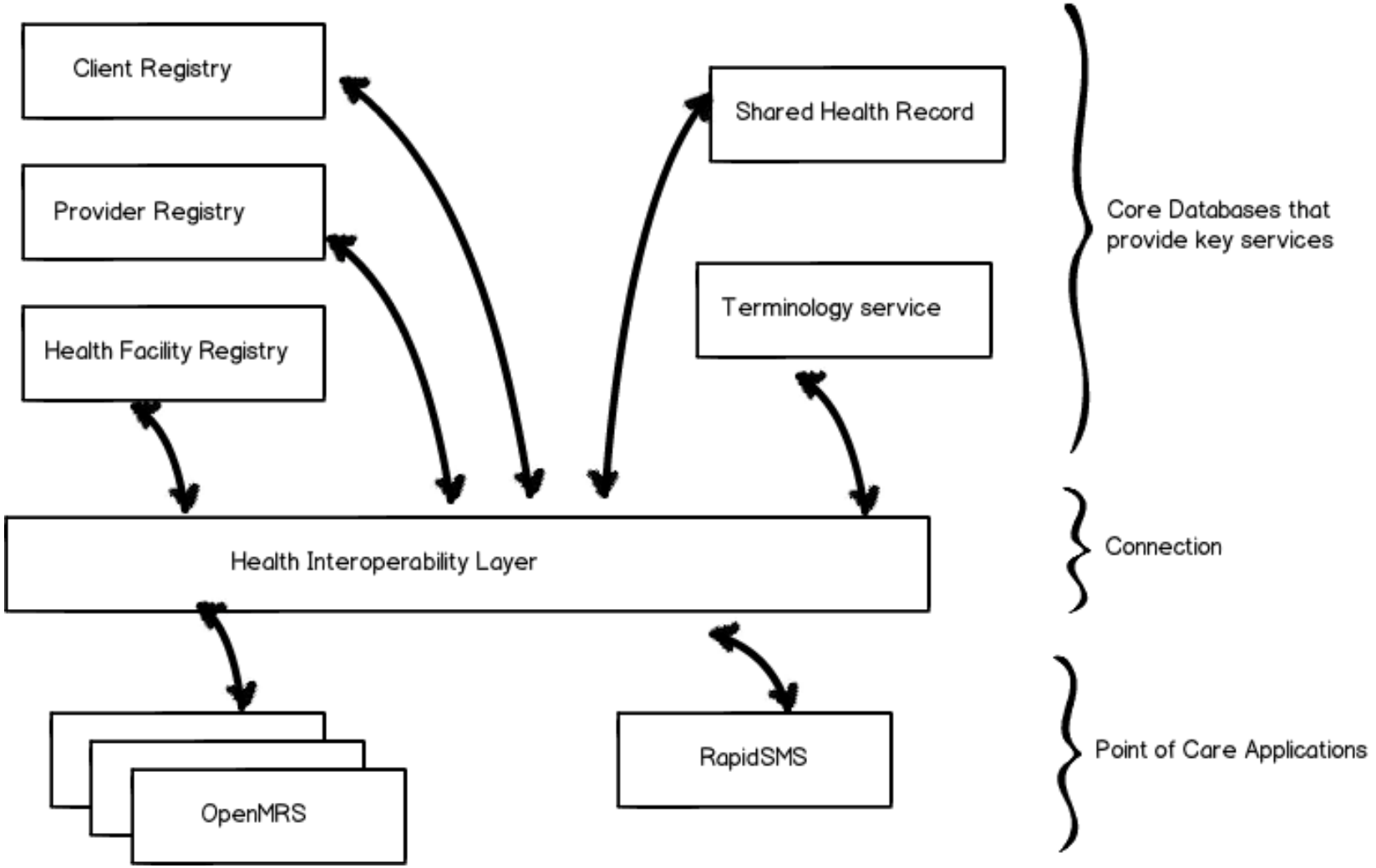
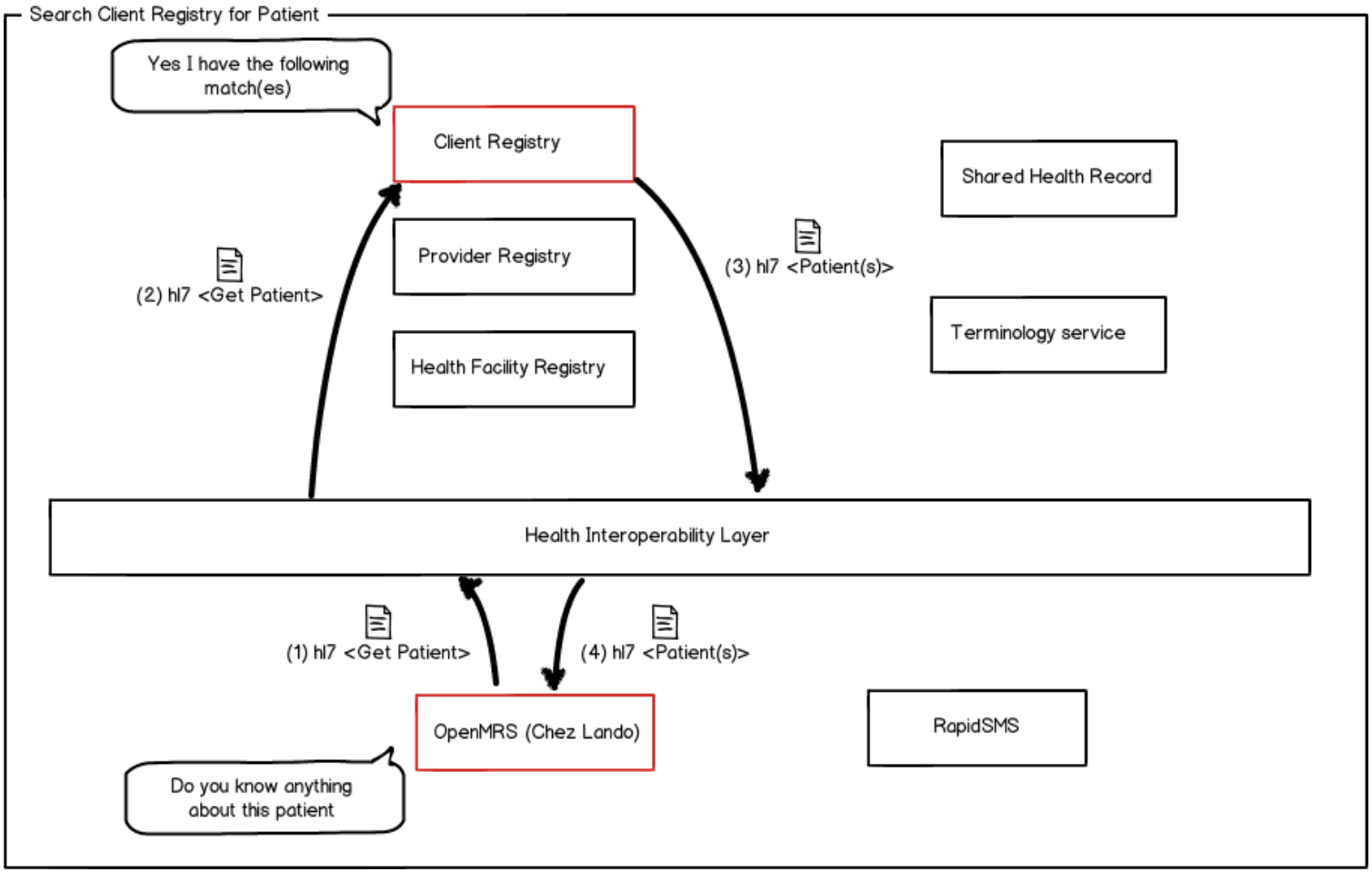
RHEA HIE Overview

Sample Scenario

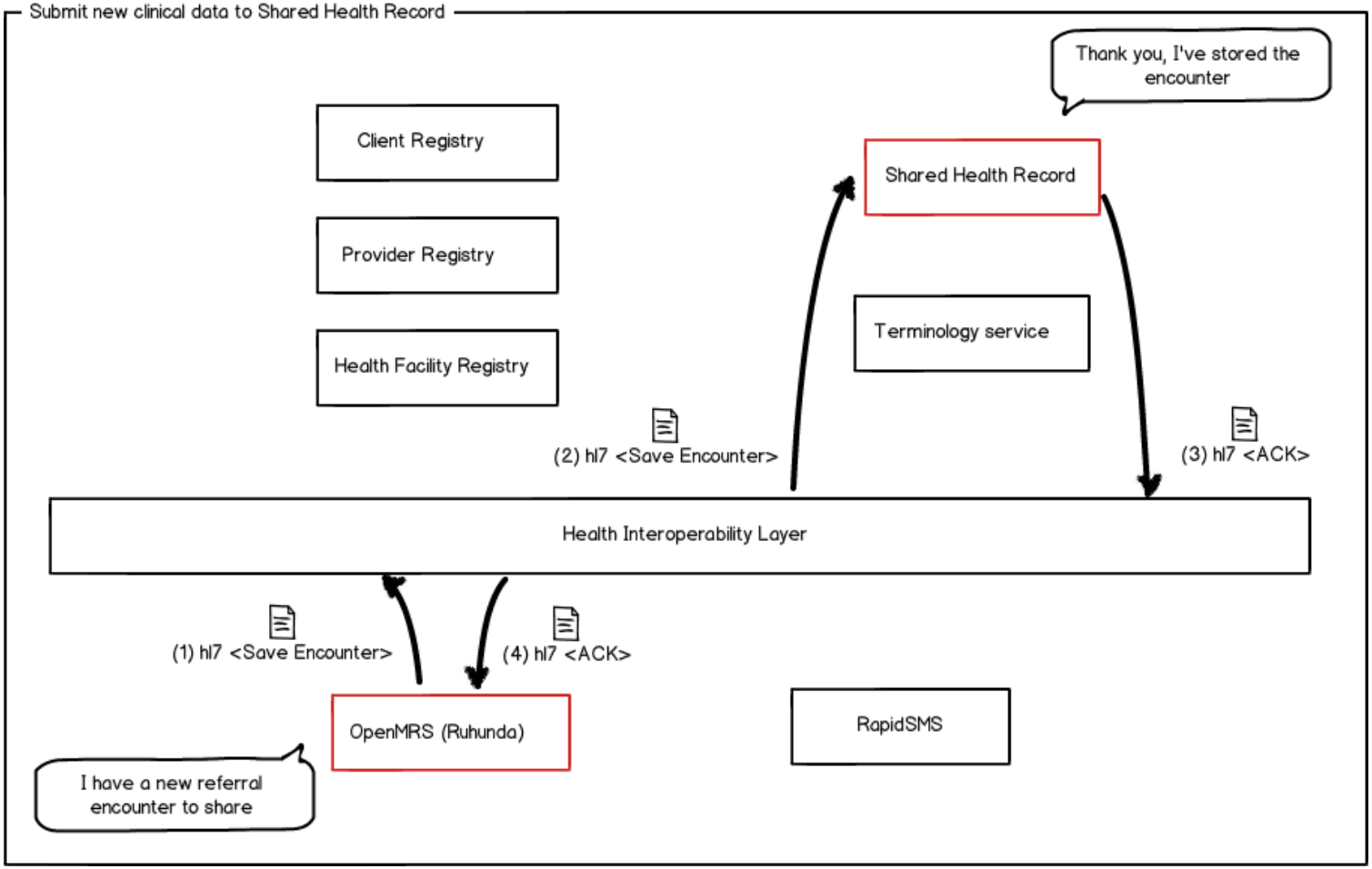
Health Information Exchange (HIE)



