Meerkat Health Surveillance

Architecture and Design

Jonathan Berry

Overview

Talk: Introducing Meerkat

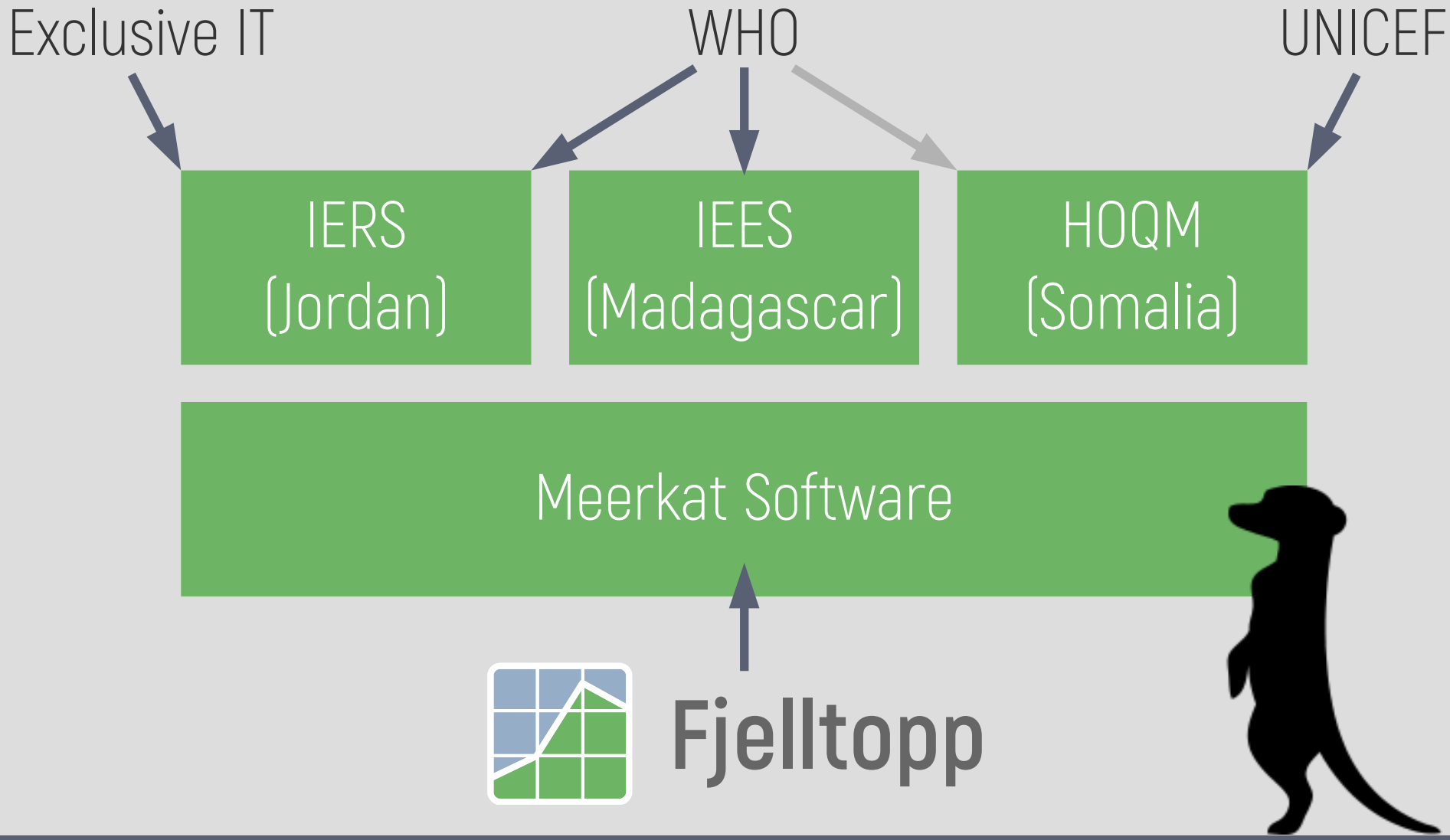
Exercise: Installing Meerkat

Talk: Meerkat Dev Environment

Exercise: Exploring Meerkat

Talk: Understanding Meerkat

Why “Meerkat”?


Exclusive IT
WHO
UNICEF
IERS
(Jordan)
IEES
(Madagascar)
HOQM
(Somalia)
Meerkat Software
Fjelltopp

Project Aims

" To enable real-time case-based **surveillance** at the health facility level that **improves public health** and clinical decision making at **all levels** of the health system. "

