INF5750

DHIS2

University of Oslo
Department of Informatics

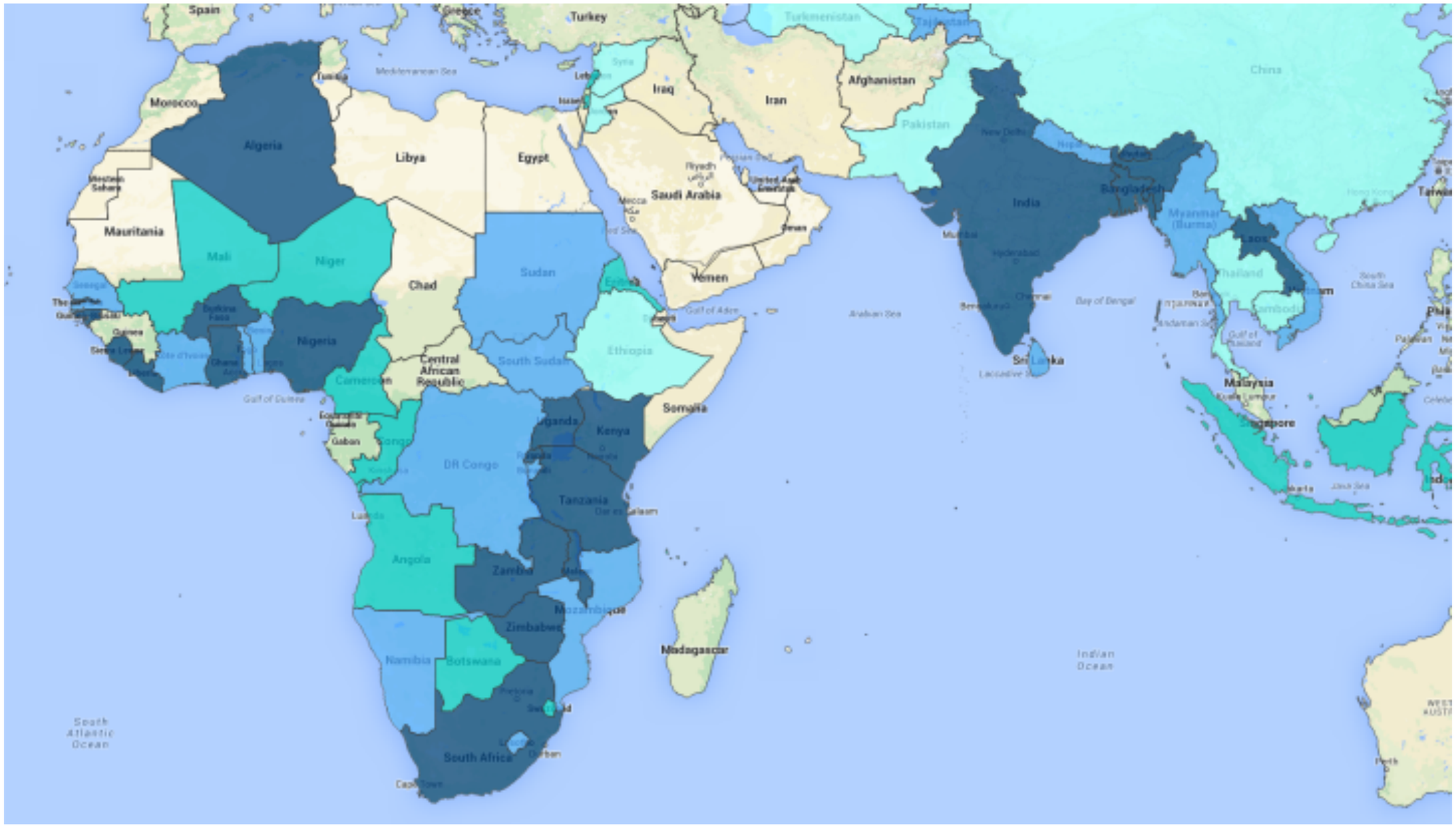
Outline

- What is DHIS2?
- HISP - research around DHIS2
- Evolution of the DHIS2 software
- Data model

What is DHIS2?

- Free and open source software - permissive BSD license
- Data collection, management, analysis - mostly in the health domain
- Aggregate and case based data
- Web-based
- Configurable through user interface

Adoption



Partners Pilot/early phase Scaling up Nation-wide rollout

Types of data

Aggregate

Routine facility data (HMIS)