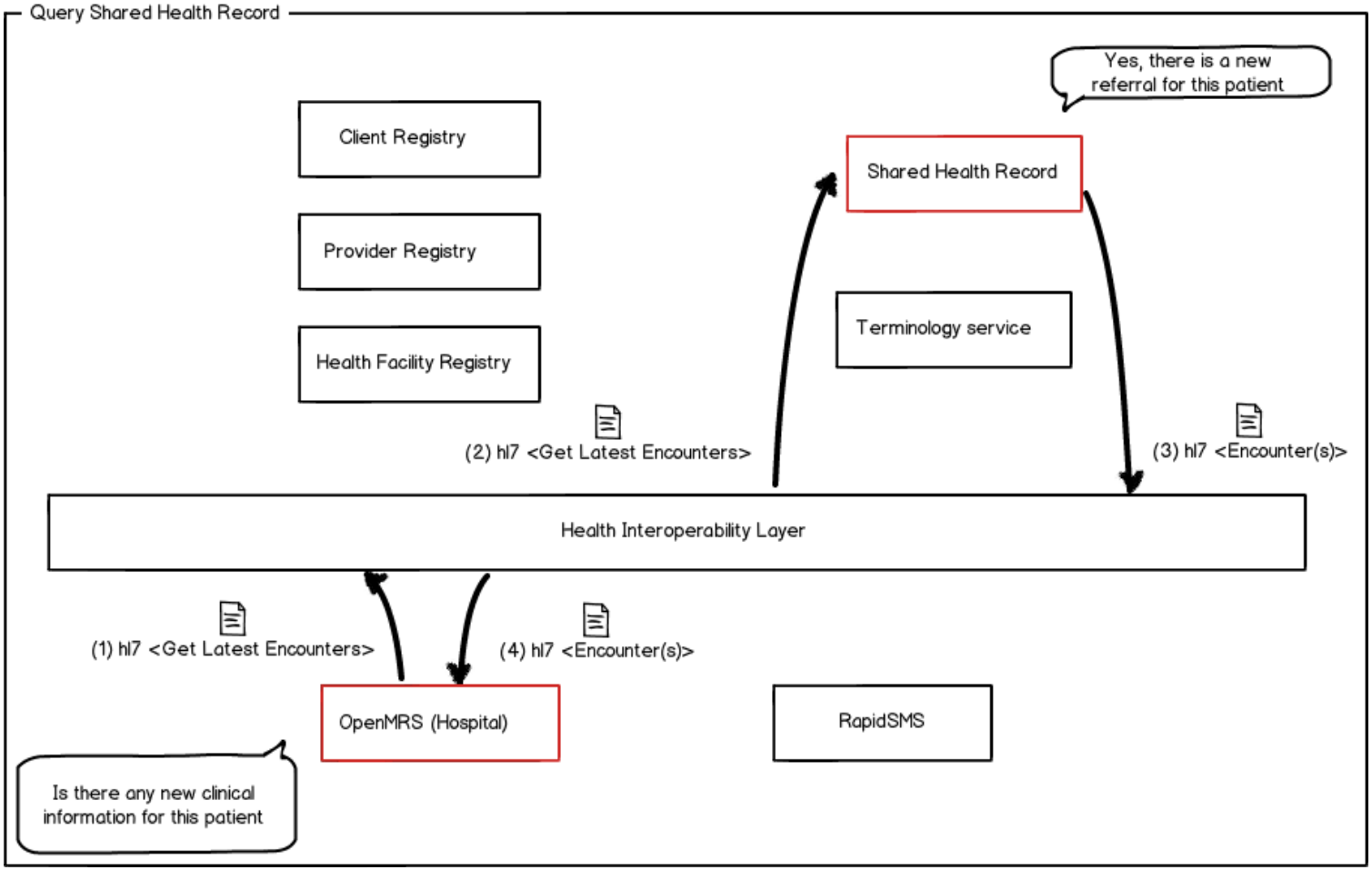
Patient Search



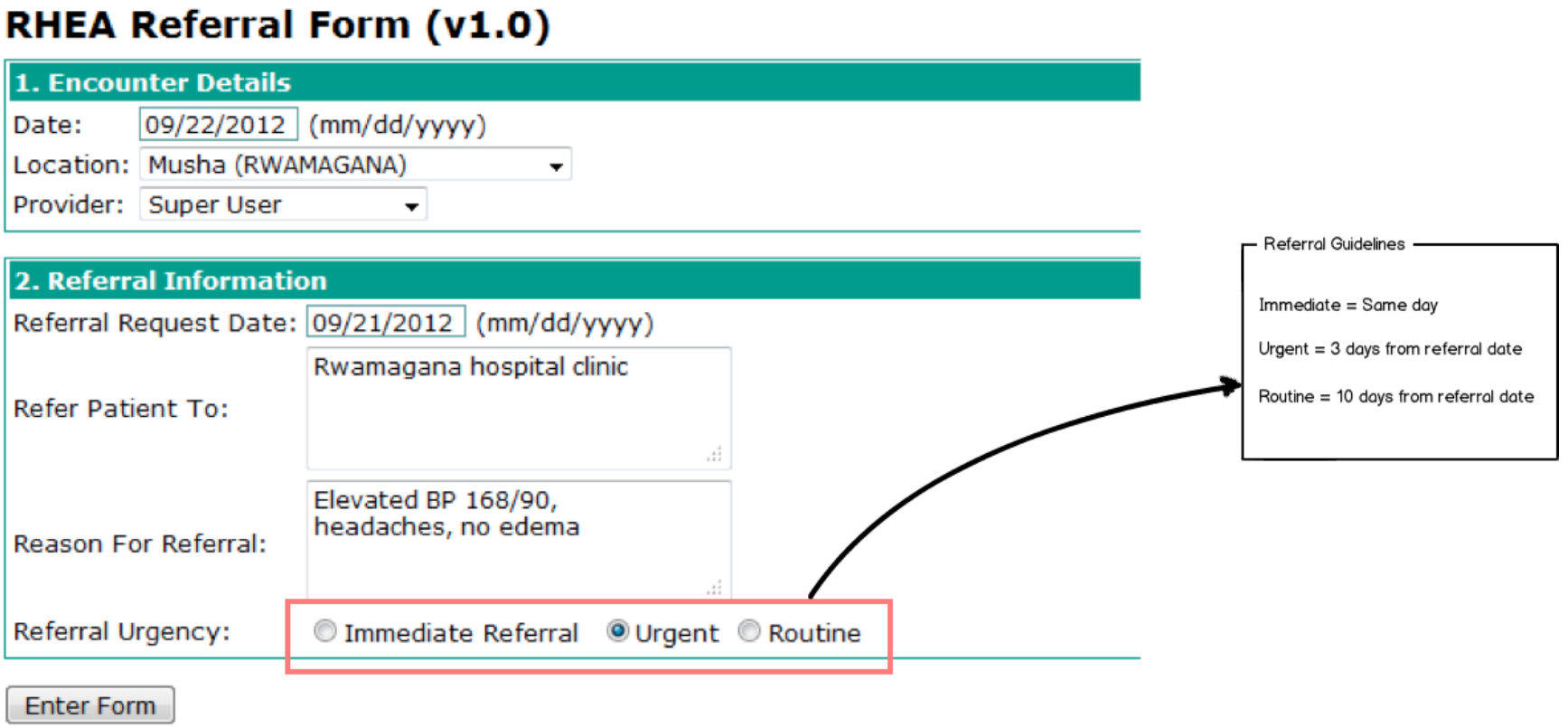
Sharing patient data across facilities (Posting new information)



