



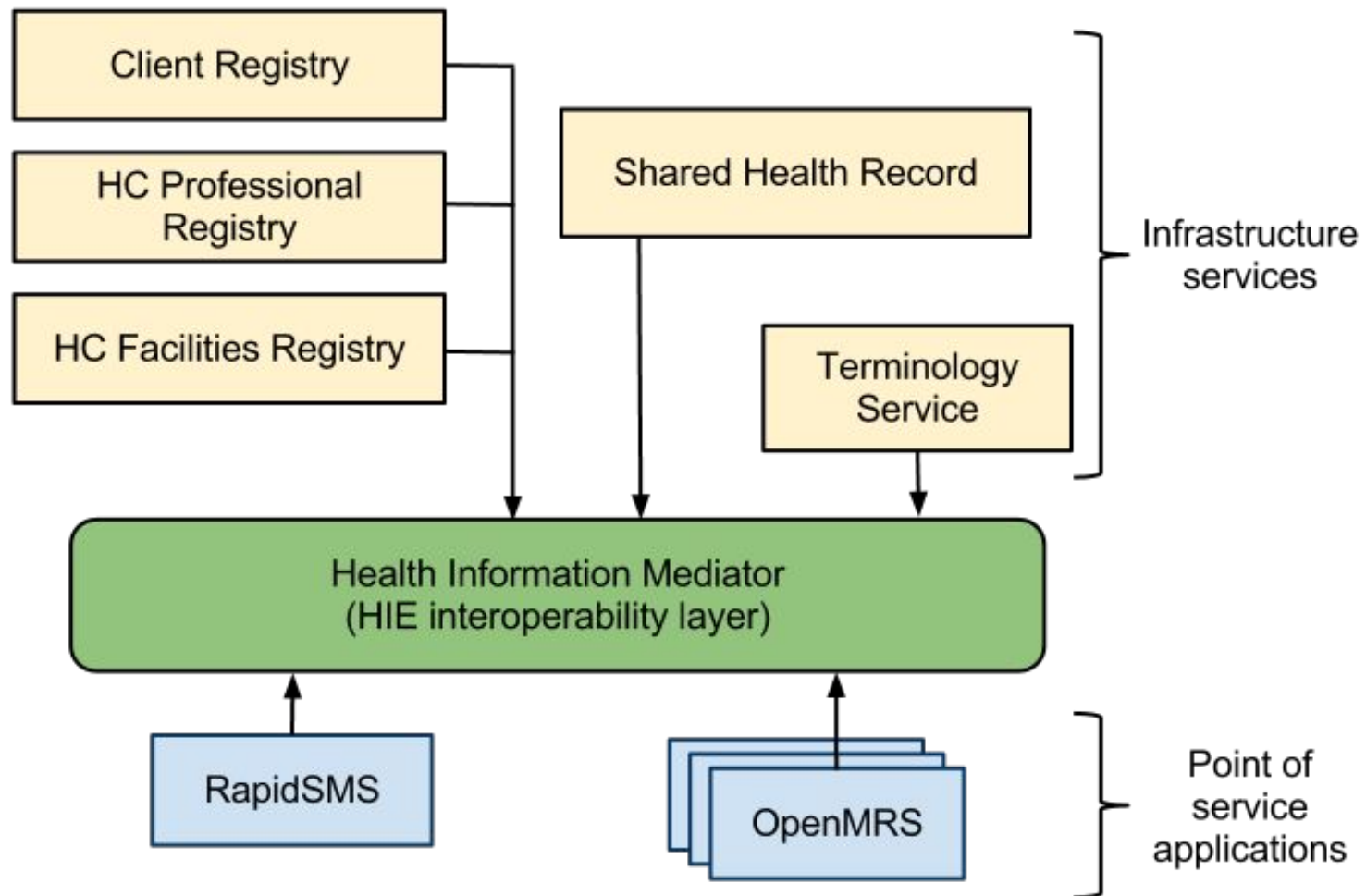
Product Overview



What is the OpenHIM?

- Open Health Information Mediator
- Middleware component
- Acts as the *lock* within an HIE
- Open source
- Eases integration between disparate information systems - linking client and infrastructure components
 - Handles common functions (security, auditing, logging)
 - Single point of communication
 - Message transformations and orchestration via mediators

Where does the OpenHIM fit within an HIE?

