- CONTAINER
- RISK SERVICE BOUNDARY
- INDICATES THAT A COMPONENT IS MONITORED BY THE CENTRAL MONITORING SYSTEM
- DATA STORE





# Notation, notation, notation

## A software architecture diagram review checklist

[Diagram review tool](#) | [Printable PDF version](#)

### General

Does the diagram have a title?

Yes

No



Do you understand what the diagram type is?

Yes

No



Do you understand what the diagram scope is?

Yes

No



Does the diagram have a key/legend?

Yes

No



Diagrams are maps  
to navigate the code

# Points of interest

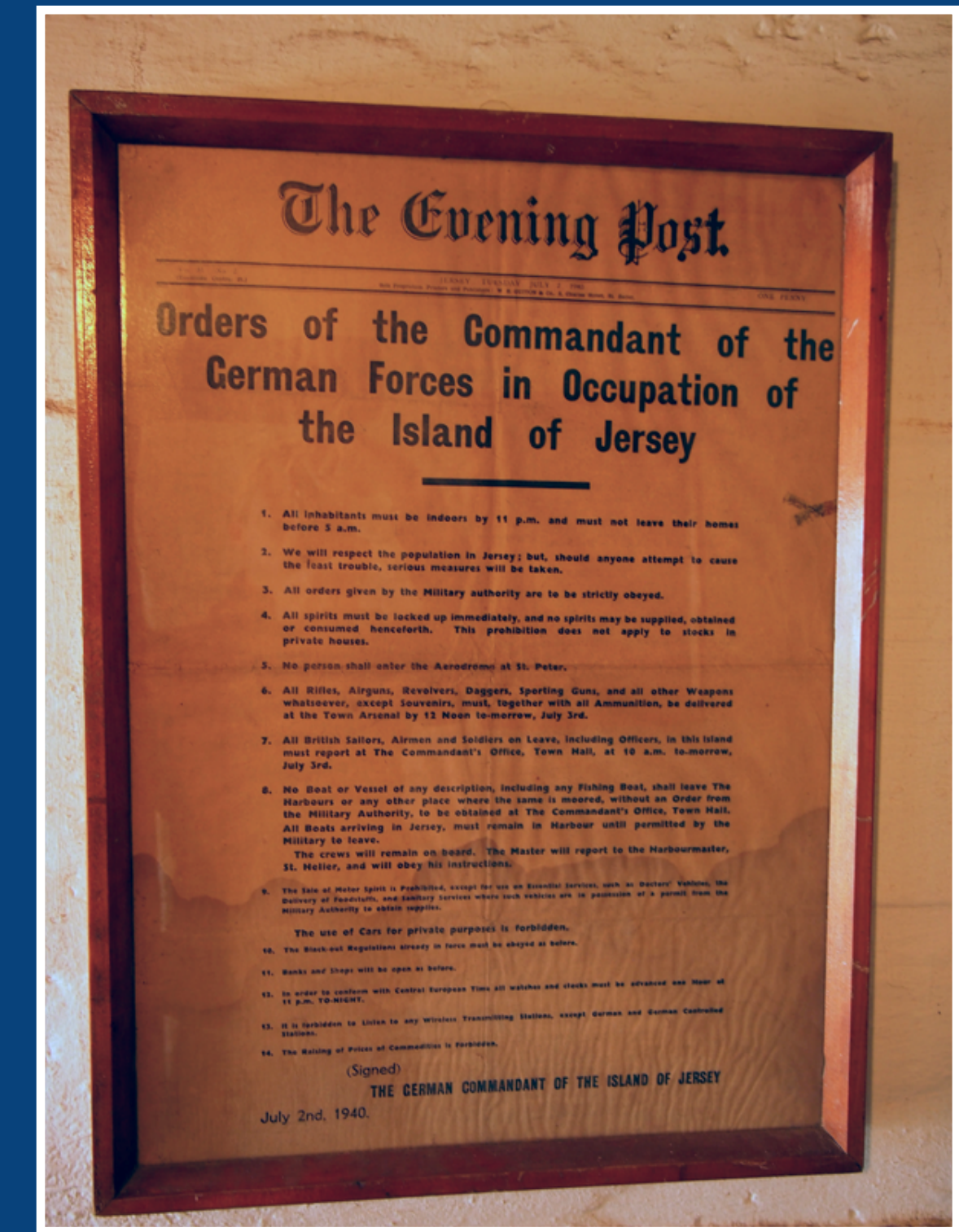


# Elizabeth Castle



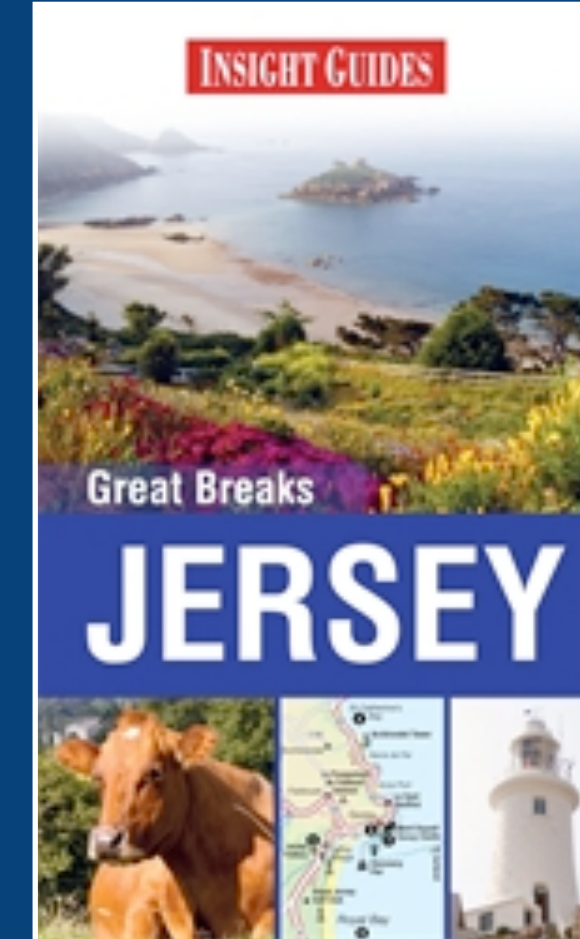
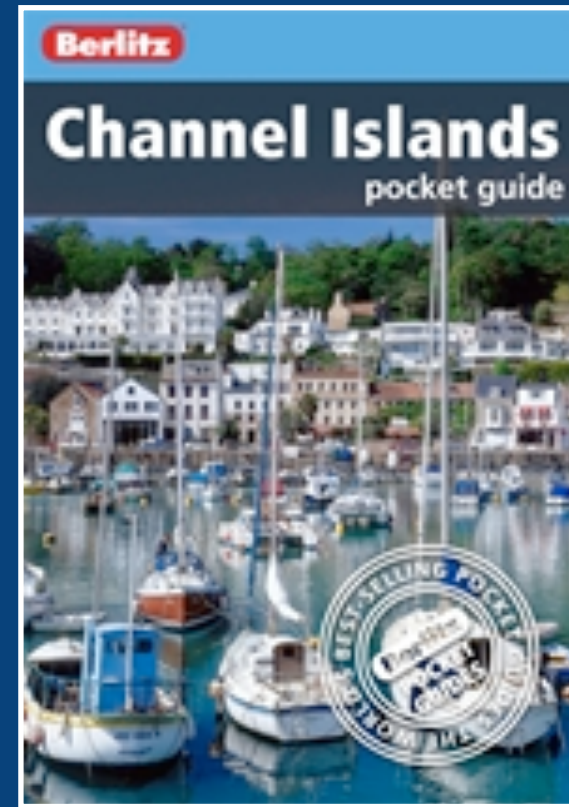
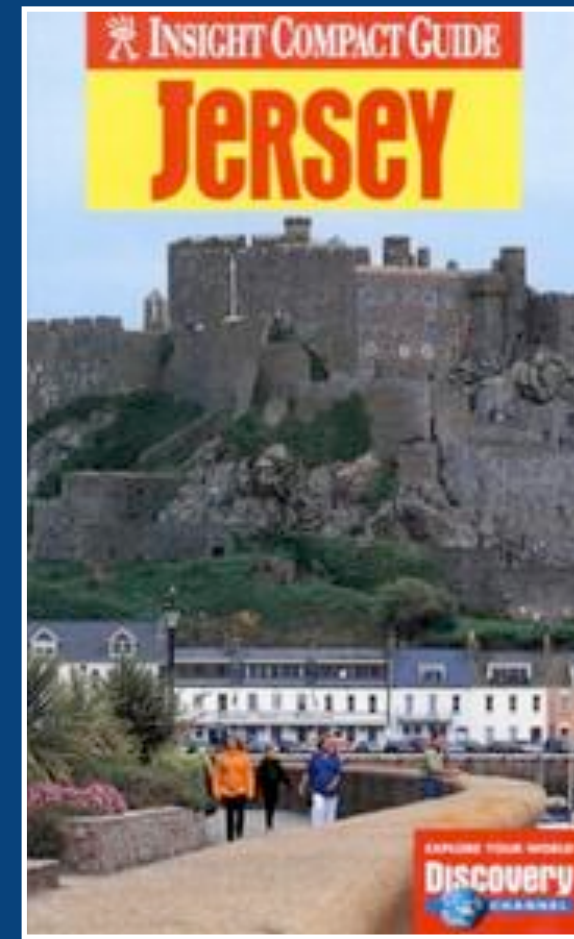