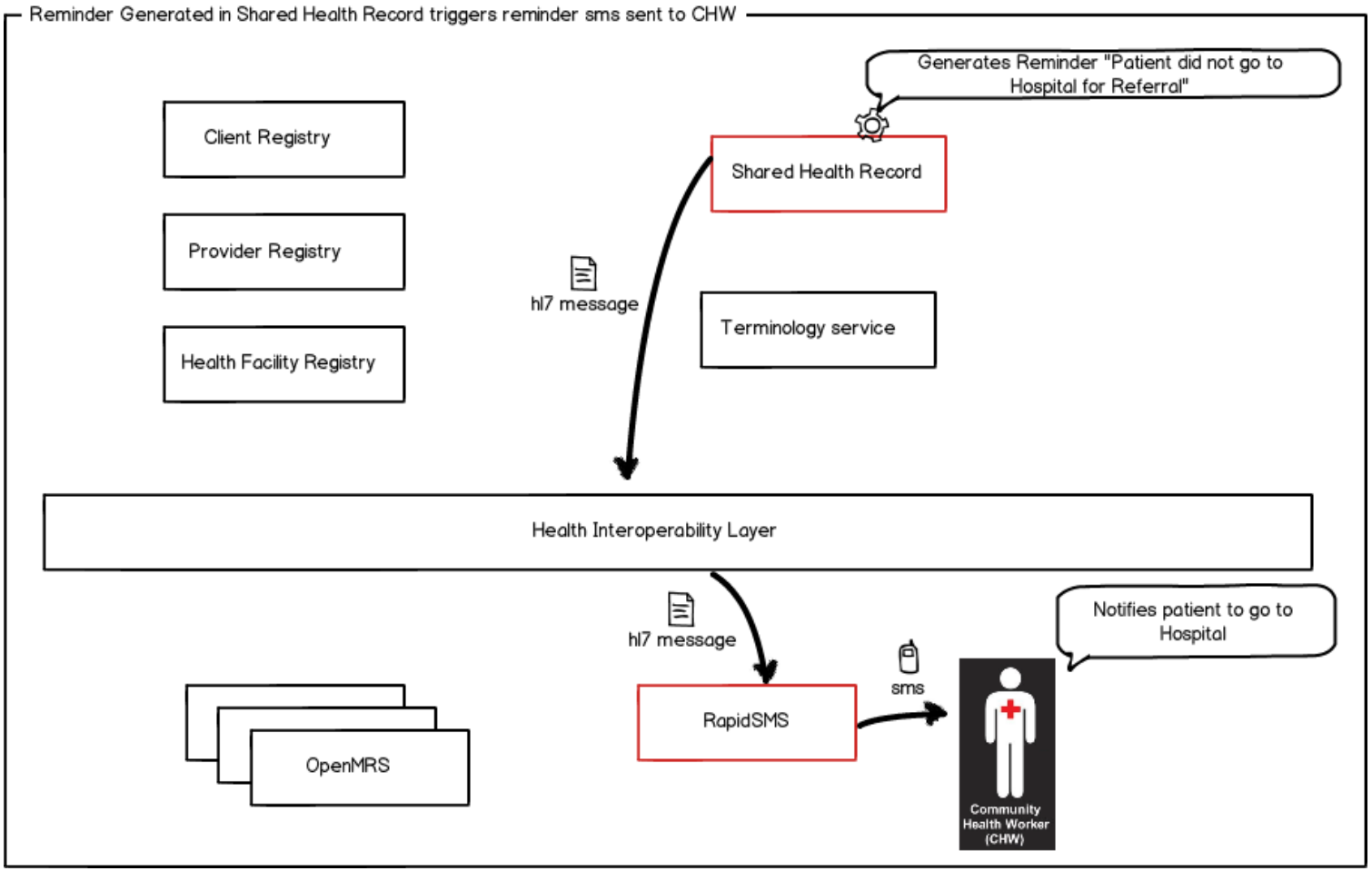
Sharing patient data across facilities (Retrieving information)



Referral Guideline



Automated Reminders via SMS



Facility Registry

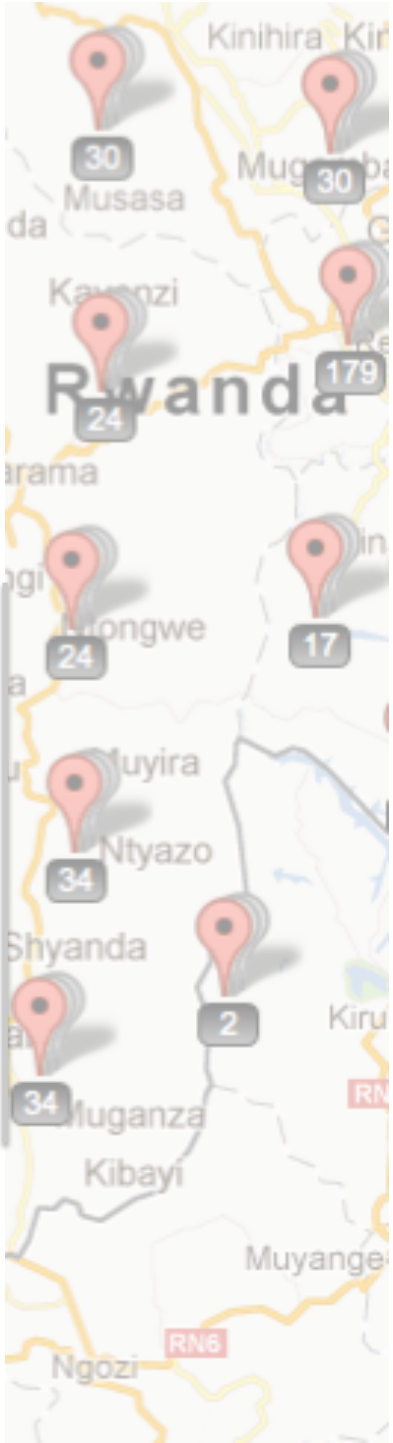
FR: Facility Registry

- Business function:
  - Registry of facilities, services provided, and other metadata

- Based on:

Tech	Design	Integration
Ruby on Rails,	Started in Cambodia	REST API
MySQL,	2 ys. ago, local devs	Trigger/Event Streams
ElasticSearch	Used by NGOs in national projects	
Google Maps & OSM		

- Team: RHEA Team & InSTEDD developers (iLab + Platform)



Key Functionality

- Browse, query, filter, manage data
- Visualize in maps & lists
- Define facility information schema
- Manage visibility & read/write permissions
- Expose API for data changes and event triggers
- Keep historical version sets (see past data)
- Expose XML, JSON and GeoJSON APIs
- Plug-ins for
  - Advanced Permissions
  - Thresholds, Alerts
  - Mobile queries, updates, staff reminders

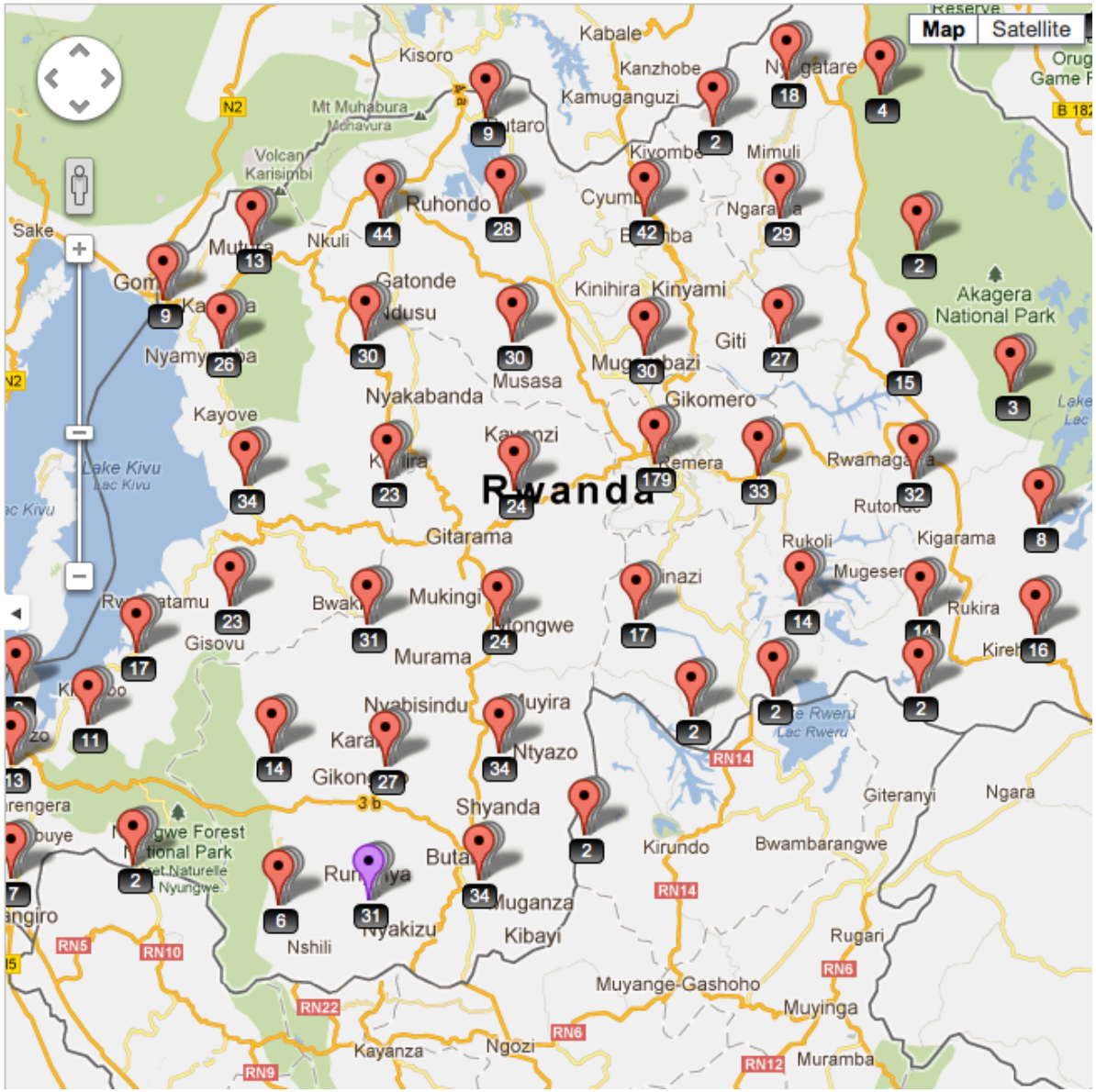
Group by Admin Hierarchy | Refine results ▸ | Search