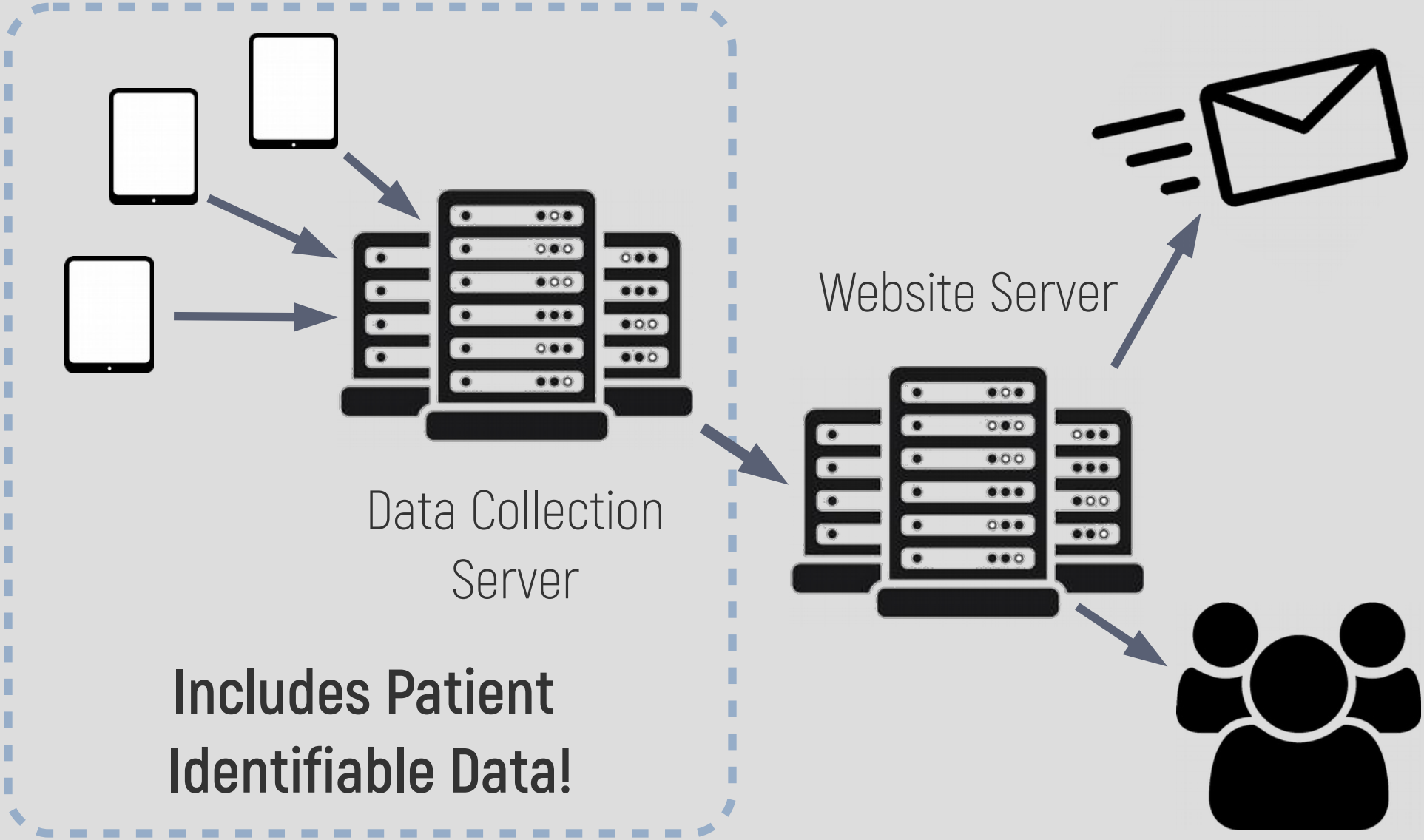
Open Source

Micro-services

Continuous Integration

Inter-operable

In a nutshell...



Design Principle: Open Source

Benefits:

- No licensing costs etc.
- Other groups can use and improve our software
- Can determine in detail how everything works if needed
- Much industry leading software is open source

Design Principle: Open Source

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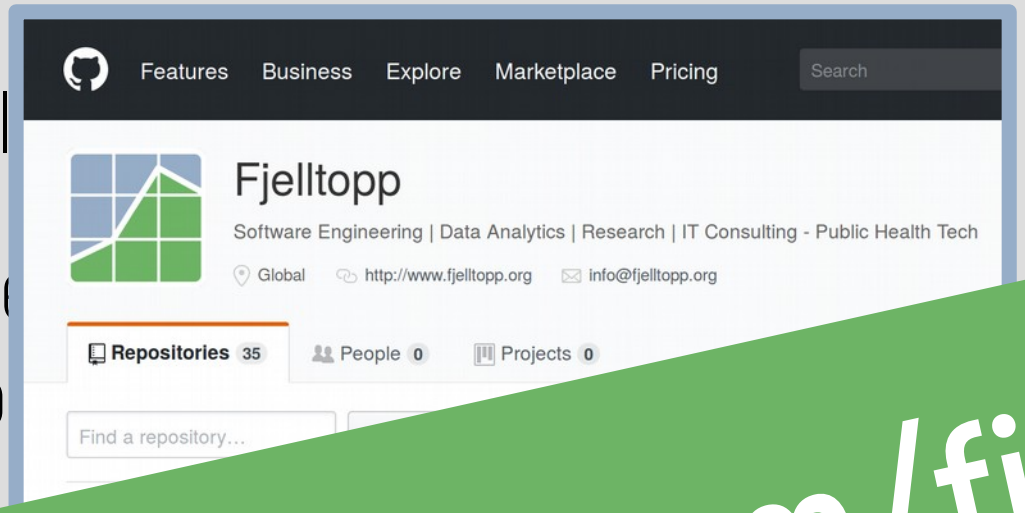
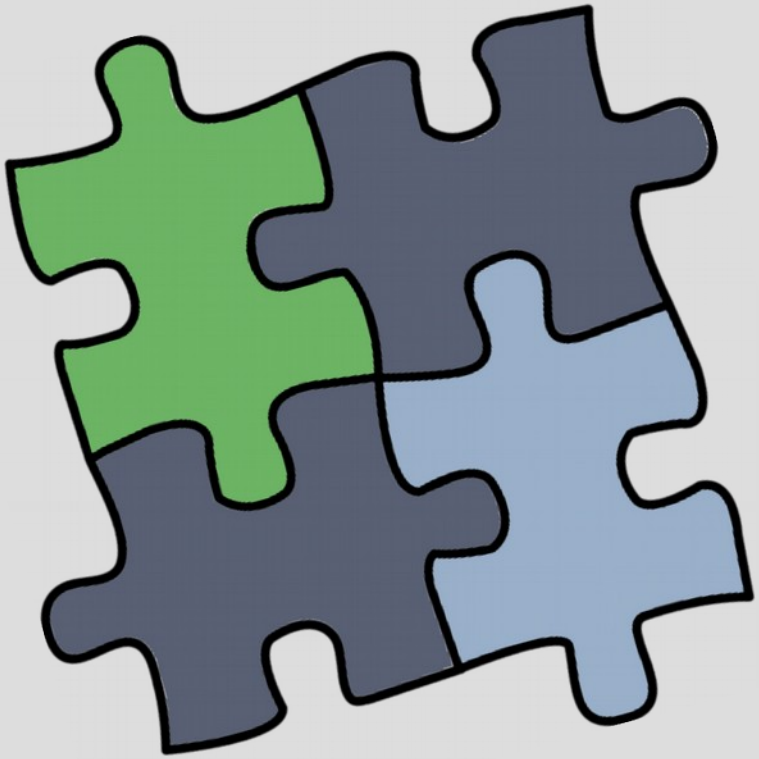