Granite and concrete?!



# History





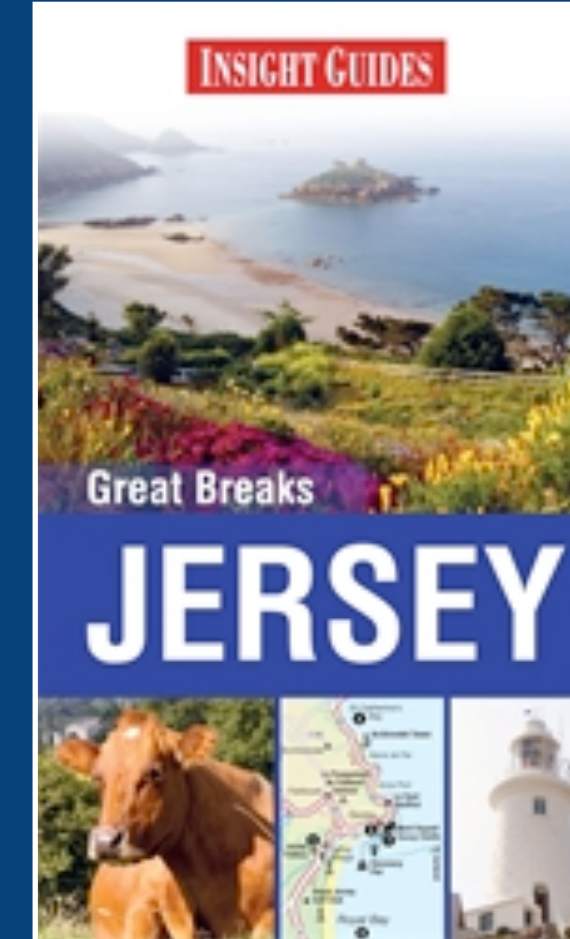
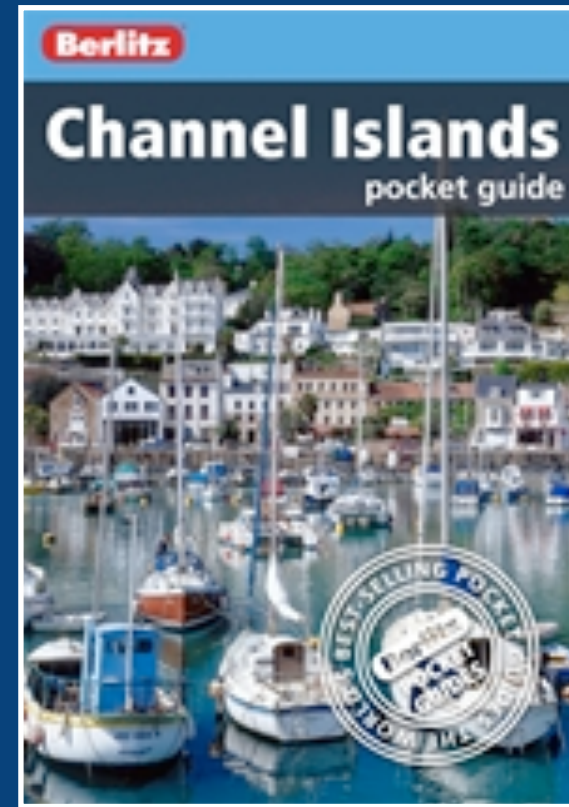
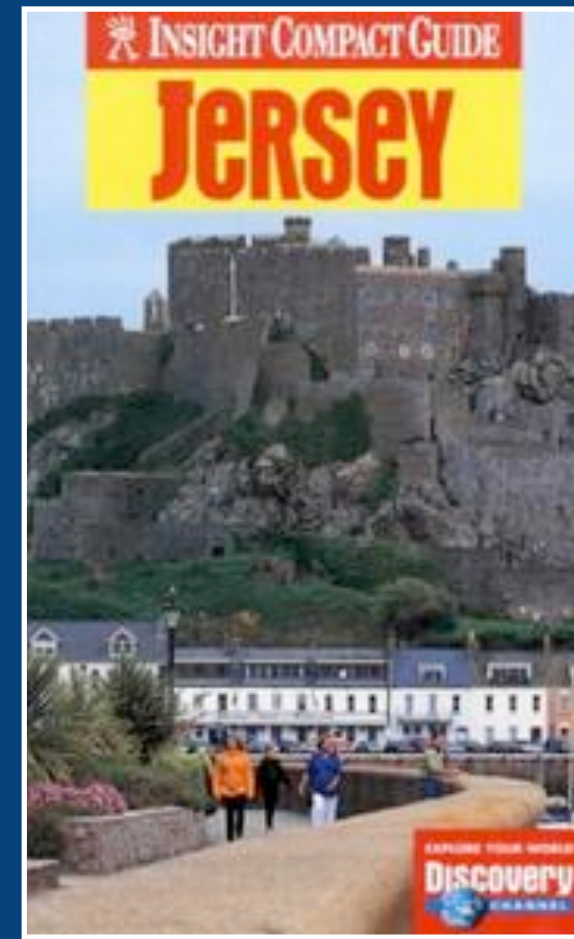
# Travel Guidebook