Rwanda Health Facility Registry

Export this result in RSS , JSON or CSV 1039 sites

- VILLE DE KIGALI
- SUD
  - NYANZA
  - GISAGARA
  - NYARUGURU
  - HUYE
    - Gishamvu
      - Busoro-Gishamvu
      - Busoro-gishamvu MU
    - Huye
    - Karama
    - Kigoma
    - Kinazi
    - Maraba
    - Mbazi
    - Mukura
    - Ngoma
    - Ruhashya
    - Rusatira

Create Site



Next Steps

RHEA (Suggestions)

- DHIS2 Integration
- Evaluate further use cases and needs of MOH
- Further capacity building in hosting ops & dev on API

General:

- Continue to evolve from other applied use worldwide
- Continue to work on plug in designs

SHR: Shared Health Record

- Business function:
  - Maintain a person centric longitudinal health record.
- Technology built on:
  - OpenMRS – custom module
  - HL7 message standards
- Technical Team
  - Jembi Health Systems, OpenMRS community

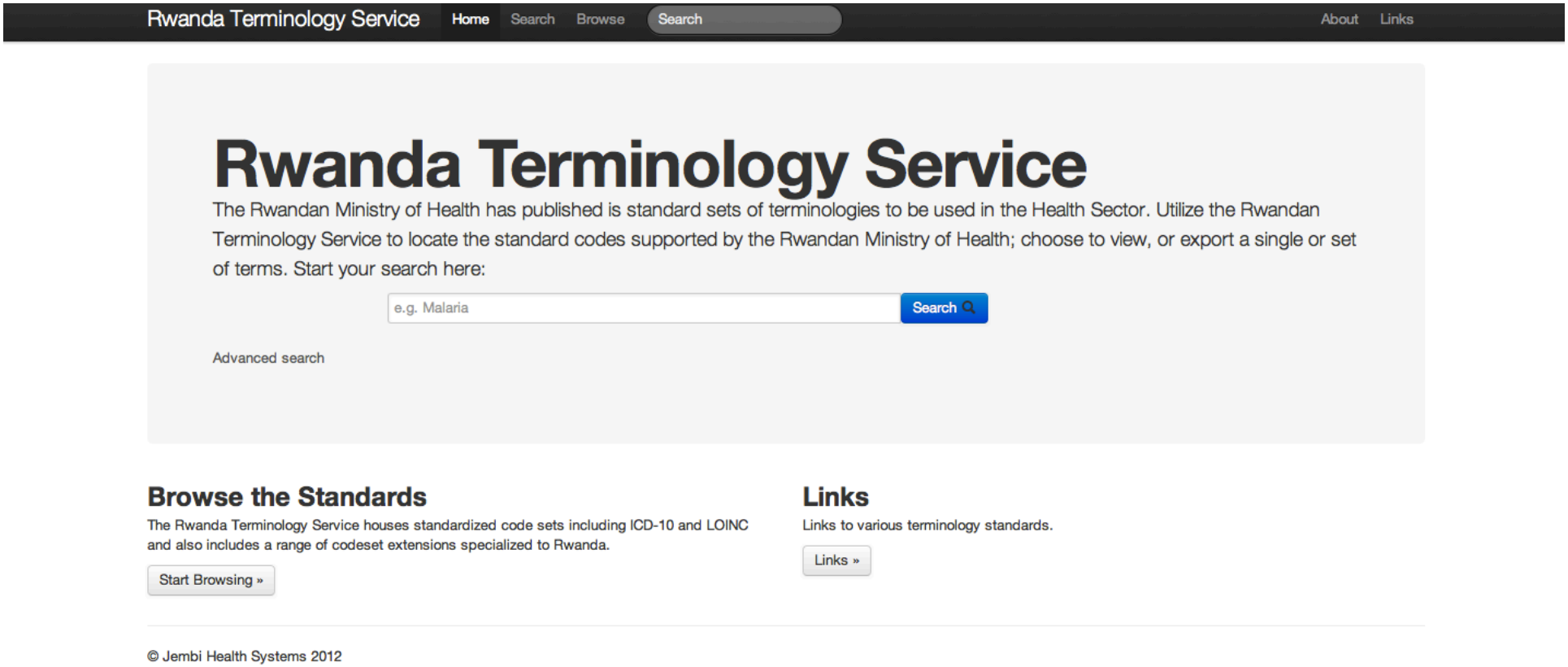
What does it do? | Services

- Storage and retrieval of patient data
- Maintains a longitudinal health record
- Business Alerting : Triggers SMS alerts
- Auditable
- Web services
    - λ Post patient encounter
    - λ Get previous patient encounters
- HL7 Messaging format

Possible Next Steps | Future feature

- Performance testing and tuning for 11 million people
- Link to Indicator Reporting systems
- Advanced Business alerting

TS: Terminology Service



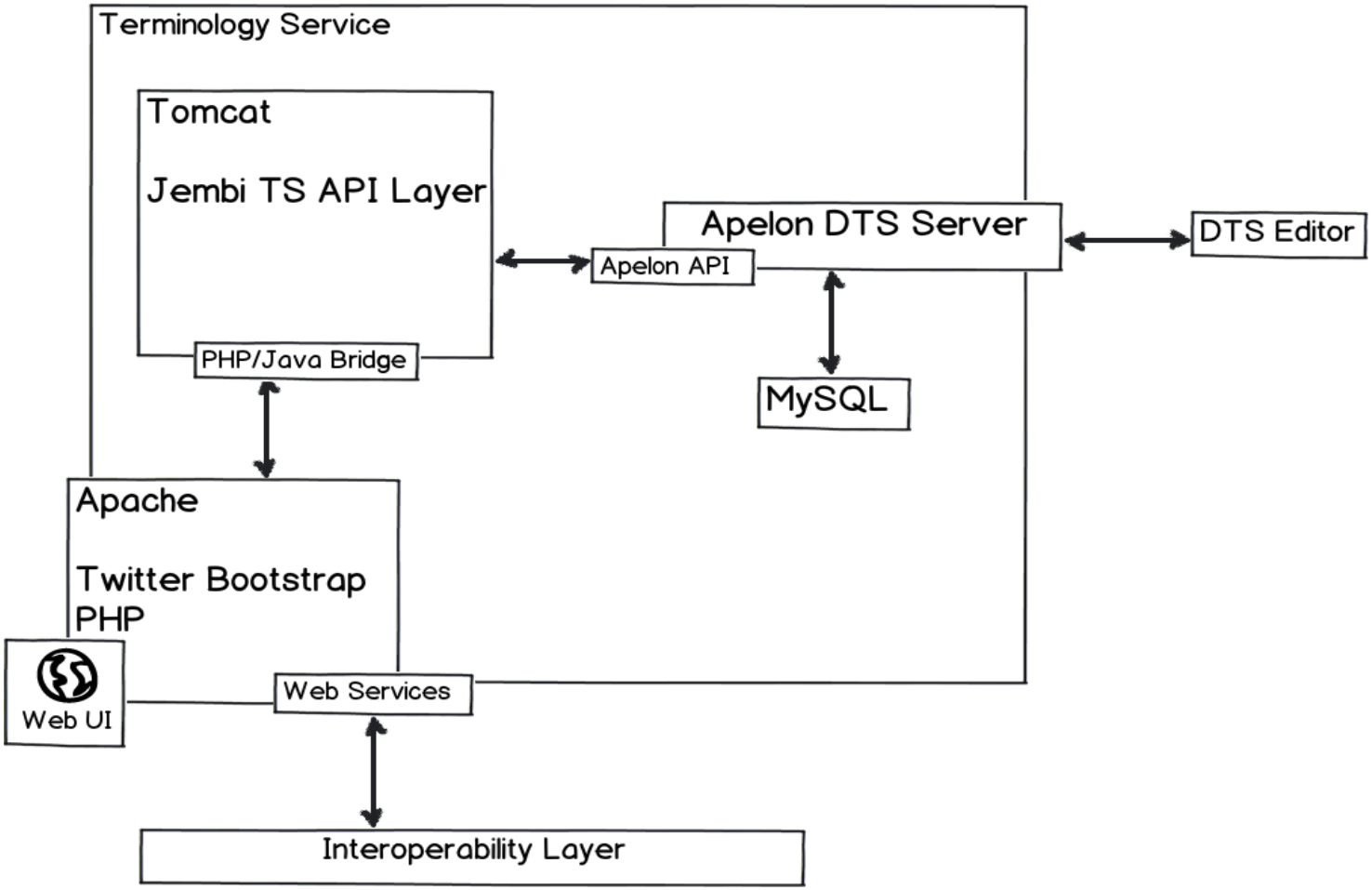
TS: Terminology Service

- Business function:
  - Promote semantic interoperability between systems/components by providing terminologies for common reference
- Technology built on:
  - Apelon DTS
  - HTML/PHP/Javascript/Java/Twitter bootstrap
- Technical Team
  - Jembi Health Systems

What does it do? | Services

- Storage of terminology sets
- ICD10, LOINC, Rwanda Extension to LOINC, and lots more
- Interfaces:
  - DTS Editor
  - Website
  - Web service interface

Structure


Terminology Service
Tomcat
Jembi TS API Layer
PHP/Java Bridge
Apelon DTS Server
Apelon API
DTS Editor
MySQL
Apache
Twitter Bootstrap
PHP
Web UI
Web Services
Interoperability Layer