Events

Surveys
Cause of death
Educational events

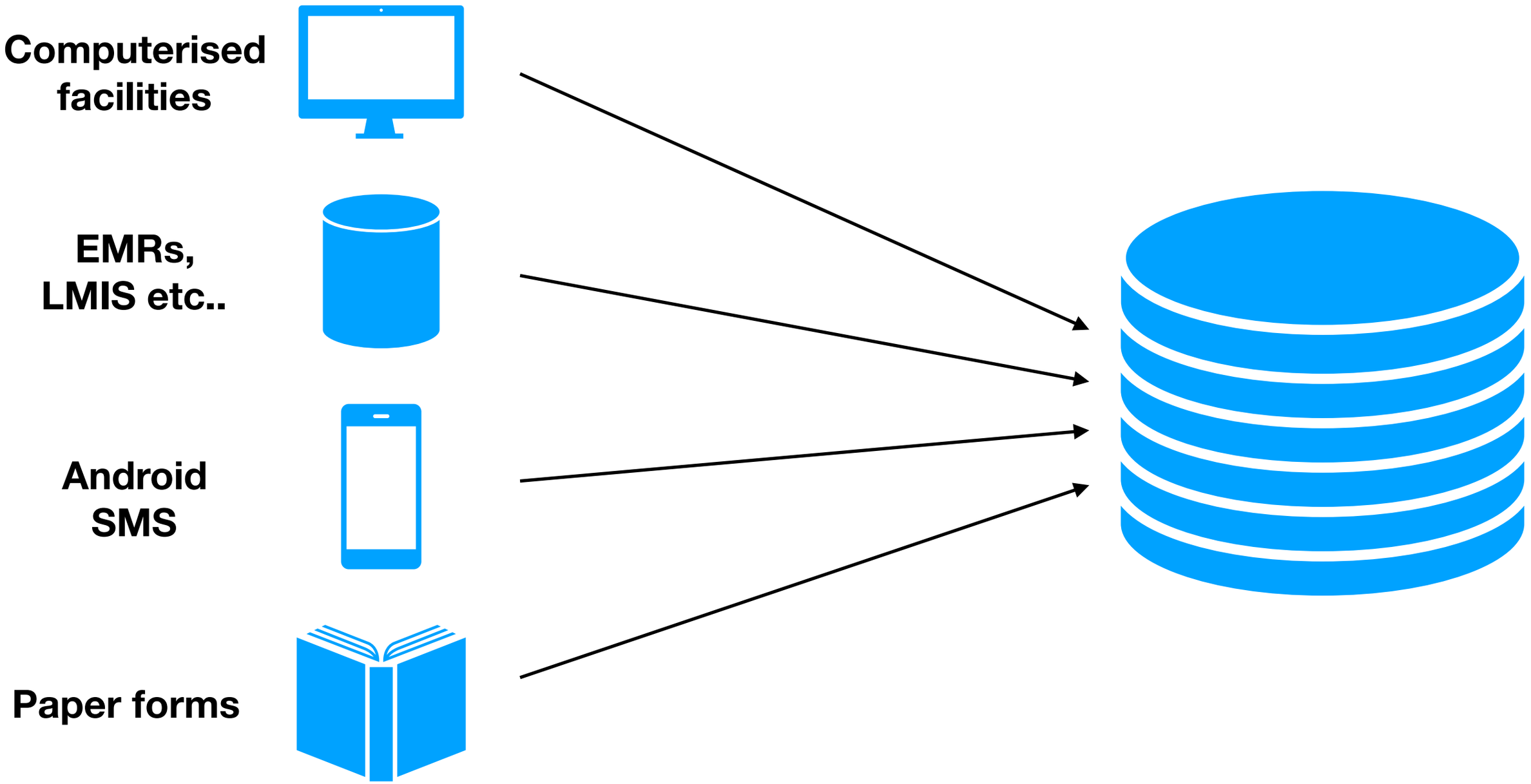
Tracker

Cause of death
ANC tracking
HIV/TB patient monitoring

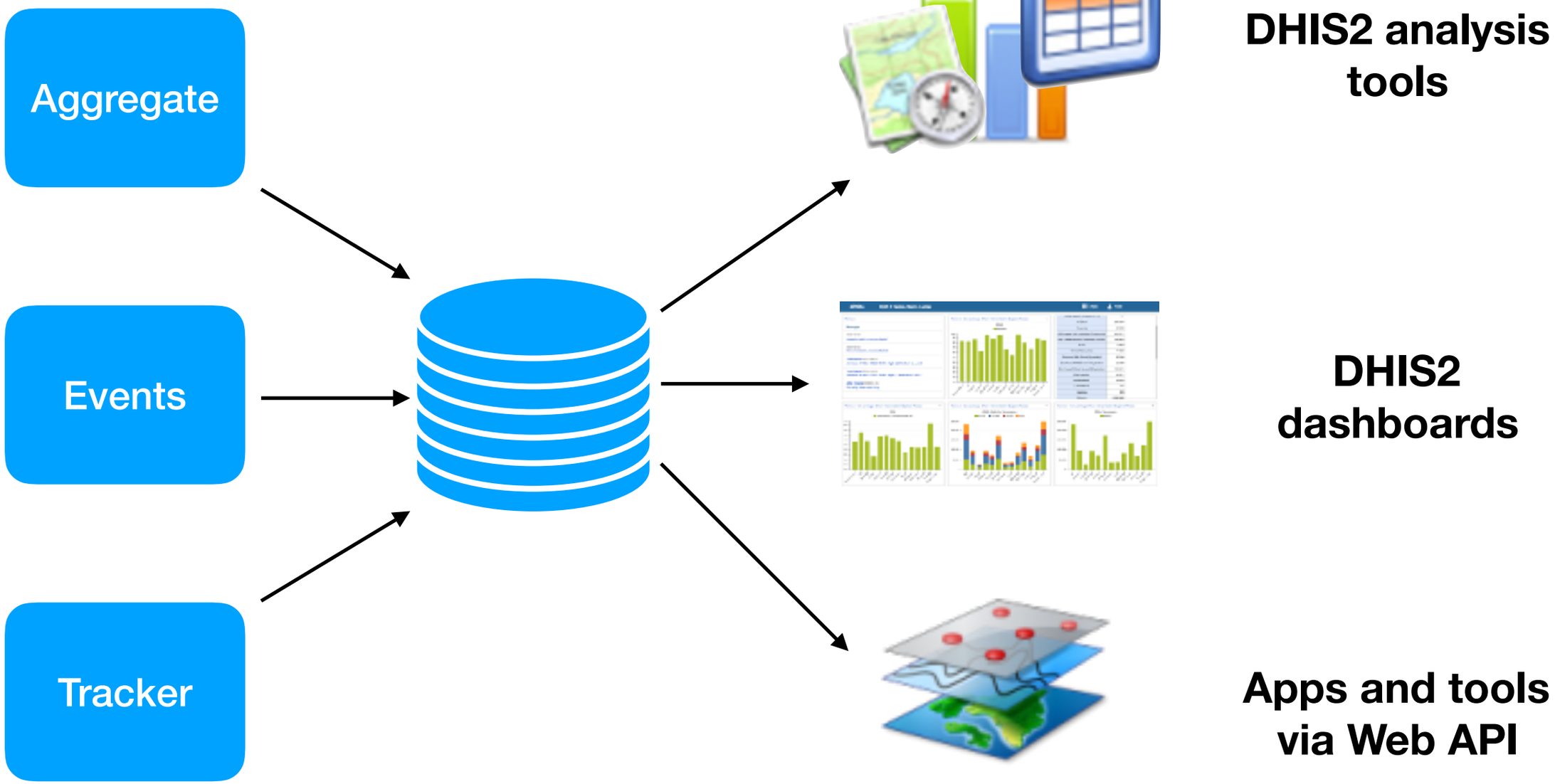
HMIS information flow

- Patients visit health centre - recorded in registers and/or patient records
- Summary report created every month - sent to district office
- District office enters data from paper forms into DHIS2
- Districts, provinces and national level have access to data to support decision-making