(maps, points of interest, sights, itineraries, history, culture, practical information, etc)

The code doesn't tell  
the whole story

# Software Architecture Document

Useful information  
spread across  
hundreds of pages;  
rarely read or updated



# Software Guidebook

(maps, points of interest, sights, itineraries, history, culture, practical information, etc)

The scope is a single  
**software system**



Describe what you  
**can't get from the code**

## Context

A system context diagram, plus some narrative text to “set the scene”.

## Functional Overview

An overview of the software system; perhaps including wireframes, UI mockups, screenshots, workflow diagrams, business process diagrams, etc.

## Quality Attributes

A list of the quality attributes (non-functional requirements; e.g. performance, scalability, security, etc).

## Constraints

A list of the environmental constraints (e.g. timescales, budget, technology, team size/skills, etc).

## Principles

A list of the development and architecture principles (e.g. coding conventions, separation of concerns, patterns, etc).

## Software Architecture

A description of the software architecture, including static structure (e.g. containers and components) and dynamic/runtime behaviour.

## Code

A description of important or complicated component implementation details, patterns, frameworks, etc.

## Data

Data models, entity relationship diagrams, security, data volumes, archiving strategies, backup strategies, etc.

This is a **starting point**; add and remove sections as necessary.

## Infrastructure Architecture

A description of the infrastructure available to run the software system.

## Deployment

The mapping of software (e.g. containers) to infrastructure.