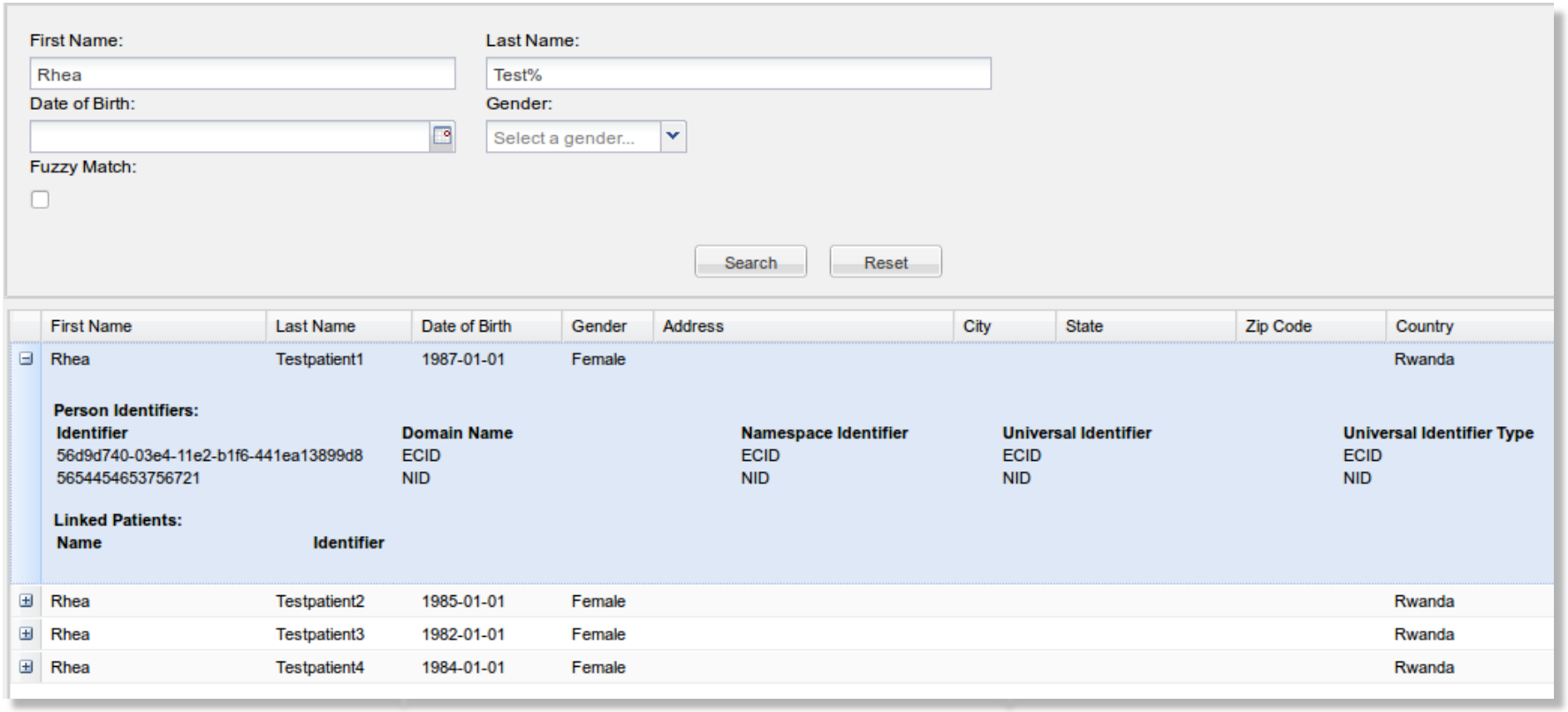
Client Registry (CR)

- Business function: the CR identifies the same patient across different health settings so that clinical data from separate sources can be integrated to provide a comprehensive portrait of care.
- The technology is built on OpenEMPI, the Open Source Enterprise Master Patient Index, which uses Java, Postgres, IHE PIX/PDQ standards (http://openempi.kenai.com)
- Technical Team: Includes leadership by SYSNET International, Regenstrief Institute

What does it do? | Services

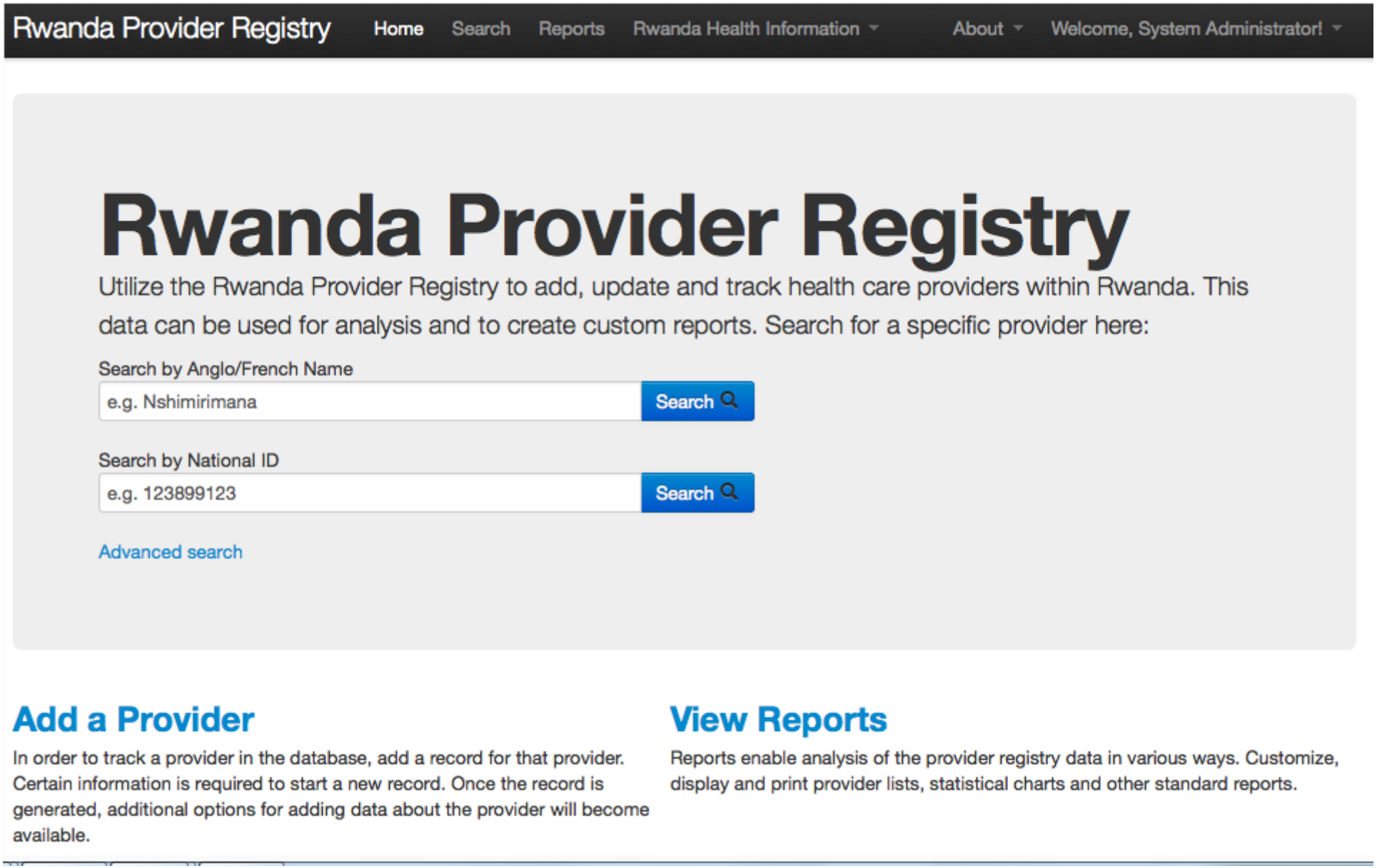
- Stores and retrieves de-duplicated patient demographic data
- Uses sophisticated methods to identify duplicate records
- OpenEMPI was designed using an extensible, Service Oriented Architecture approach.
- Interfaces include:
  - IHE PIX/PDQ Interface
  - REST-based Web service interface
  - Java & EJB APIs

What does it look like



Possible Next Steps | Future features

- Scalability: Ensuring the system response exceeds expectations as it scales to 9 million people
- Customization: Supporting tailored data elements across varying clinical environments
- Match Intelligence: Augmenting the matching engine with additional algorithms and methods
- Workflow: Enhancing end-user workflows for algorithm tuning and match-management.


Rwanda Provider Registry
Home
Search
Reports
Rwanda Health Information
About
Welcome, System Administrator!
Rwanda Provider Registry
Utilize the Rwanda Provider Registry to add, update and track health care providers within Rwanda. This data can be used for analysis and to create custom reports. Search for a specific provider here:
Search by Anglo/French Name
e.g. Nshimirimana
Search
Search by National ID
e.g. 123899123
Search
Advanced search
Add a Provider
In order to track a provider in the database, add a record for that provider. Certain information is required to start a new record. Once the record is generated, additional options for adding data about the provider will become available.
View Reports
Reports enable analysis of the provider registry data in various ways. Customize, display and print provider lists, statistical charts and other standard reports.

RHEA PR: Provider Registry

- **Business function:**
  - Register providers from multiple sources and validate provider data from PoC applications before they enter the shared health record.