Data Integration



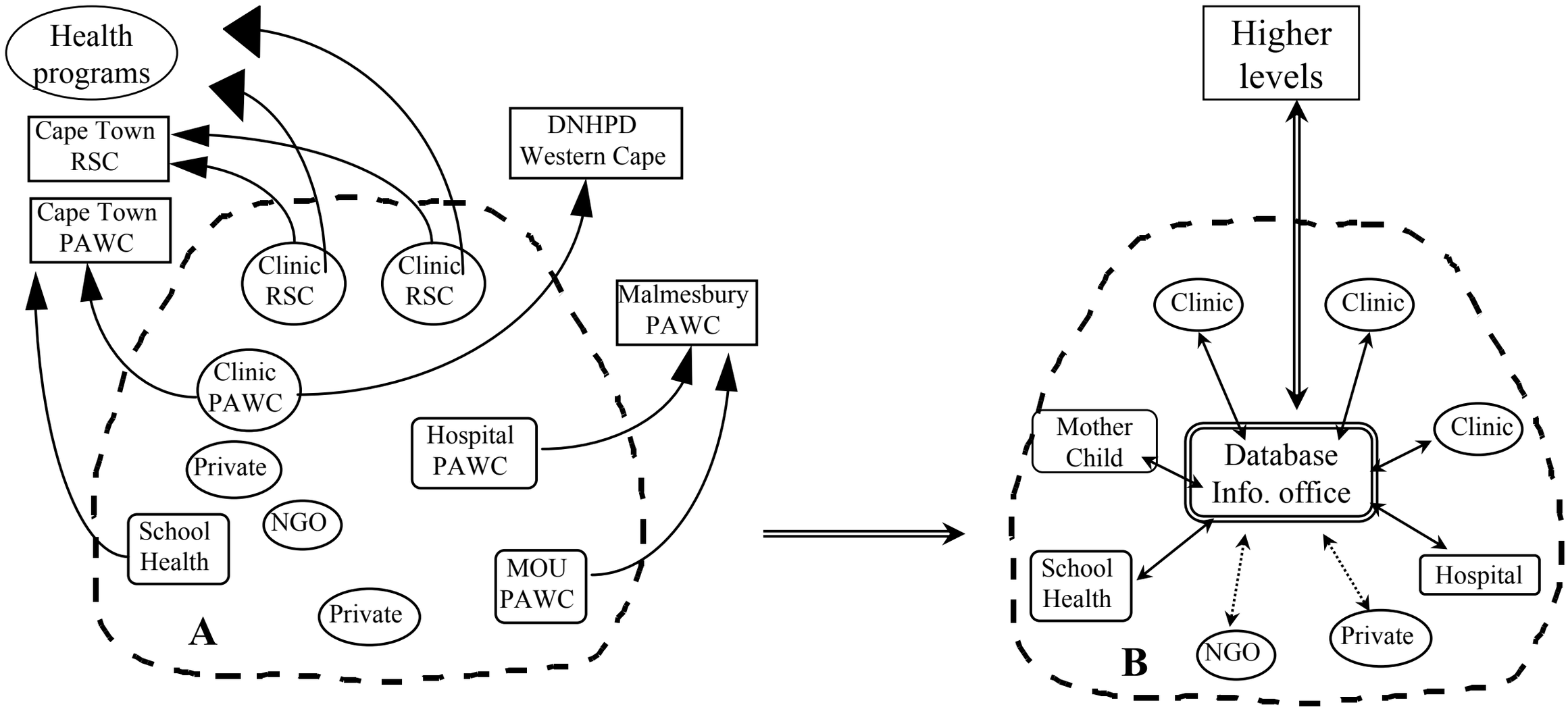
Analysis across data types



HISP

Health Information Systems Programme

Beginning in South Africa



Beginning in South Africa

- Attempt to integrate fragmented information system from apartheid era
- Developed a minimal data set which all facilities should report as a minimum
- DHIS developed to support this integration and reporting process
- Participatory Design - users involved in development

HISP

- Started in South Africa, then spread to India, West Africa etc…
- Loose/informal network supporting
    - research
    - software development and implementation
    - capacity development

  around health information systems
- Universities, Ministries of Health, NGOs

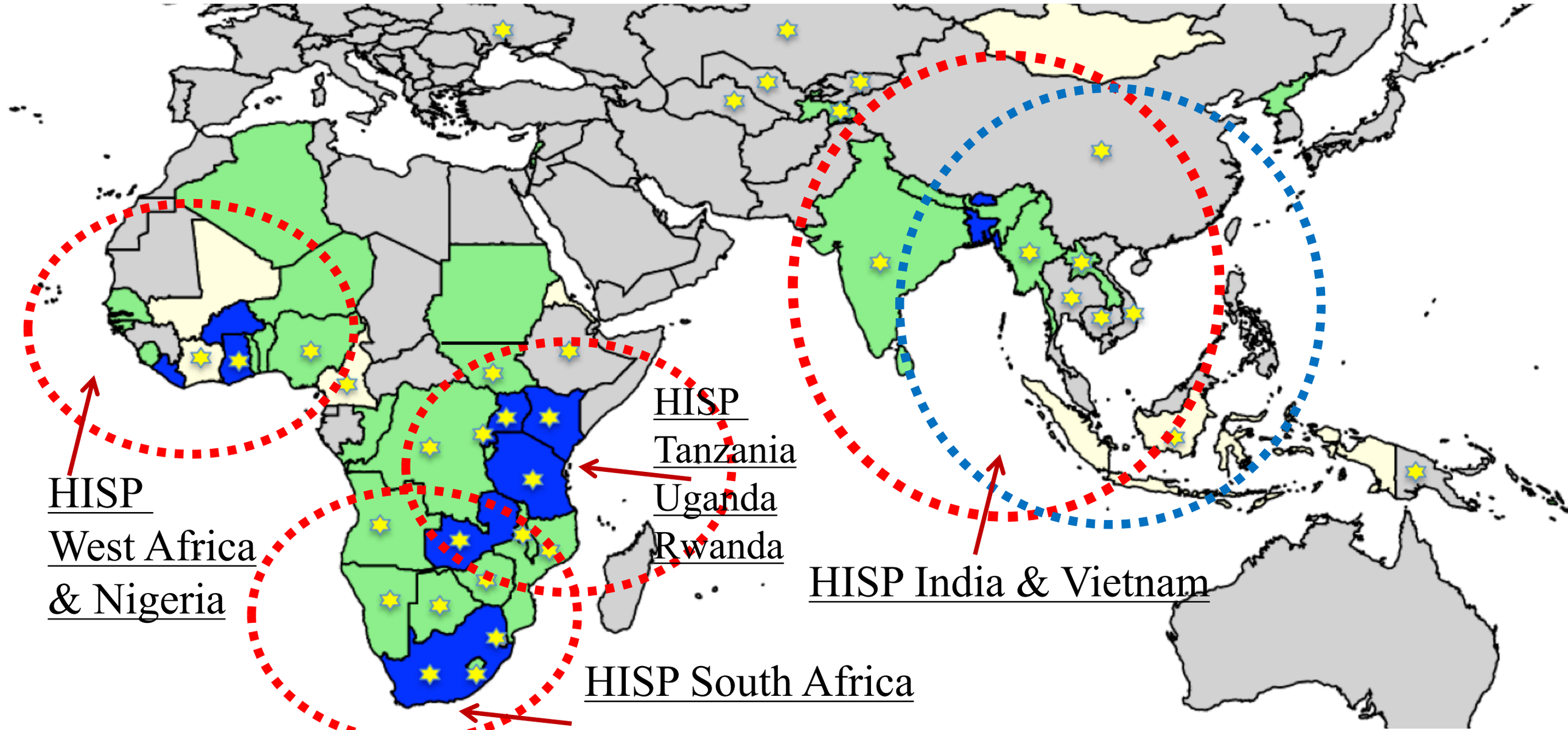
HISP "network of action"