github.com/fjelltopp

Design Principle: Microservices Architecture

Benefits:

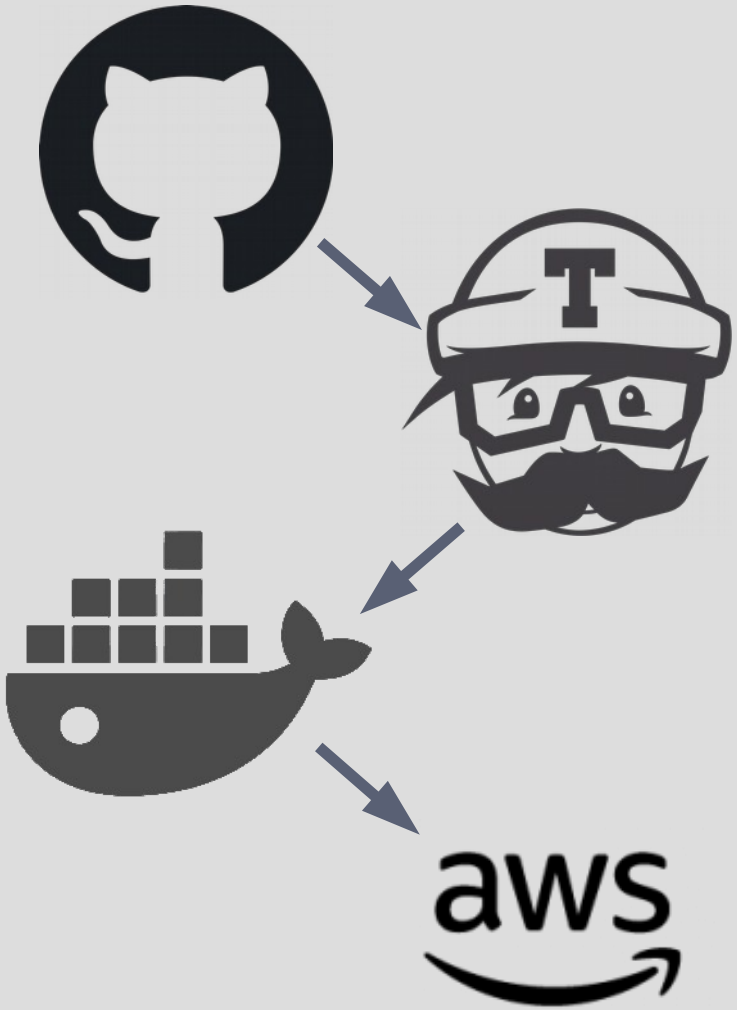
- Each component developed independently
- Can make different design decisions for each component
- Components easily replaced if needed
- Separation of responsibilities reduced code repetition



Design Principle: Continuous Integration

Benefits:

- Faster deployment of needed changes
- Continuous feedback on changes and incremental improvements
- Agile development

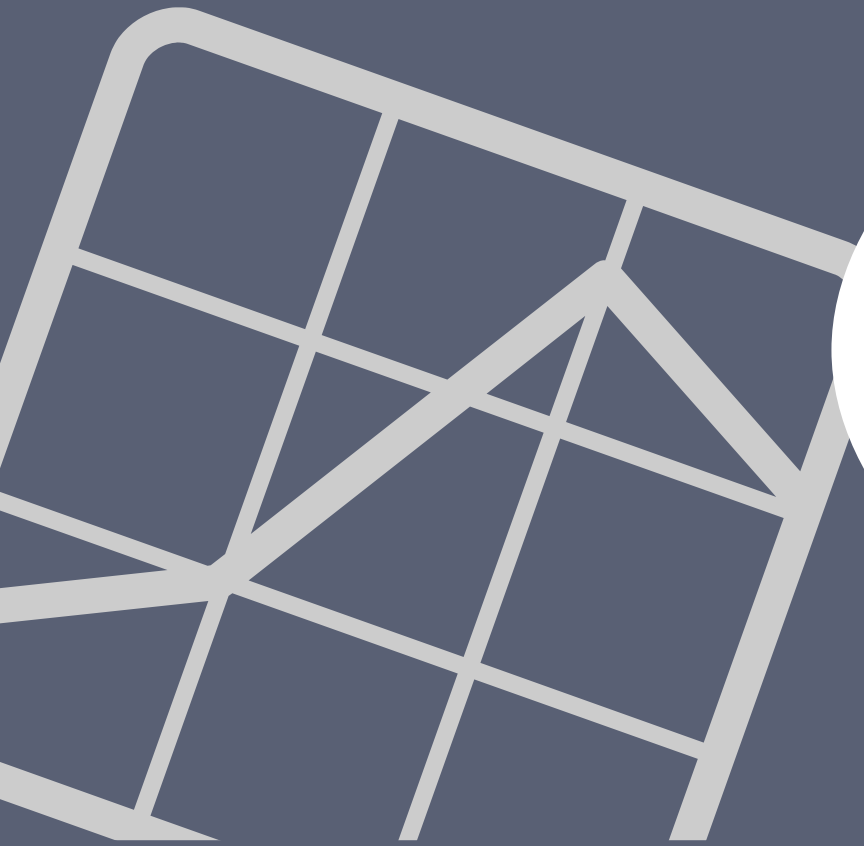


Design Principle: Continuous Integration

Will it be possible to continue this in Jordan, without using the cloud?