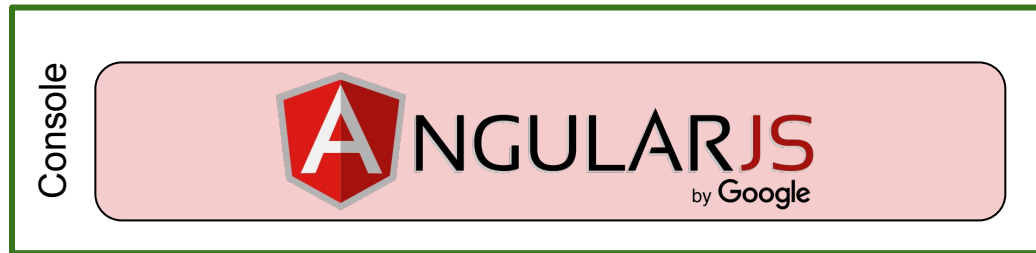


An example - The Rwandan Health Information Exchange (RHIE)

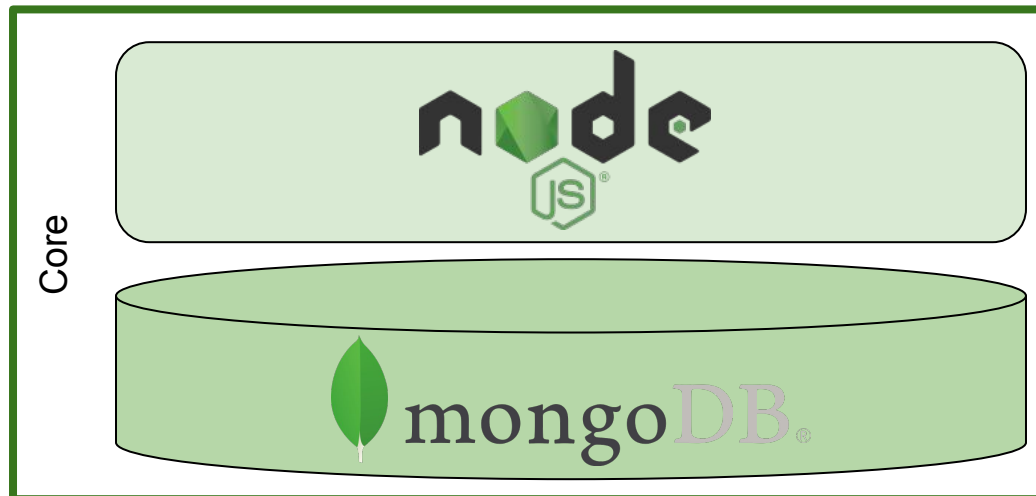
History of the OpenHIM

- OpenHIM was first introduced for the RHIE in 2012 - OpenHIM v1
 - Built using Mule ESB and written in Java
- Later revised the architecture to split out the RHIE specific code - Dawn of OpenHIM v2
- Designed OpenHIM v2 from the ground up for OpenHIE (early 2014 - present)
 - Uses **node.js**
 - **Faster, more secure, quicker to develop**
 - <https://github.com/jembi/openhim-core-js>