Health Information Systems
- Integration, standards, architecture
- Use of information for action

Free & Open Source Software
- Distributed DHIS development - sharing across the world
- Generic solutions to local problems

Capacity building
- Training of health workers
- Masters courses, PhD programme
- Sharing teaching/courses

HISP network



Information Systems Research

- Action Research - researchers engage to solve real world problems

- Examples of topics:
  - IS architecture
  - Scalability and sustainability
  - Standardisation
  - Use of information and data quality

Capacity Development

- Big capacity development effort around health information systems
- Masters programmes established in several countries
- PhD programme in Oslo
- DHIS2 Academies - thousands of people trained
- DHIS2 Online Academy launched 2017

Master Project @ IFI

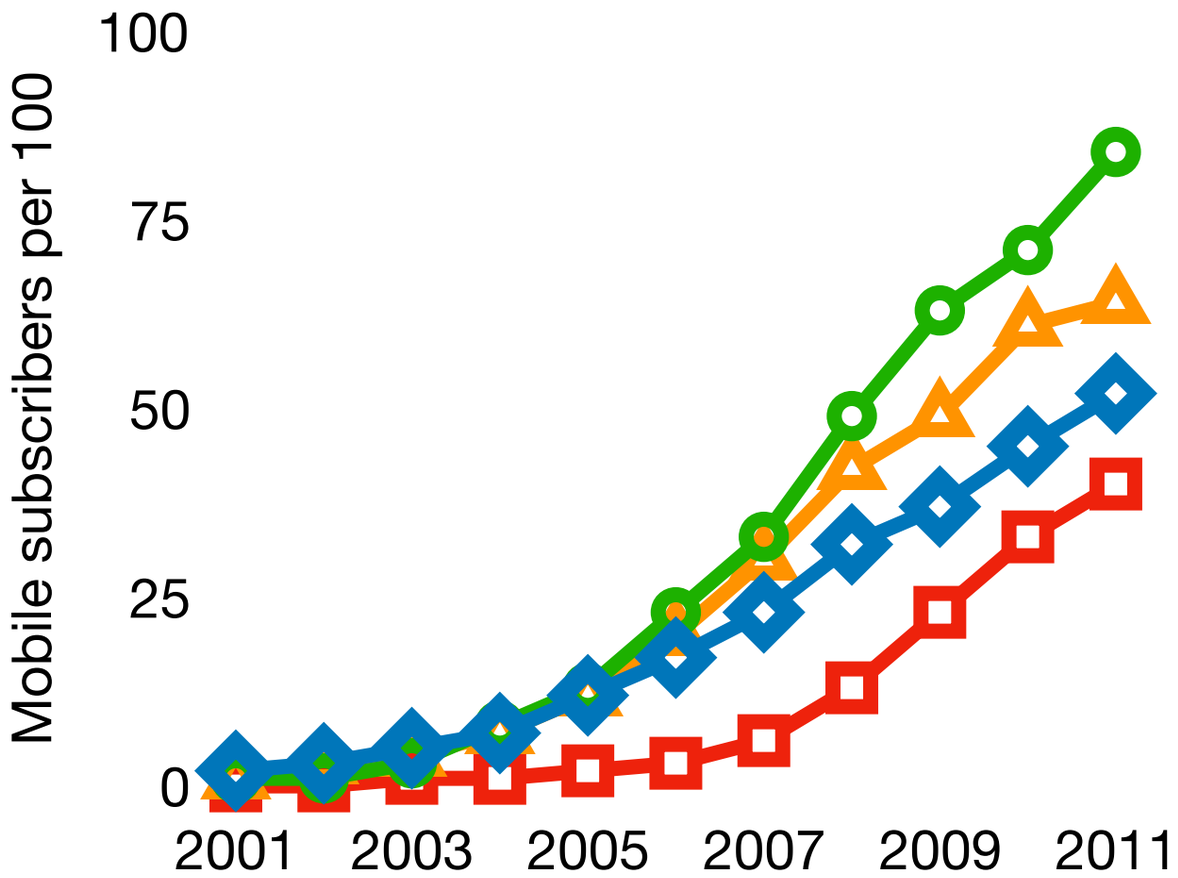
- Opportunity to work on (and solve?) real world problems
- Work with Ministries of health or international organisations to:
  - Develop new functionality for a use case
  - Configuration for new use cases