Exercise

Installing Meerkat



"The Dev Env"

Meerkat Dev: The Glue

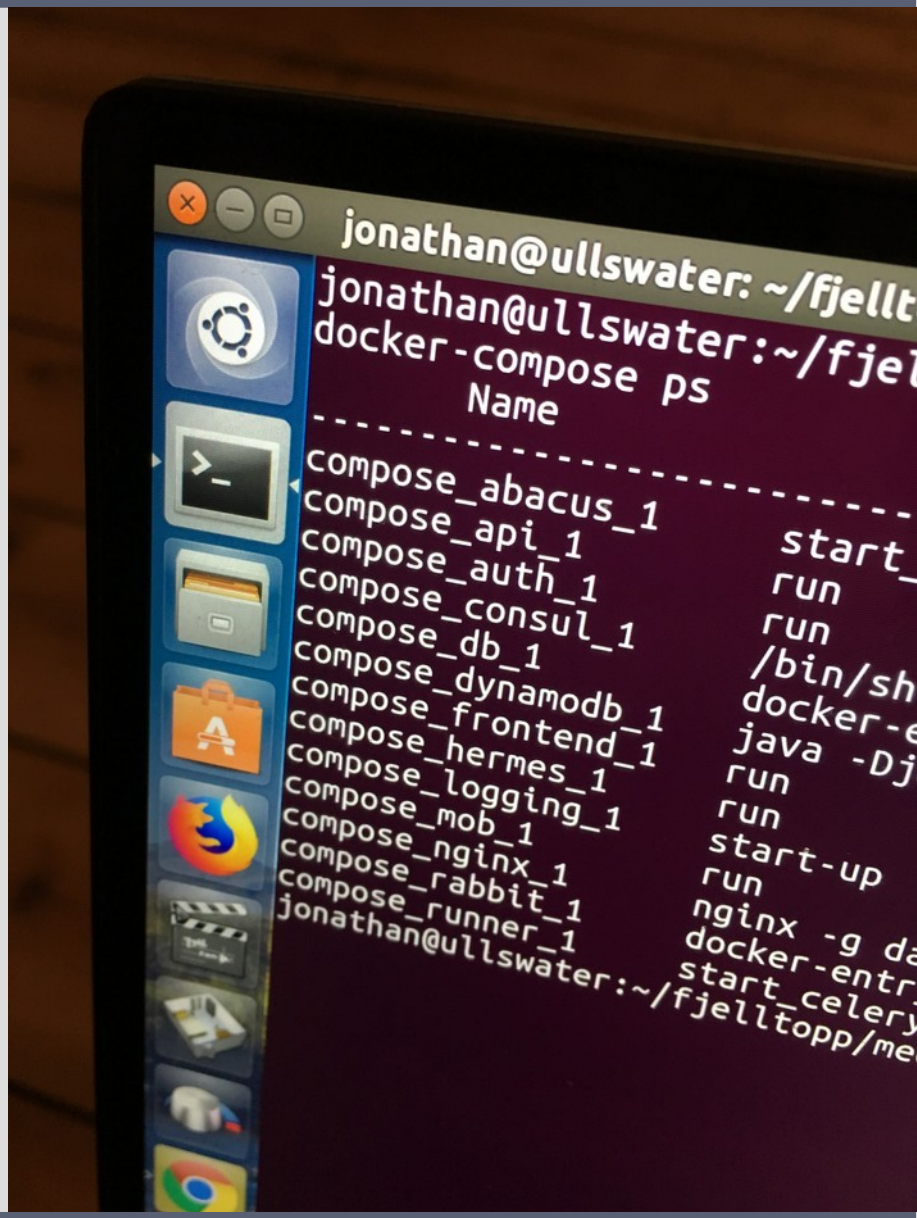
The glue that holds it all together:

- Country configs
- Meerkat code
- Third party dependencies.