## Development Environment

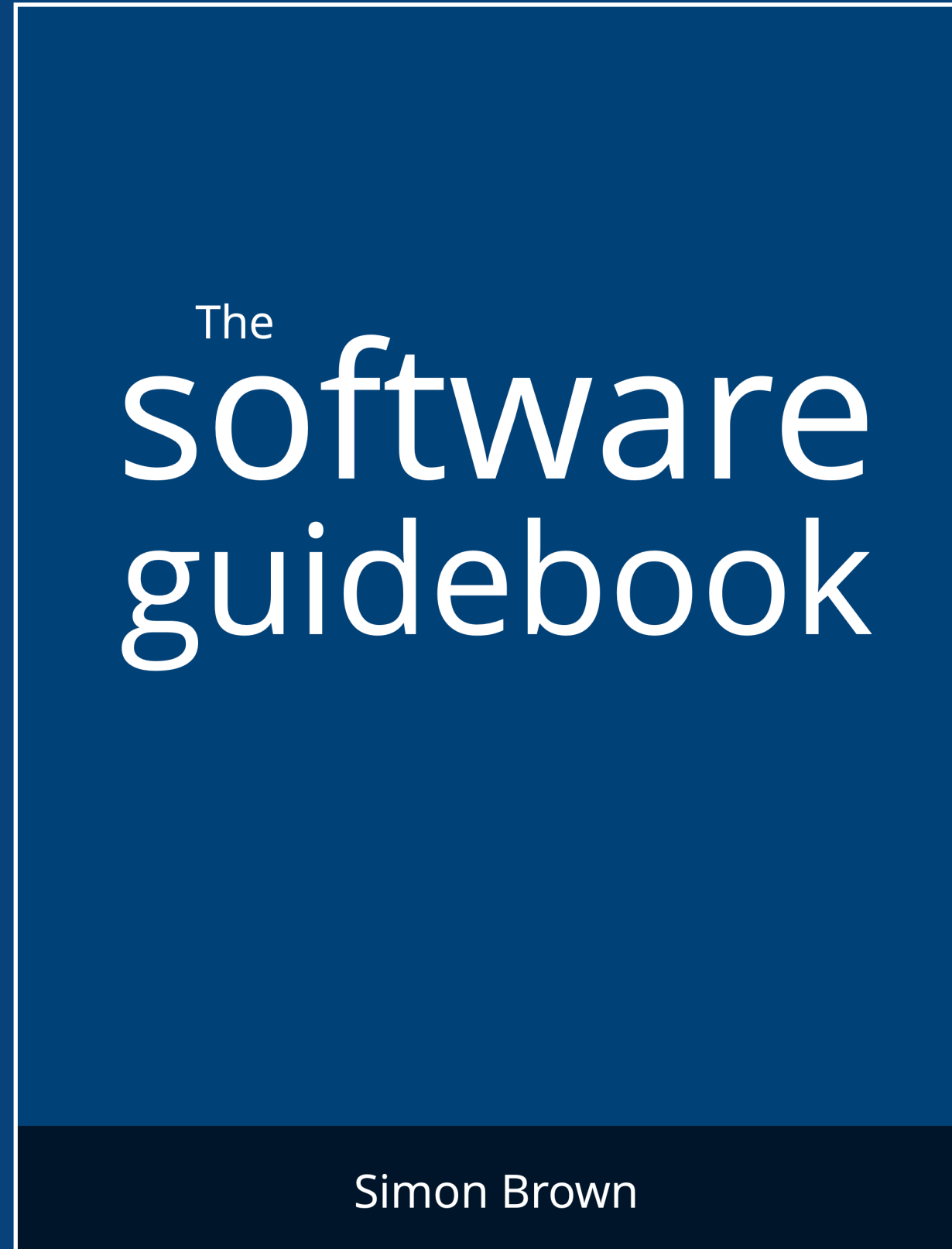
A description of how a new developer gets started.

## Operation and Support

An overview of how the software system is operated, supported, monitored, etc.

## Decision Log

A log of the major decisions made; e.g. as free format text or a collection of “Architecture Decision Records”.



<https://leanpub.com/documenting-software-architecture/c/free>

# arc42 Template Overview

arc42 is a template for architecture communication and documentation.

Photo credit: [unsplash](#)

arc42 answers the following two questions in a pragmatic way, but can be tailored to your specific needs:

- *What* should we document/communicate about our architecture?
- *How* should we document/communicate?



## 1. Introduction and Goals

Short description of the **requirements**, driving forces, extract (or abstract) of requirements. Top three (max five) **quality goals** for the architecture which have highest priority for the major stakeholders. A table of important **stakeholders** with their expectation regarding architecture.

[Read More](#)

# Documentation format?

Microsoft Word, Microsoft SharePoint,  
Atlassian Confluence, Markdown or AsciiDoc, etc

# How long?

Something I can read in 1-2 hours;  
a good starting point for exploring the code

How do you keep software  
architecture documentation  
up to date?