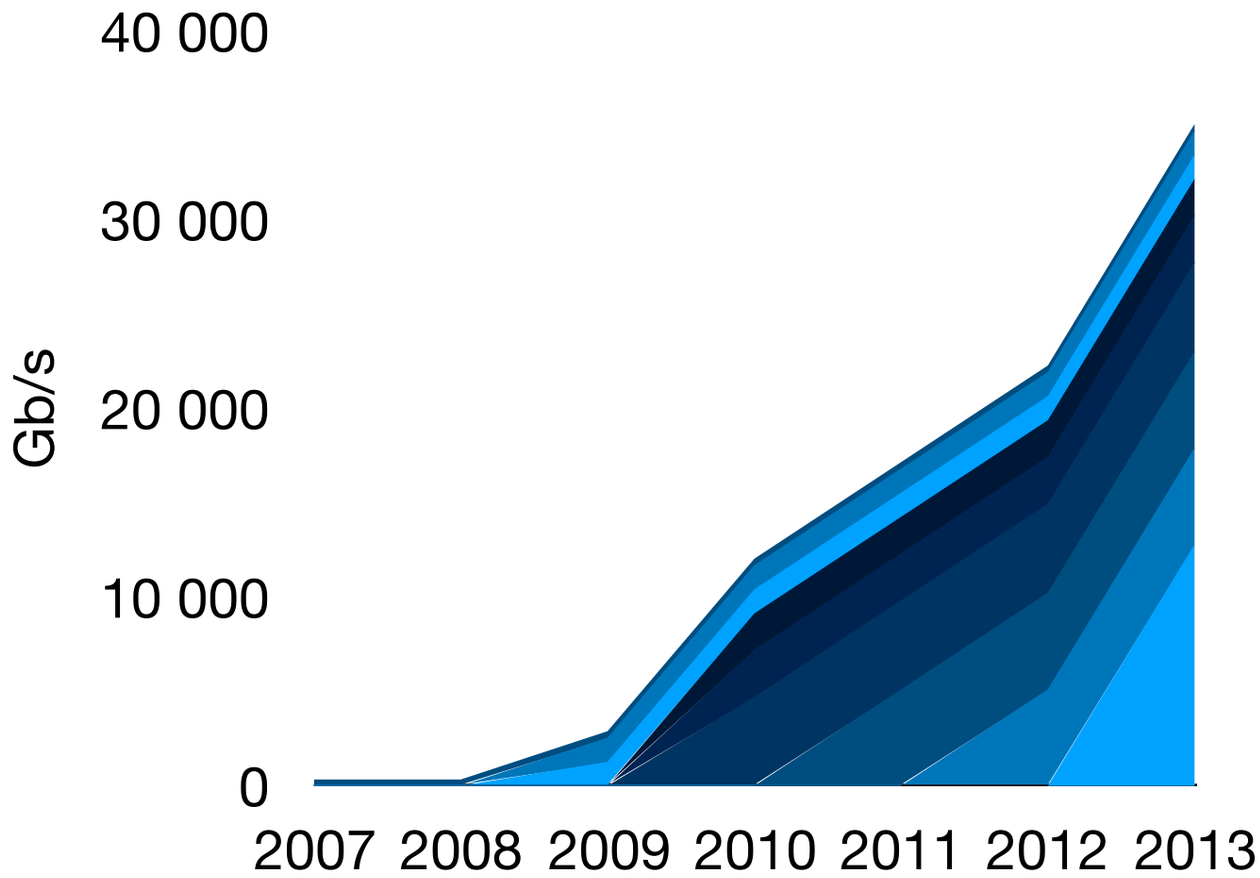
Evolution of the DHIS2 software

MS Access

- DHIS originally developed as MS Access application
- Open source, developed in South Africa
- Standalone - relied on export/import of data and transmission by mail, USB, CD etc..
- DHIS 1.4 still in limited use today

Web Based





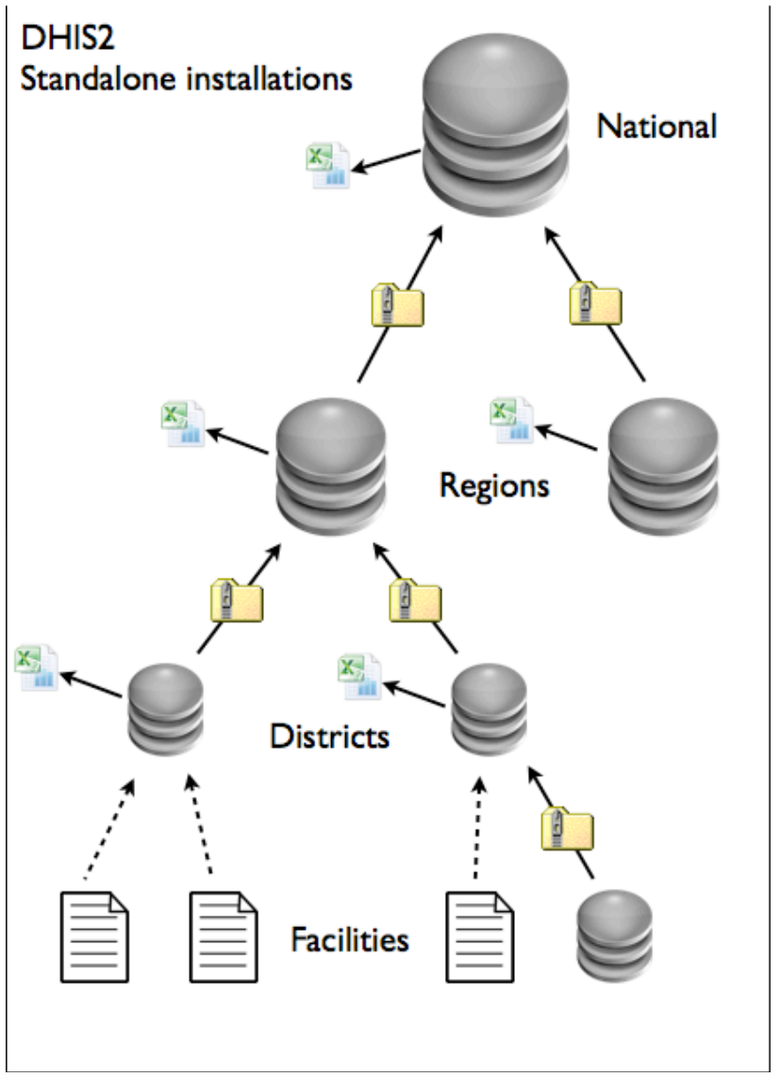
- Sub-Saharan Africa
- Ghana
- Kenya
- Rwanda

- SAex
- EASSy
- TEMAs
- ACE
- GLO-1
- Seacom
- WACS
- MaiN OnE
- SAT3

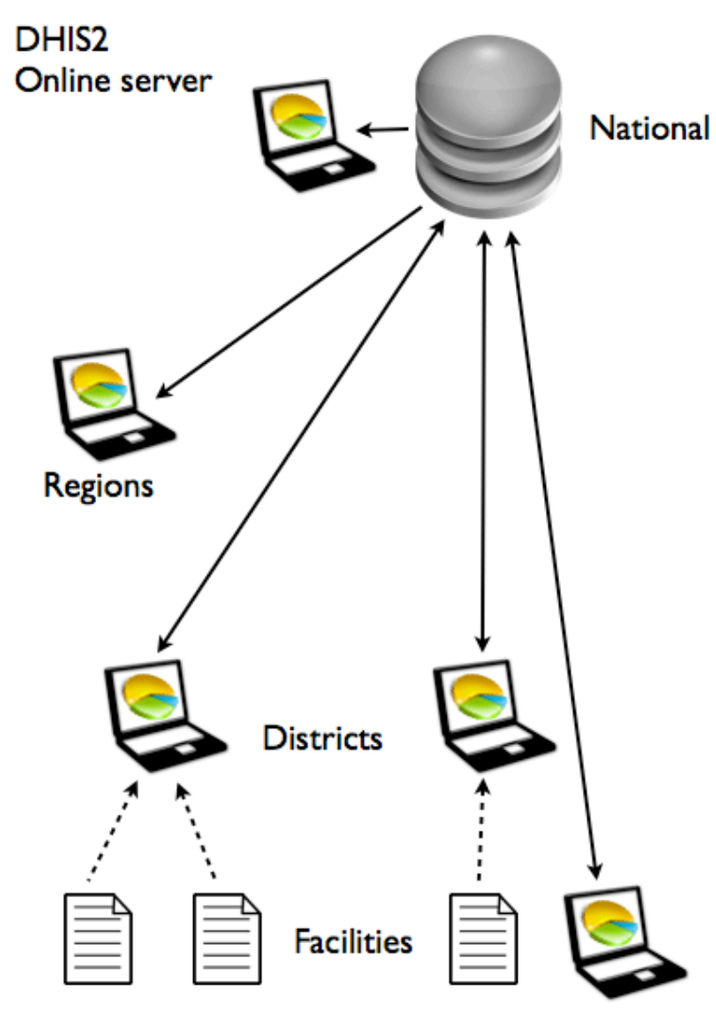
Web Based

- Work on web based version of DHIS2 started around 2005
- Based on then "cutting-edge" Java frameworks - spring, hibernate, velocity templates etc
- Largely replicating DHIS 1 data model and functionality
- First used in 2006 in one state in India
- Fully online/centralised implementation only in 2011