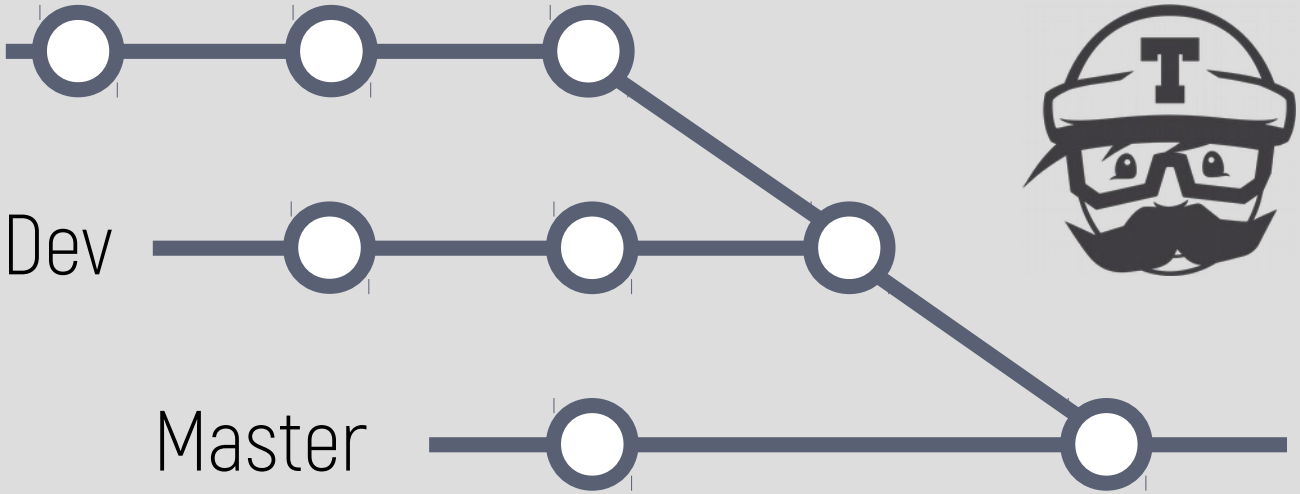
CODE → RUNNING APPLICATION

Meerkat Dev includes:

- Dockerfiles
- Docker Compose configs
- Utility scripts

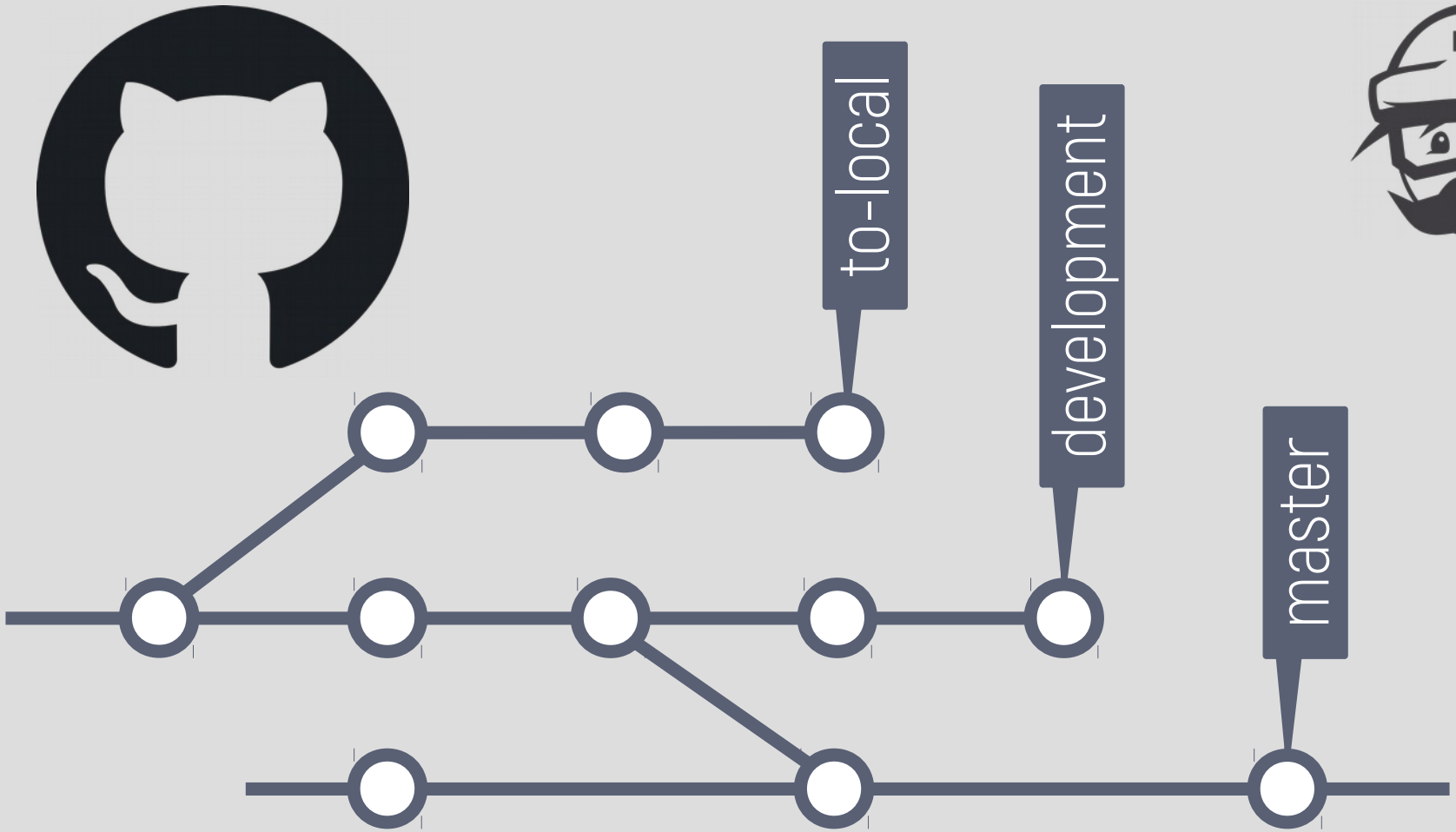


The Old Workflow



Deploy Server

The Old Workflow



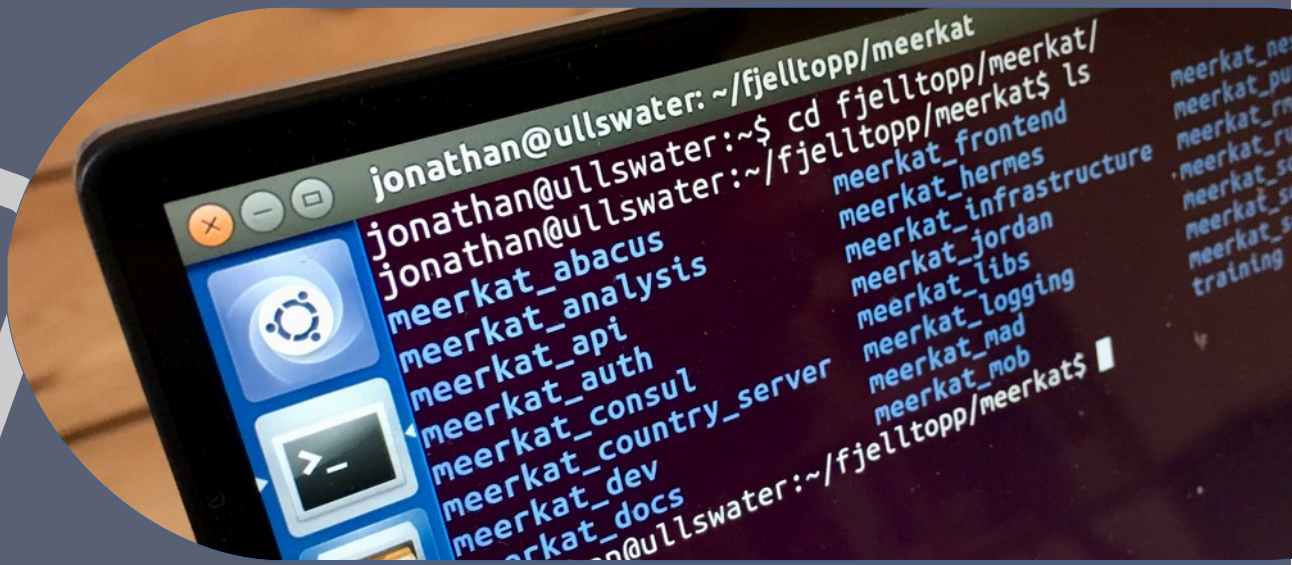
The Live Infrastructure

We will look at the live infrastructure tomorrow!

Challenge: How will Jordan administer & deploy code?

Exercise

Exploring Meerkat



Meerkat Abacus: Data Transformation

Question: How many males are over 60 years old?

We could:

- Query DB for all ages
- Load into memory
- Start calculating

What we actually do:

- Pre-empt questions like this
- Abacus determines the answer as each submission arrives...
- ...then tags submission in db
- All that is left: **quick** SQL count

Meerkat Abacus: Data Transformation

Question: How many males are over 60 y[illegible]d?

We c[illegible]

- [illegible]

Transforms the data so that complex queries are reduced to simple counts.

[illegible]tags submission in db

- All that is left: **quick** SQL count

Meerkat Abacus: Data Transformation

Question: How many males are over 60 y d?

We

- ...

Does this for over 13,000 different questions!

...tays submission in db

- All that is left: **quick** SQL count

Meerkat API: Data Aggregation

Question: Incidence of Hepatitis A in Amman?

$$= \frac{\#\ \text{New Cases Hepatitis}}{\text{Population of Amman}}$$

Meerkat API: Data Aggregation

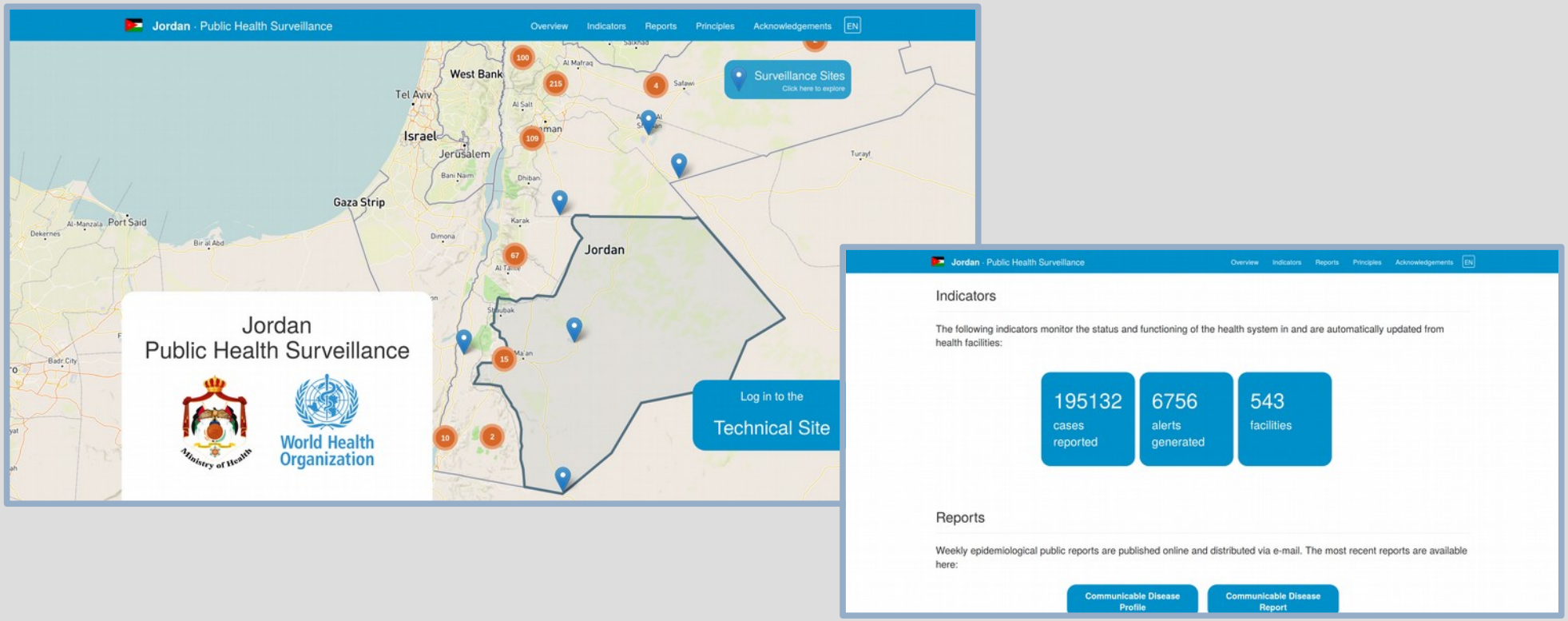
Question: Incidence of Hepatitis A in Amm

Aggregates data & provides HTTP access

Amman

Meerkat Frontend: Data Visualisation

Question: Where are diseases occurring?