OpenHIM Technology stack



API

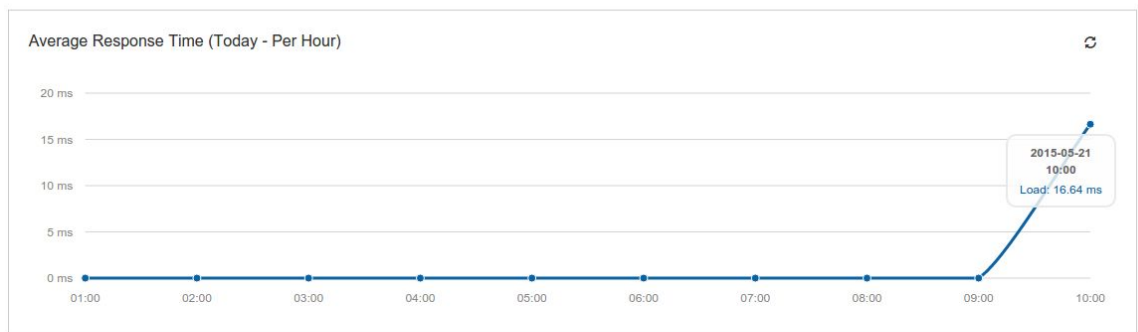
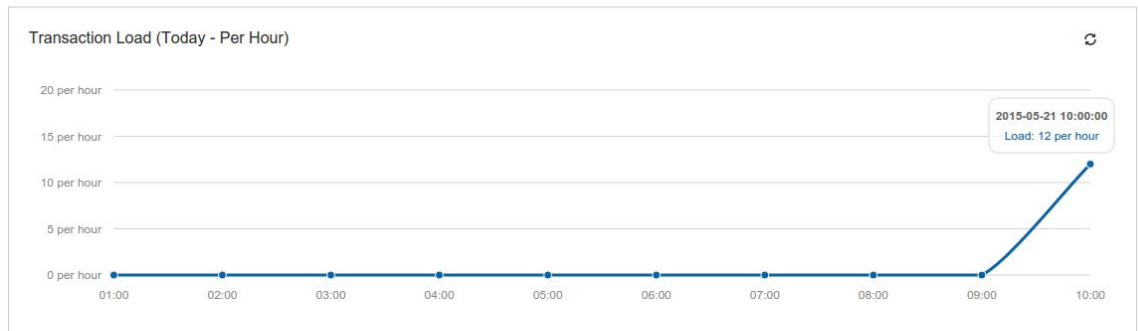


OpenHIM Dashboard

- Dashboard
- Transaction log
- Audit log
- Clients
- Channels
- Tasks
- Visualizer
- Contact Lists
- Mediators
- Users
- Certificates
- Export/Import

Dashboard

Active Channels (Today): 3	Total Transactions (Today): 12	Average Response Time (Today): 16.64 ms
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Key function of the OpenHIM is to give you a view into what is happening within your HIE

OpenHIM transaction log

The screenshot displays the OpenHIM Admin Console interface. On the left is a navigation sidebar with options like Dashboard, Transaction log, Audit log, Clients, Channels, Tasks, Visualizer, Contact Lists, Mediators, Users, Certificates, and Export/Import. The main area is split into two panels. The left panel shows the 'Transactions Log' with a table of transactions and filter settings. The right panel shows a detailed view of a specific transaction, including its status, timestamp, headers, and the SOAP message body. Below the message body is an 'Orchestrations' table listing the sequence of operations performed during the transaction.

Transactions Log Table:

#	HTTP Method	Path	Request Params	Channel
1	GET	/bench/basic/get		OpenHIM Bench - Basic G
2	GET	/bench/basic/get		OpenHIM Bench - Basic G
3	GET	/bench/basic/get		OpenHIM Bench - Basic G
4	GET	/bench/basic/get		OpenHIM Bench - Basic G
5	POST	/bench/basic/post		OpenHIM Bench - Basic P
6	POST	/bench/basic/post		OpenHIM Bench - Basic P
7	POST	/bench/basic/post		OpenHIM Bench - Basic P
8	GET	/bench/basic/get		OpenHIM Bench - Basic G
9	GET	/bench/basic/get		OpenHIM Bench - Basic G
10	GET	/bench/basic/get		OpenHIM Bench - Basic G

Transaction #5555ef0b9b9d892d17e28918 Details:

- Status: 201
- Timestamp: 2015-05-15 15:05:17 +0200
- Headers: Show/Hide Headers
- Body:

```
<?xml version='1.0' encoding='UTF-8'>
<env:Envelope xmlns:env='http://www.w3.org/2003/05/soap-envelope'>
  <env:Header xmlns:wsa='http://www.w3.org/2005/08/addressing'>
    <wsa:To env:mustUnderstand='true'>http://www.w3.org/2005/08/addressing/anonymous</wsa:To>
    <wsa:Action>urn:ihe:iti:2007:ProvideAndRegisterDocumentSet-bResponse</wsa:Action>
    <wsa:MessageID>urn:uuid:bacd085c-9e15-4832-b8be-c4b3692c08b8</wsa:MessageID>
    <wsa:RelatesTo>6e76d5ee-ee0-41b3-acf4-582134885c3c</wsa:RelatesTo>
  </env:Header>
  <env:Body>
    <ns3:RegistryResponse xmlns:ns3='urn:oasis:names:tc:ebxml-regrep:xsd:rs:3.0'
      xmlns:ns2='urn:oasis:names:tc:ebxml-regrep:xsd:rsm:3.0'
      xmlns:ns4='urn:ihe:iti:xds-b:2007'
      xmlns:ns5='urn:oasis:names:tc:ebxml-regrep:xsd:lcm:3.0'
    >
      </ns3:RegistryResponse>
    </env:Body>
</env:Envelope>
```