Web Based



Before 2011



2011 and onwards

Platform

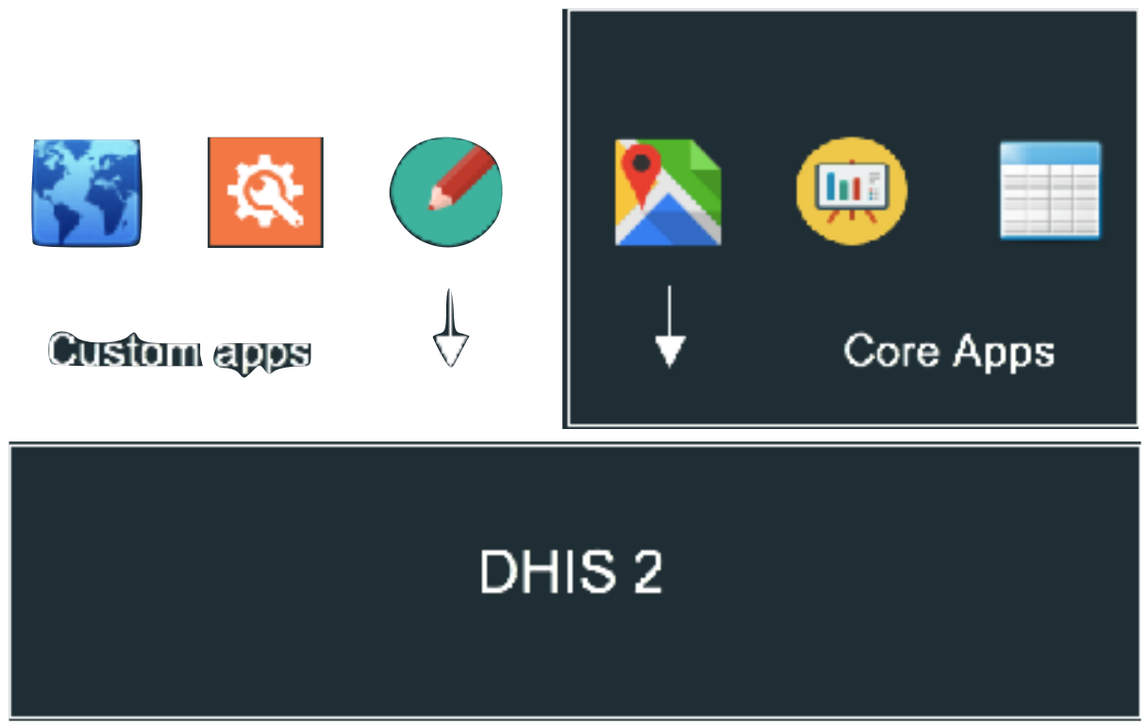
- Increased and more diverse use meant more need for tailor-made solutions