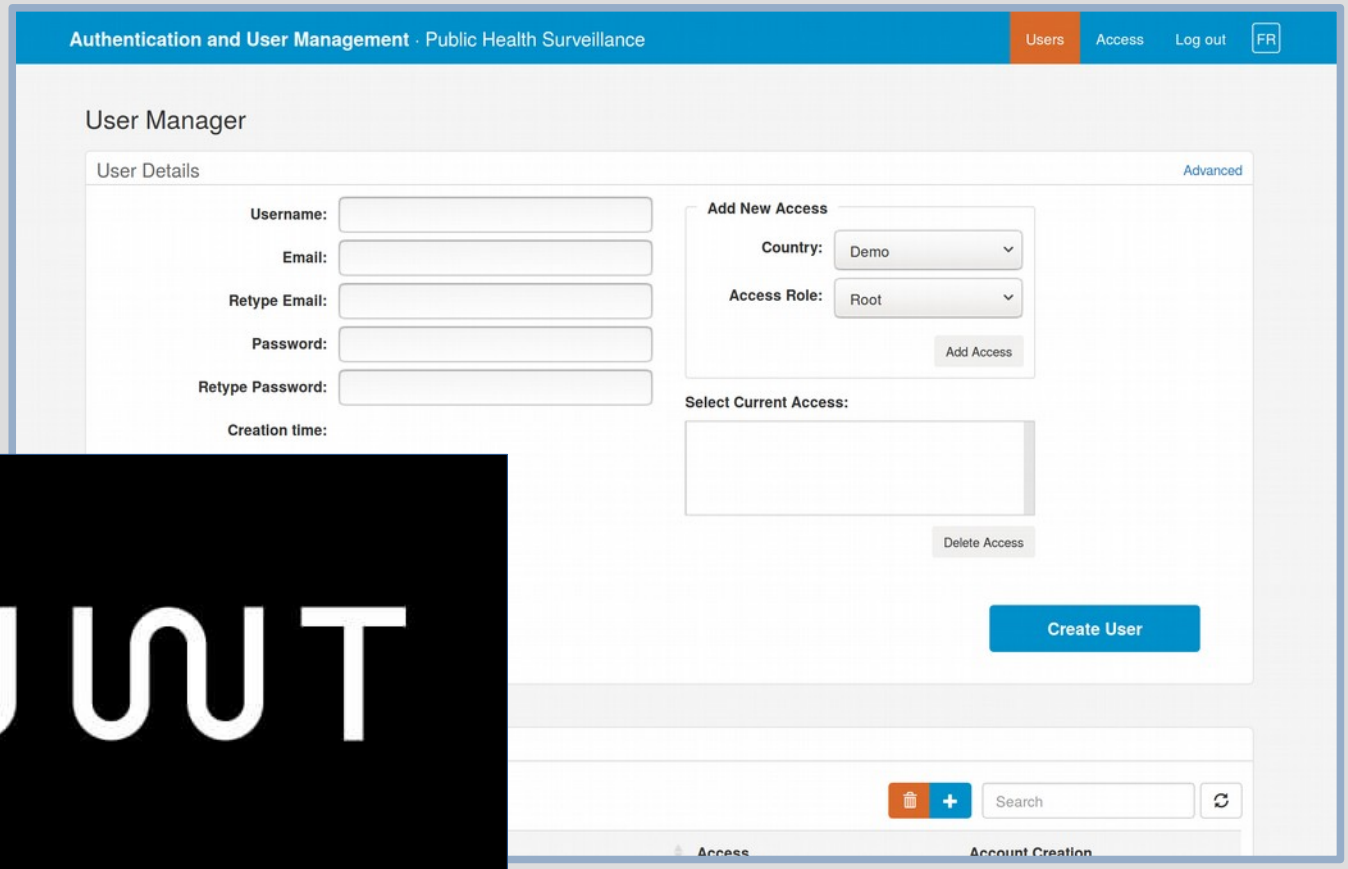
Meerkat Frontend: Data Visualisation

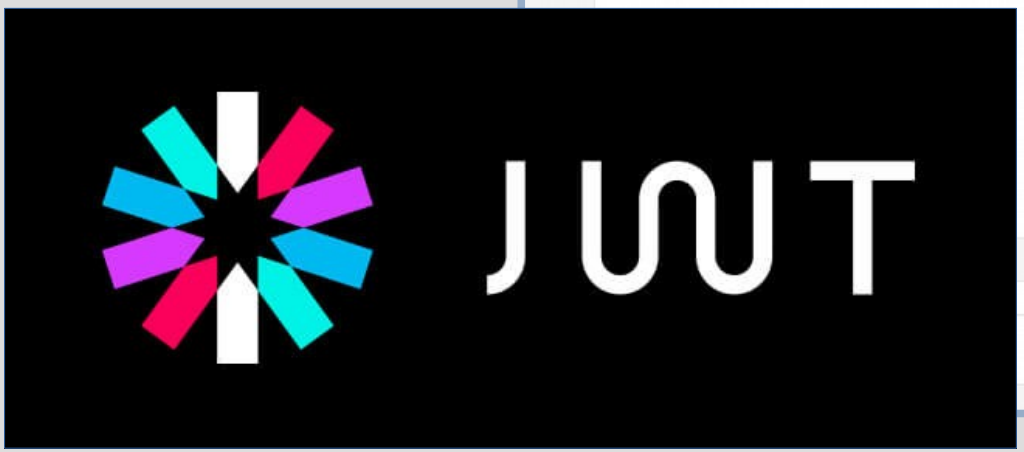
Question: Where are diseases occurring?