- **Technology built on:**
  - **LDAP** – data store (provider and posts for web services)
  - **MySQL** – database (lists (e.g. jobs) & search for user interface)
  - **Twitter Bootstrap** – User Interface
  - **iHRIS** – PHP middleware (provides HRH business & interface logic)
  - ***Moodle*** *– eLearning system*

- **Technical Team**
  - IntraHealth International, Inc + Capacity*Plus* partnership (TRG, LATH, IMA)
  - RHEA collaborative
  - More to be added in next phase

What does it do? I Services

- Storage and retrieval of provider data
  - Consolidates key information from multiple sources
- Allows addition and edits by
  - User interface
  - Updates from national HRHIS (for paid/public sector)
- Additional interfaces
  - LDAP
  - Web services for HIM
- Multiple roles supported e.g…
  - Administrator
  - Provider Manager
- Powerful reporting capability

Search Provider

Use search fields to locate a specific provider and related postings.

Results found : 20

#	Rwandan Name	Anglo/French Name	National ID	Category/Cadre	Type	Last Post Facility	Facility	Start Date	End Date	Last Post Locati
1		Gilbert NTAGANDA	1197980035033091		Paid Public Sector					
2		Gilbert E Karonkano Rutayisire	1197980124719077		Paid Public Sector	King Faisal Hospital Provincial Hospital	King Faisal Hospital			
3		Gilbert Munyemana	1198680175218001		Paid Public Sector	Nyamure Health Center	Nyamure			
4		Gilbert Maniriho	1198380019165028		Paid Public Sector	Rutare Health Center	Rutare			
5		Gilbert Musine	1198480187962023		Paid Public Sector	Mwogo Health Center	Mwogo			
6		Gilbert Manishimwe	1198180071771038		Paid Public Sector	Butaro Health Center	Butaro			
7		Gilberte Uwicyeza	119827014990140		Paid Public Sector	Nyamata Health Center	Nyamata			
8		Gilbert Nyandwi	1198680005267025		Paid Public Sector	CHK/CHUK Provincial Hospital	CHK/CHUK			
9		Gilbert Habimana	1198380047661084		Paid Public Sector	Kibilizi HD District Hospital	Kibilizi HD			

Search Fields

Save as default view

Rwandan Name

Anglo/French Name

Gilbert

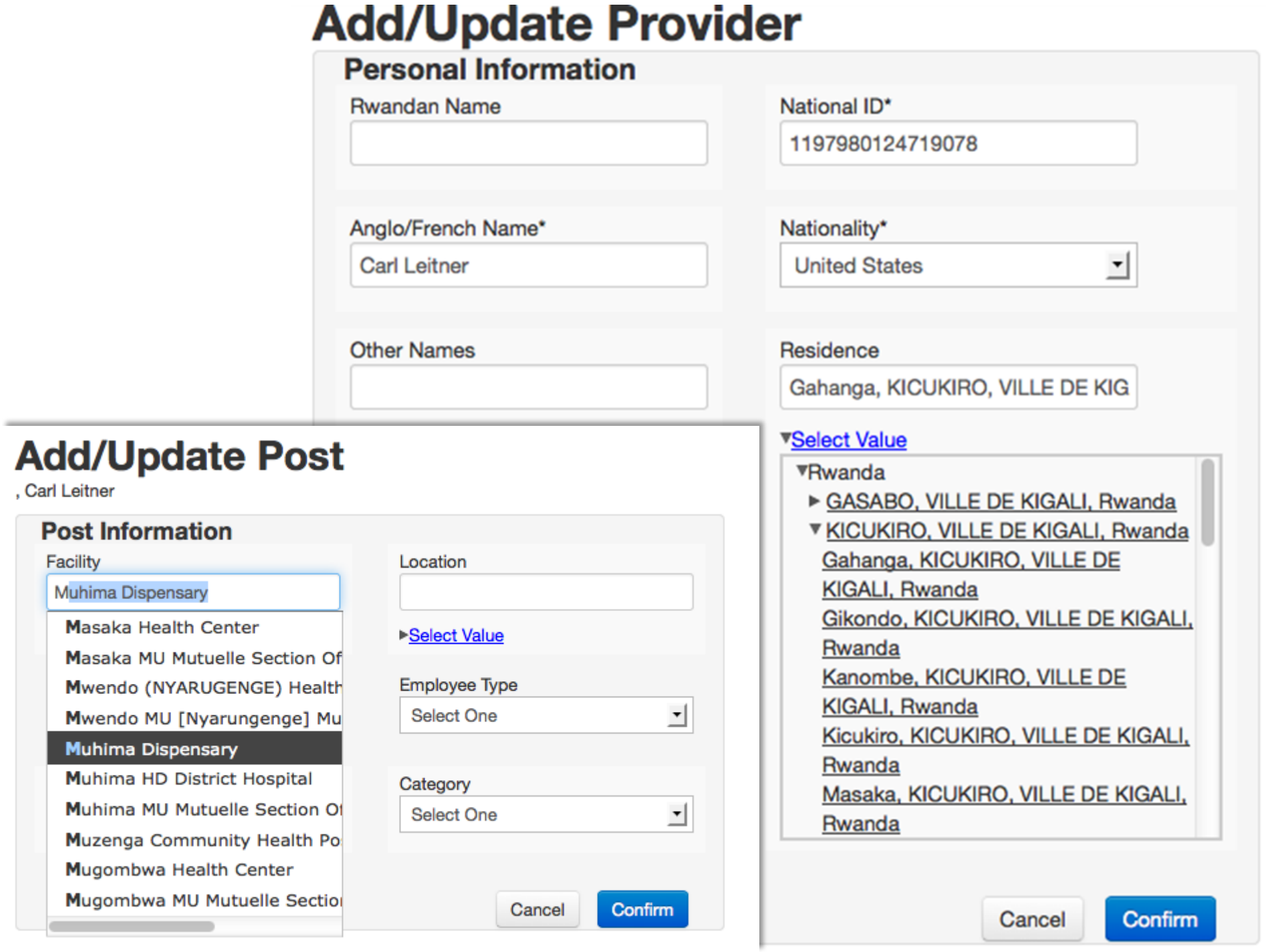
National ID

CSR

Mutuelle

Passport

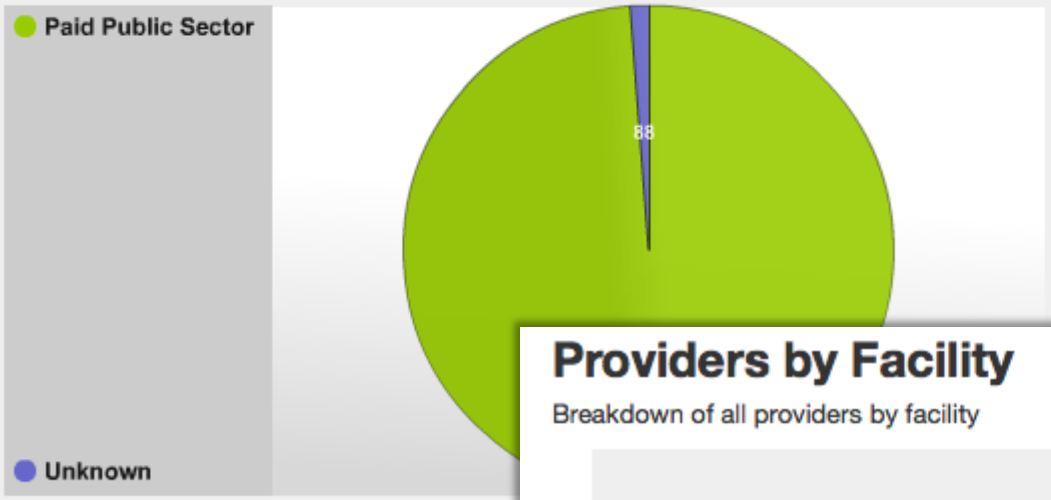
Search


Add/Update Provider
Personal Information
Rwandan Name
National ID*
1197980124719078
Anglo/French Name*
Carl Leitner
Nationality*
United States
Other Names
Residence
Gahanga, KICUKIRO, VILLE DE KIG
Select Value
Rwanda
GASABO, VILLE DE KIGALI, Rwanda
KICUKIRO, VILLE DE KIGALI, Rwanda
Gahanga, KICUKIRO, VILLE DE KIGALI, Rwanda
Gikondo, KICUKIRO, VILLE DE KIGALI, Rwanda
Kanombe, KICUKIRO, VILLE DE KIGALI, Rwanda
Kicukiro, KICUKIRO, VILLE DE KIGALI, Rwanda
Masaka, KICUKIRO, VILLE DE KIGALI, Rwanda
Cancel
Confirm
Add/Update Post
, Carl Leitner
Post Information
Facility
Muhima Dispensary
Masaka Health Center
Masaka MU Mutuelle Section Of
Mwendo (NYARUGENGE) Health
Mwendo MU [Nyarungenge] Mu
Muhima Dispensary
Muhima HD District Hospital
Muhima MU Mutuelle Section Of
Muzenga Community Health Po
Mugombwa Health Center
Mugombwa MU Mutuelle Sectio
Location
Select Value
Employee Type
Select One
Category
Select One
Cancel
Confirm