- Solution was to make DHIS2 a platform with support for 3rd party apps

- Development of extensive web API

Platform

- Built-in apps/modules also being “appifield”
- Indistinguishable for end users

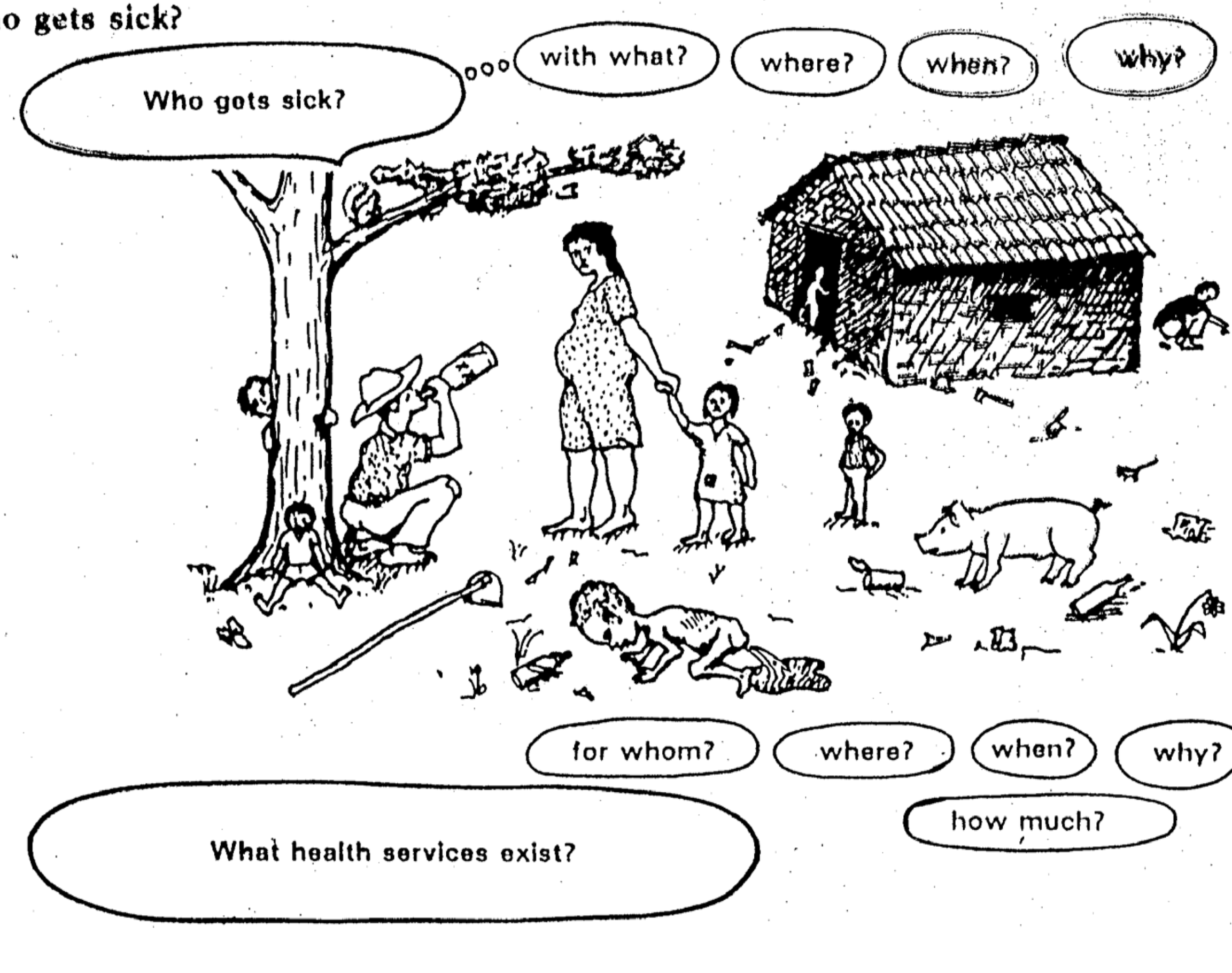


Data Model

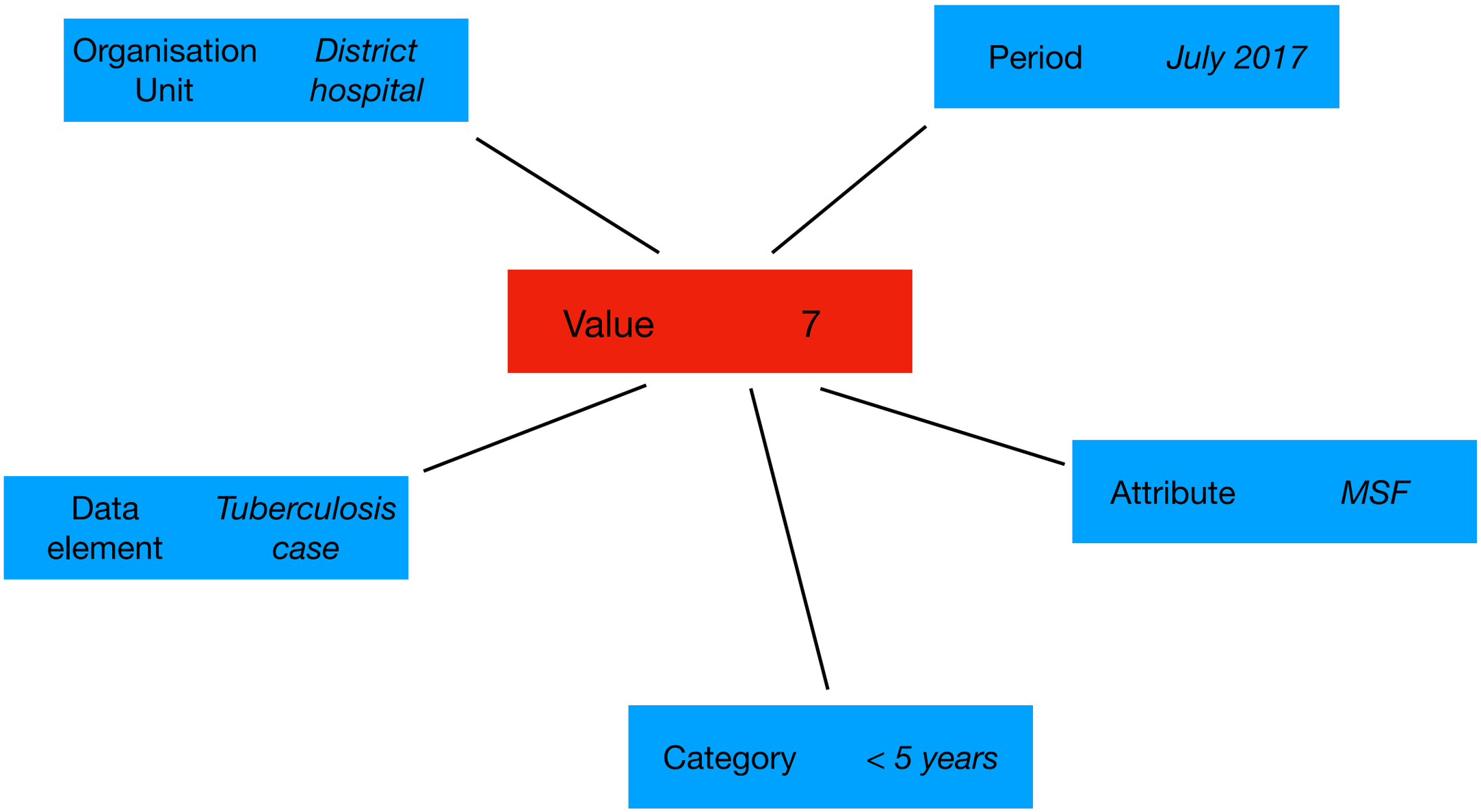
Key elements

- Organisational units
- Data elements and indicators
- Data sets and tracker programmes
- Users, user roles and user groups

Who gets sick?



Data dimensions



Organisation Units

- The WHERE

- Organised in hierarchy - normally corresponding to administrative hierarchy with health facility at lowest level

- Organisation units *groups* provide:

  - classification used for analysis and disaggregation (e.g. facility type)

  - "alternative" hierarchies for analysis

Data Elements

- The WHAT
- Describes the (health) event, service provided etc
- Numbers, text, drop downs, boolean, dates++
- Can be disaggregated by data element categories

Categories and Category Combinations

- Disaggregations of the WHAT
- Most common use is for age and sex disaggregations
- Categories are combined in category combinations
- Category combinations can be applied to data elements and data sets

Category options	Categories	Category combinations	Data elements	Data set
male	sex	sex and age	malaria cases	malaria form
female	age		malaria deaths	
< 5 years				
≥ 5 years				

	Male < 5 years	Female < 5 years	Male ≥ 5 years	Female ≥ 5 years
Malaria cases				
Malaria deaths				

Data Sets

- Collection of data elements
- Corresponds to a (paper) “reporting form”
- Used for data entry, by period and organisation unit
- Can be disaggregated by a category combination - *attribute* dimension

Tracker Programmes

- Tracker *programmes* consist of one or more stages - corresponds to (health) “events”