Visualises data & provides tools for exploration

Meerkat Auth: User Authentication

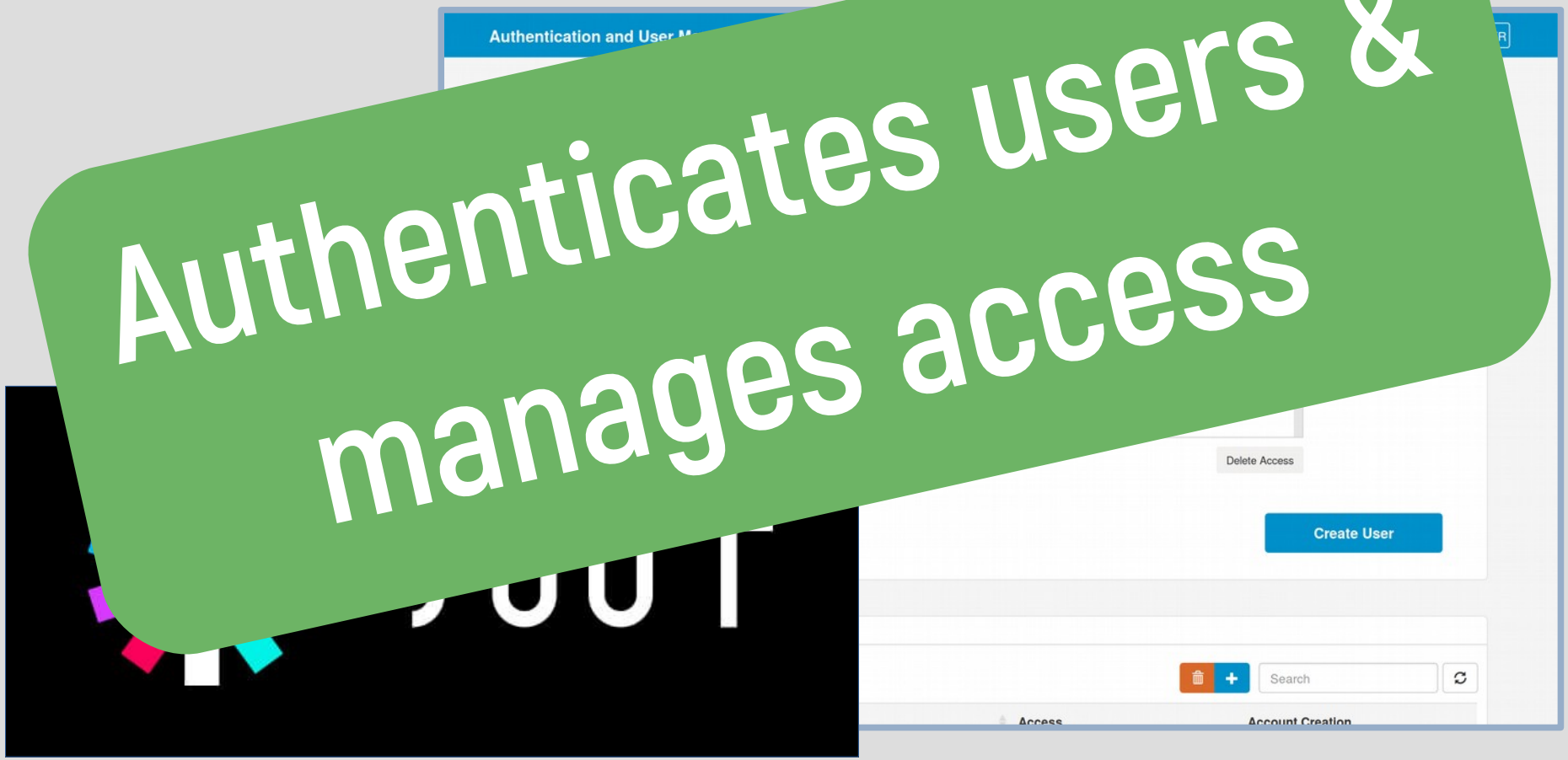
Question: Who can access the data downloads?





Meerkat Auth: User Authentication

Question: Who can access the data dow[illegible]ds?



Other Repositories

Meerkat Hermes – Messaging/Notification Service for sending SMS/Emails

Meerkat Runner – Asynchronous scheduling of data processing tasks

Meerkat Analysis – Deeper data analysis functions

Meerkat Libs – Shared code libraries

Meerkat Mob – Google cloud messaging to tablets

Meerkat Logging – Logging of all system actions

Meerkat Consul – [Beta] DHIS2 Integration

(Meerkat Jordan – Country-specific configs**)**

Summary

IERS is built using “Meerkat” software, freely available from Fjelltopp’s GitHub page.

Meerkat uses a micro-services architecture.

Understanding each service’s prupose is the first essential step to debugging.

Each micro-service is packaged in a Docker container.

Challenge: How will IERS code be administered & deployed moving forwards?