Documentation should  
be **constantly evolving**



# Decision Log

A log of the major decisions made; e.g. as free format text or a collection of “Architecture Decision Records”

**Title** These documents have names that are short noun phrases. For example, "ADR 1: Deployment on Ruby on Rails 3.0.10" or "ADR 9: LDAP for Multitenant Integration"

**Context** This section describes the forces at play, including technological, political, social, and project local. These forces are probably in tension, and should be called out as such. The language in this section is value-neutral. It is simply describing facts.

**Decision** This section describes our response to these forces. It is stated in full sentences, with active voice. "We will ..."

**Status** A decision may be "proposed" if the project stakeholders haven't agreed with it yet, or "accepted" once it is agreed. If a later ADR changes or reverses a decision, it may be marked as "deprecated" or "superseded" with a reference to its replacement.

**Consequences** This section describes the resulting context, after applying the decision. All consequences should be listed here, not just the "positive" ones. A particular decision may have positive, negative, and neutral consequences, but all of them affect the team and project in the future.

# “Architecture Decision Record”

A short description of an architecturally significant decision

<http://thinkrelevance.com/blog/2011/11/15/documenting-architecture-decisions> (Michael Nygard)

We're not trying to make  
and record every decision

Architecture represents the **significant decisions**, where significance is measured by **cost of change**.

Grady Booch

I think there is a role for a **broad starting point architecture**. Such things as stating early on how to layer the application, how you'll interact with the database (if you need one), what approach to use to handle the web server.

Martin Fowler

<https://martinfowler.com/articles/designDead.html>

# Structurizr cloud service

- 66. ECS on Amazon Web Services
- 65. CloudFlare Worker for static content headers
- 64. S3 and CloudFlare for static content
- 63. Google reCAPTCHA
- 62. Graphviz
- 61. Cypress for end-to-end testing
- 60. Docker for testing on-premises installation
- 59. Removed Google Analytics
- 58. Zendesk for support tickets
- 57. VIES for VAT identifier validation
- 56. Amazon SES for e-mail
- 55. Taxamo for VAT identifier validation
- 54. Braintree Payments drop-in
- 53. MaxMind for geo-location
- 52. Apache PDFBox
- 51. Elasticsearch
- 50. Amazon S3 to store workspaces
- 49. Puppeteer and headless Chrome
- 48. Amazon S3 to store images
- 47. MySQL via Amazon RDS
- 46. Redis via RedisLabs
- 45. Papertrail for log aggregation
- 44. CloudFlare for SSL
- 43. Redis via PWS marketplace
- 42. Spring Session and Redis
- 41. Pingdom