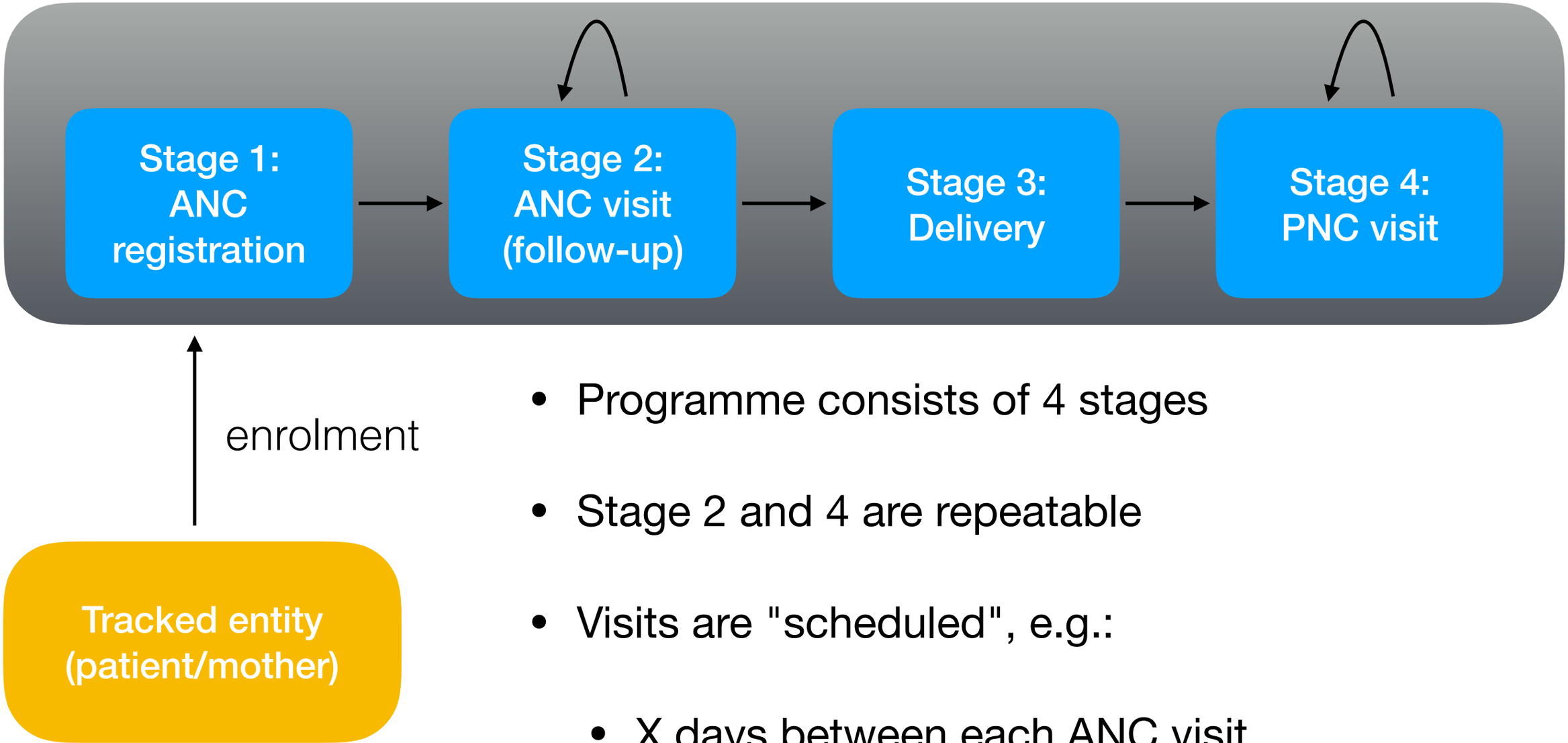
- Data elements are assigned to each stage

- *Tracked entities* (often persons) are *enrolled* in programmes*

- Typically used for longitudinal tracking of patients

*A special type of tracker programme based on single events is not linked to tracked entities

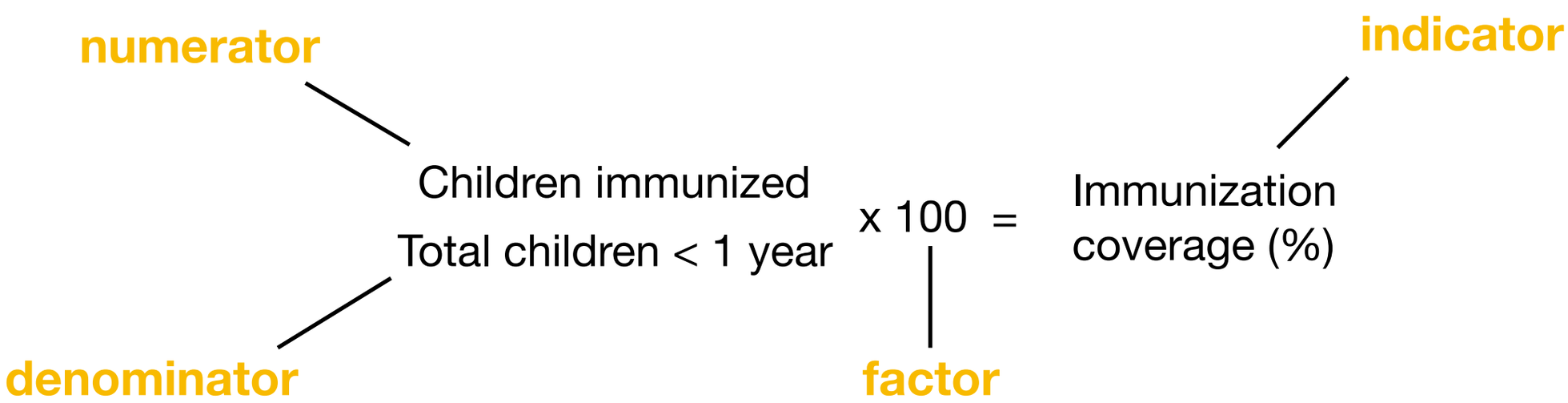
Tracker Example



- Programme consists of 4 stages
- Stage 2 and 4 are repeatable
- Visits are "scheduled", e.g.:
  - X days between each ANC visit
  - X days from LMP to delivery stage

Indicators

- Calculated values based on data elements
- Used for analysis of data



Users

- Users are managed through user roles and groups
- User roles define:
  - access to perform tasks and see modules
    - access to data entry for data sets and programmes
- User groups define:
  - access to metadata objects through *sharing*
- Users are assigned to organisation units - restricts access

Sharing

- "Sharing" functionality controls access to view and edit metadata:
    - data elements, indicators, data sets, programmes, analytical outputs etc
- In most MoH databases all metadata is "public"
- Allows multiple "views" to the same system (multiple systems in a system)
- Can be used to simplify system for user by hiding irrelevant metadata

Demo

- Dashboard
- Apps and app management
- Aggregate data
    - Data entry
    - Analysis tools
- Tracker data
    - Data entry
    - Analysis tools

Installing DHIS2

- Full/production installations use Tomcat
- DHIS2-live package can be used for testing
- PostgreSQL for backend - demo database available
- Can be downloaded from https://dhis2.org/downloads