Providers by Type

Breakdown of all providers by type

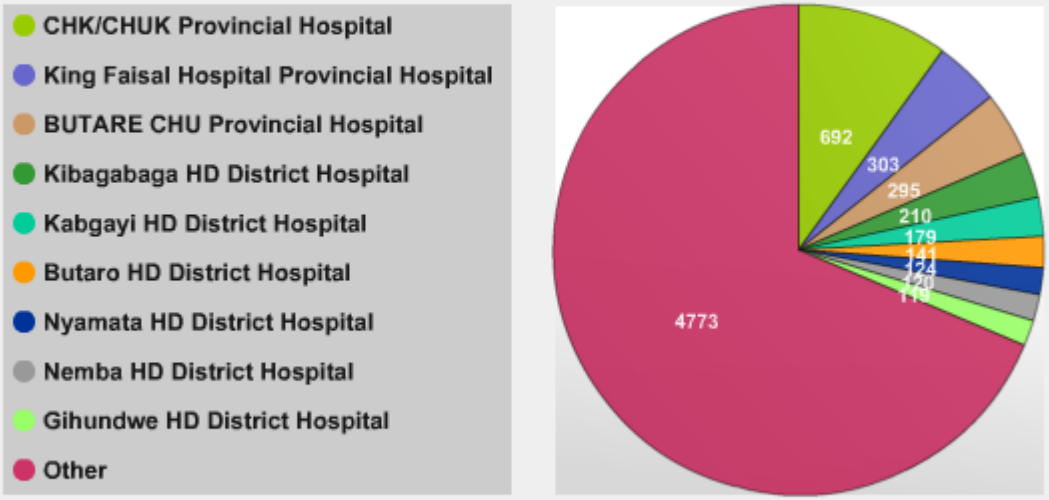
Print



Providers by Facility

Breakdown of all providers by facility

Print



RHEA Provider Registry

Navigation

Home
- My home
- Site pages
- My profile
- My courses
  - rhea-pr
    - Participants
    - General
    - Purpose of the Provider Registry
    - Using the Provider Registry
    - Provider Registry Architecture
    - Administration of Provider Registry User Interface
    - Introduction to LDAP
    - Installation of the Provider Registry
    - Provider Registry Software Development
    - Customization of the Provider Registry

Settings

News forum

Purpose of the Provider Registry

Intended audience: Data managers, system administrators, and software developers

Topics covered:

- Role of the Provider Registry in the RHEA.
- Who is considered a provider?
- What is the scope of the data managed?

Purpose of the Provider Registry
Provider Registry Validation

Using the Provider Registry

Intended audience: Data managers and software developers

Topics covered:

- Search for an existing provider
- Create a new provider
- Add deployment information to a new provider
- Edit provider details
- Handling exceptions from the interoperability layer
- Running reports
- Data quality issues

Using the provider registry

Search forums

Go
Advanced search

Latest news

(No news has been posted yet)

Upcoming events

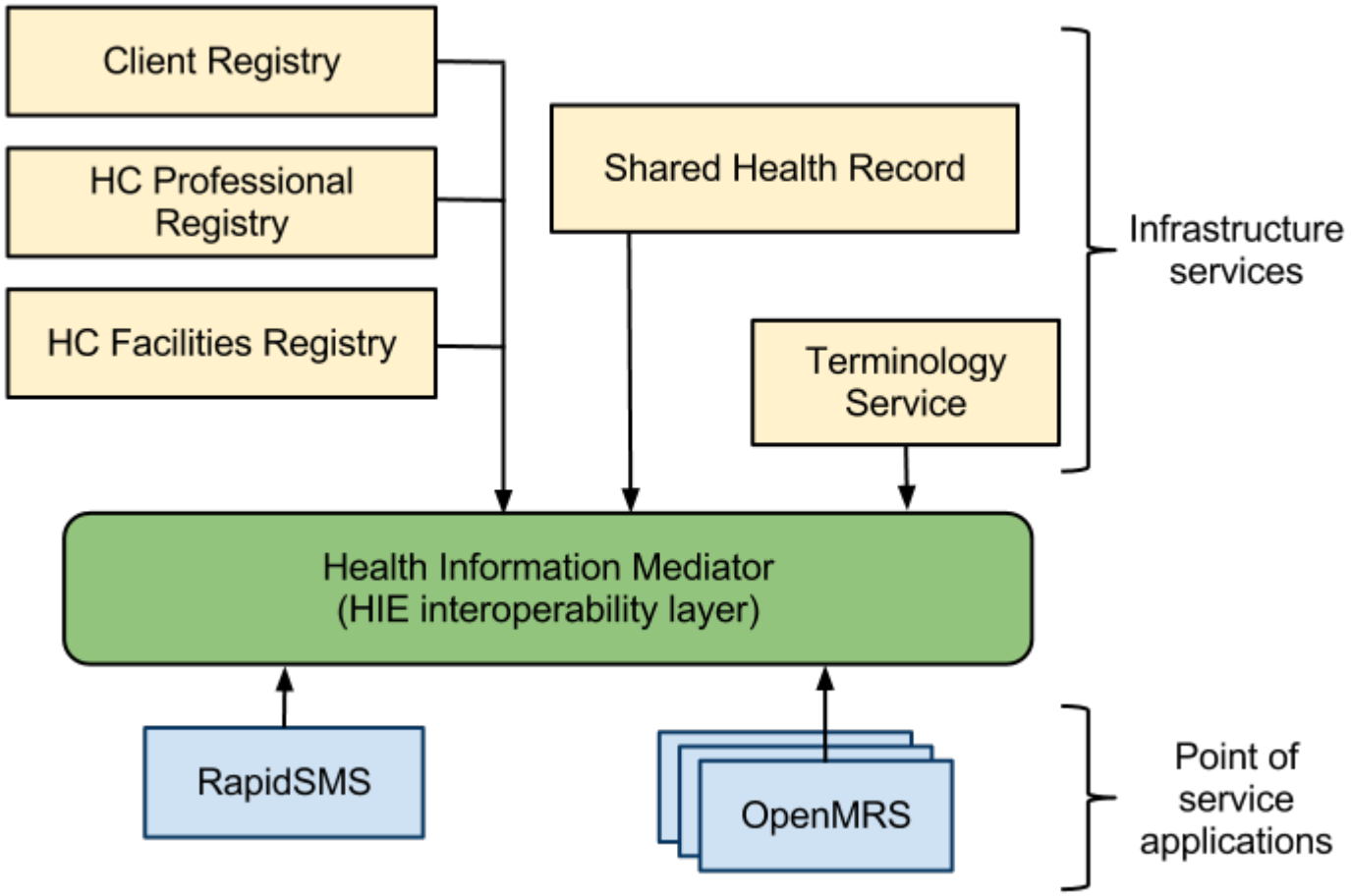
There are no upcoming events
Go to calendar...
New event...

Recent activity

Activity since Friday, 21 September 2012, 6:05 PM
Full report of recent activity...
Nothing new since your last login