## 64. S3 and CloudFlare for static content

Tuesday, 7 July 2020

Accepted

## 63. Google reCAPTCHA

Sunday, 19 April 2020

Accepted

## 62. Graphviz

Saturday, 28 March 2020

Accepted

## 61. Cypress for end-to-end testing

Thursday, 19 March 2020

Accepted

## 60. Docker for testing on-premises installation

Thursday, 19 March 2020

Accepted

## 59. Removed Google Analytics

Thursday, 5 March 2020

Accepted

## 58. Zendesk for support tickets

Tuesday, 3 March 2020

Accepted

## 57. VIES for VAT identifier validation

Thursday, 23 January 2020

Accepted

# 2019

## 56. Amazon SES for e-mail

Sunday, 18 August 2019

Accepted

## 55. Taxamo for VAT identifier validation

Sunday, 28 July 2019

Superseded

## 54. Braintree Payments drop-in

Sunday, 28 July 2019

Accepted

## 53. MaxMind for geo-location

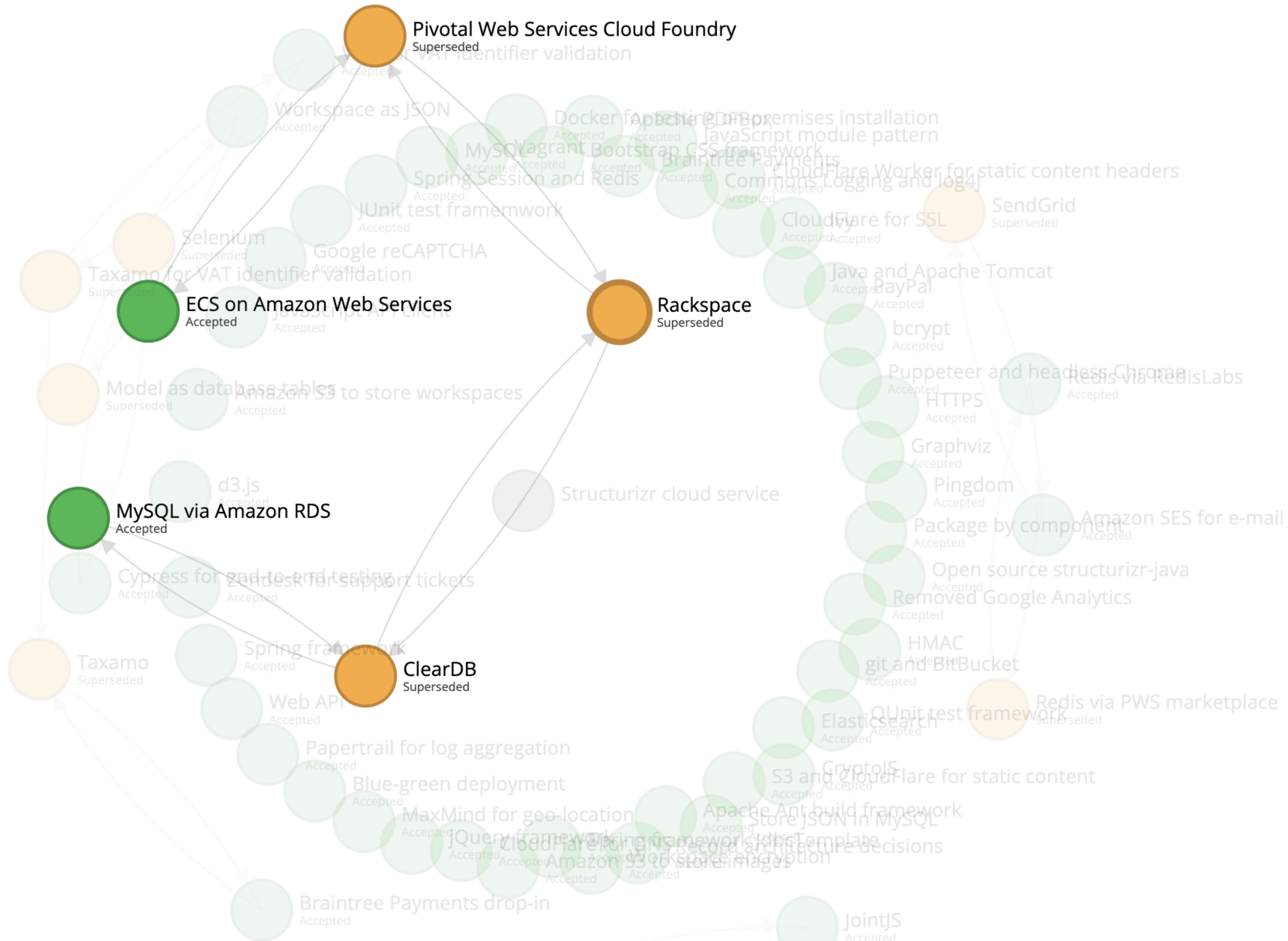
Sunday, 28 July 2019

Accepted

## 52. Apache PDFBox

Monday, 27 May 2019

Accepted



Immutable vs mutable ADRs?



Software architecture diagrams  
should show the result  
of significant decisions

In summary...

Over the past 20 years,  
many teams have thrown  
away big design up front

Unfortunately, architectural thinking, documentation, diagramming and modelling were also often discarded

# Working software over comprehensive documentation

Manifesto for Agile Software Development

We have a duty to deliver  
**some** documentation  
alongside the code

# Tribal and siloed knowledge

# The “bus factor”



# Diagrams

Maps to help you navigate a codebase

# Documentation

Describes what you can't get from the code

# Architecture decision records

A changelog of major decisions

# Thank you!

Simon Brown

 @simonbrown