Health Information Mediator

What is the Purpose of RHEA? - Information sharing between sites

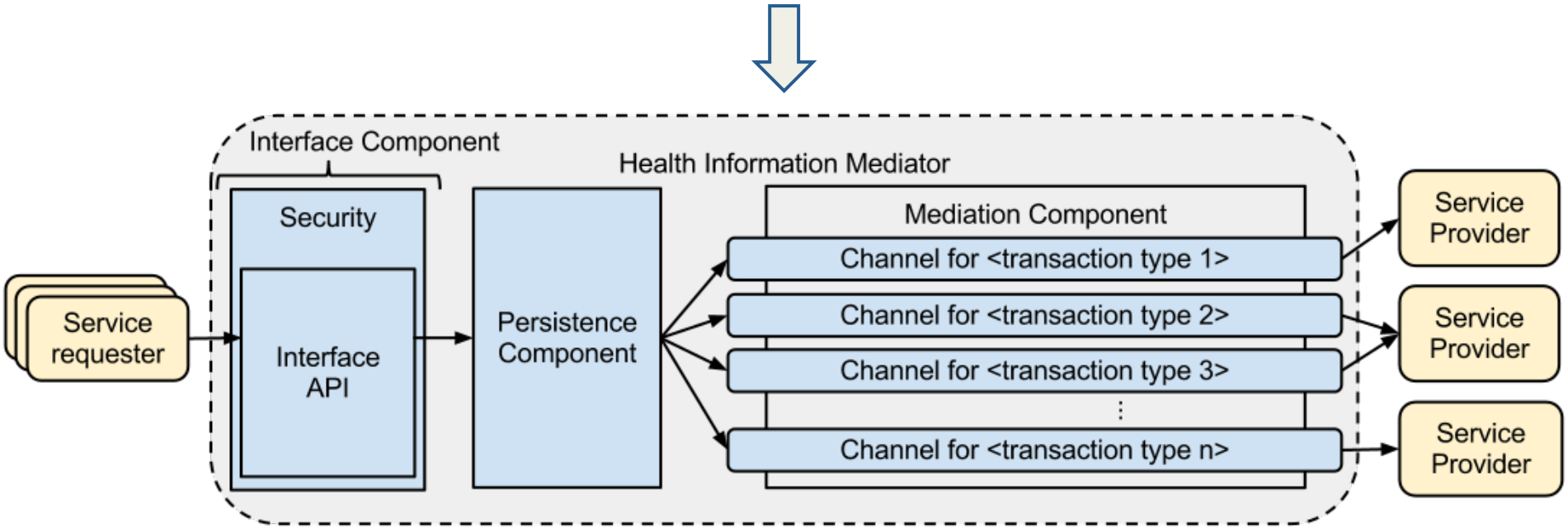


Requirements and challenges of Interoperability

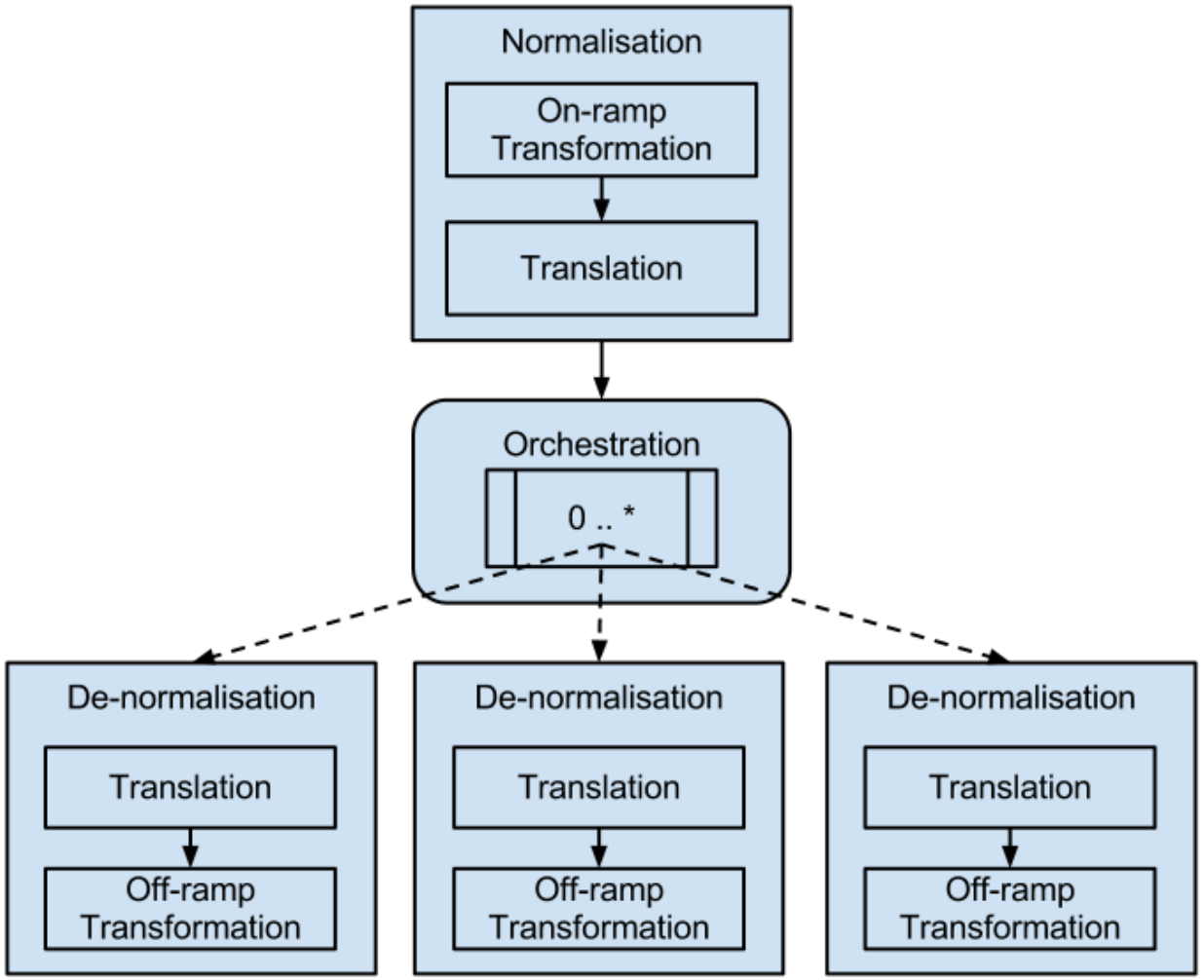
- Facilitate interoperability between disparate and heterogeneous systems, both existing and future.
- Adapt and scale within a changing environment
- Local changes should not propagate through the system
- Provide a low barrier to entry to connect new and legacy systems

HIM = {I, P, M}

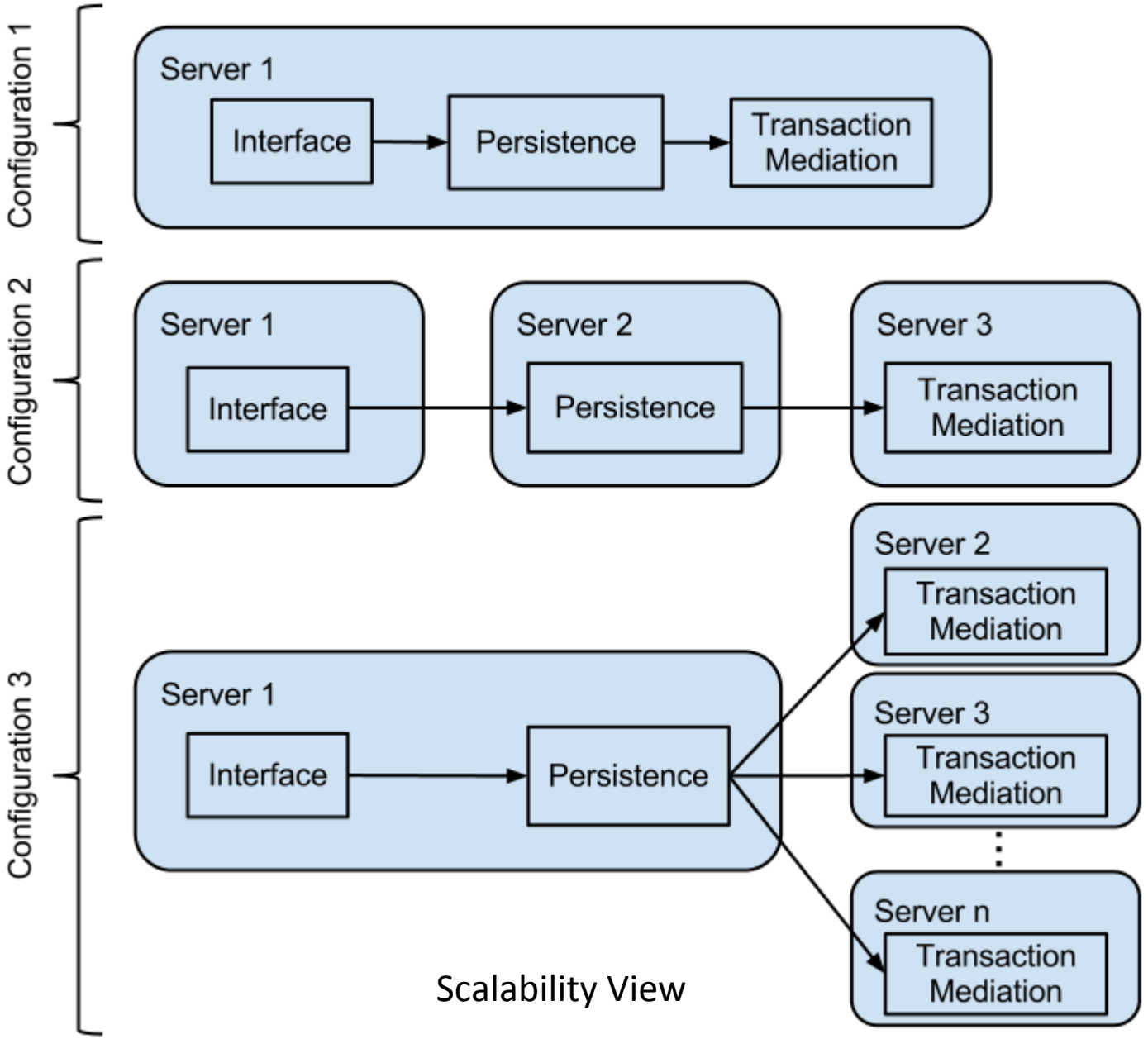
Enterprise Service Bus approach



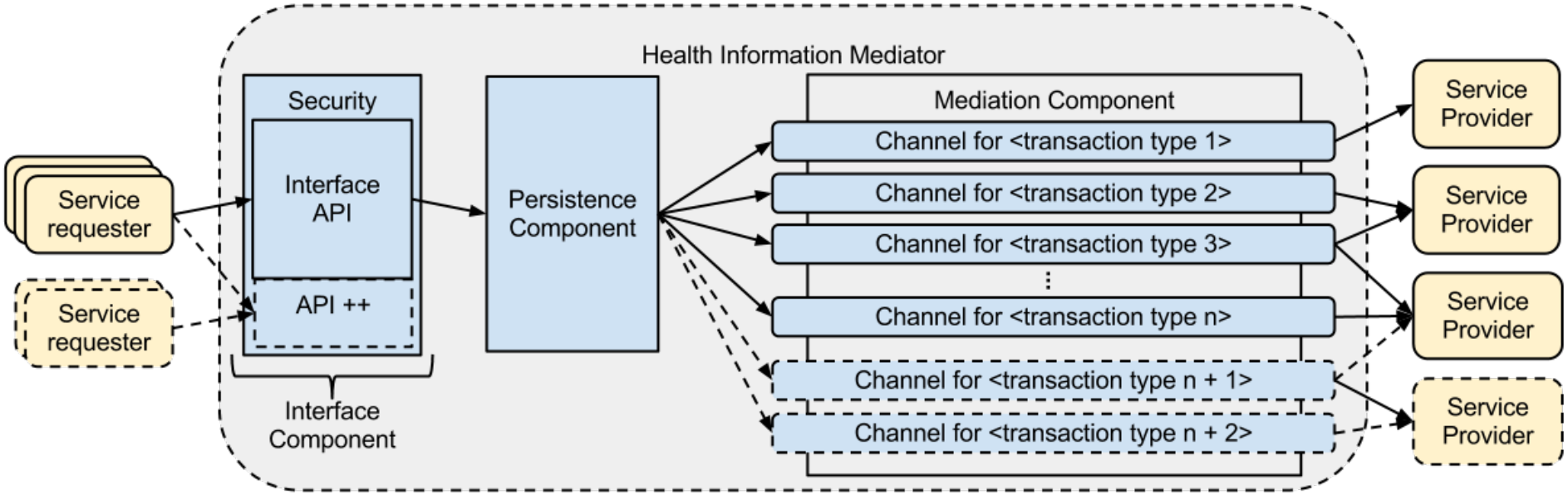
Overview of the HIM Components



Mediation Component



Scalability View



Adaptability View

Analysis

- Currently being implemented in Rwanda
- API hides complexity of infrastructure
  - facilitates easy interoperability between disparate HISs
- Encourages local autonomy
- The HIM does not prescribe a data exchange format

Conclusion

- Future Work
  - Developing a more general framework
  - Security architecture
- Proposed architecture proves to
  - facilitate easy interoperability, promote local autonomy
  - scale and adapt
- We currently have a functioning reference implementation of this architecture