Orchestrations Table:

Name	Method	Path	Request Params	Status	Response Time
MHD to XDS.b mediator request	POST	/xdsrepository		200	2015-05-15 15:05:17 +0200
Parse Provider and Register Document Set.b contents					2015-05-15 15:05:15 +0200
PIX Resolve Enterprise Identifier					2015-05-15 15:05:15 +0200
PIX Resolve Enterprise Identifier					2015-05-15 15:05:15 +0200
PIX Create Patient Demographic Record					2015-05-15 15:05:15 +0200
PIX Resolve Enterprise Identifier					2015-05-15 15:05:15 +0200
PIX Resolve Enterprise Identifier					2015-05-15 15:05:15 +0200
XDS.b Repository	POST	/openrms/xdsrepository		200	2015-05-15 15:05:17 +0200

View technical details about the transaction (messages) flowing through your HIE

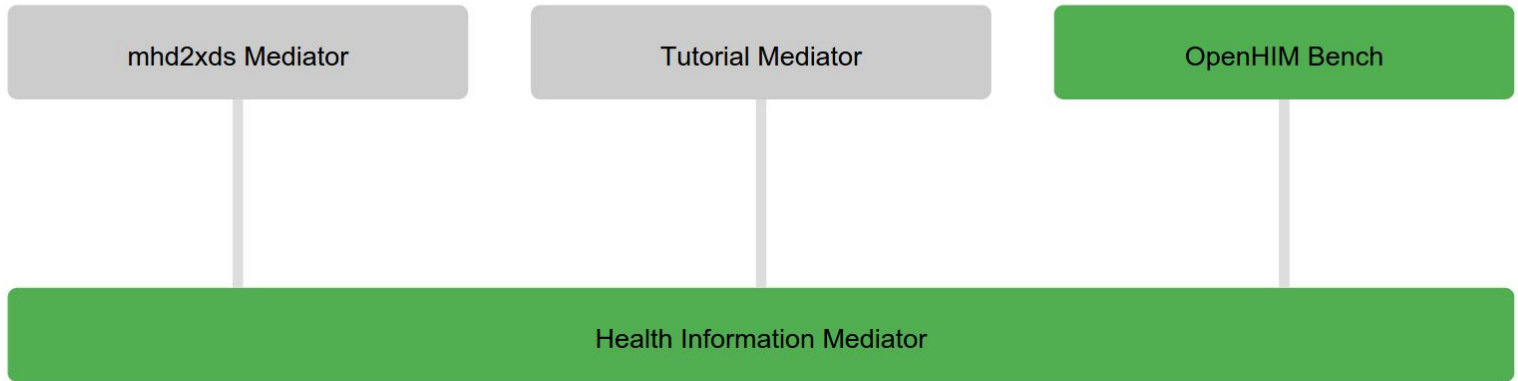
Filter transactions by a number of different fields

Visualizing transactions



- Dashboard
- Transaction log
- Audit log
- Clients
- Channels
- Tasks
- Visualizer**
- Contact Lists
- Mediators
- Users
- Certificates
- Export/Import

Visualizer



MHD Request

OpenHIM Bench - Basic GET Test



How is the OpenHIM configured to route transactions?

Need to setup 3 things:

- Clients
 - A client is a *system* that wants to connect to the HIE. eg. a EMR system
 - Adding a client enables them to access the HIE
- Channels
 - A channel matches a message type and forwards that message to one or more routes
 - Describes which client are authorised to access the channel
- Routes
 - A route describes an endpoint to another system where a message should be forwarded to. eg. A shared health record or a client registry

OpenHIM clients and channels

The image displays the OpenHIM Admin Console interface, showing two overlapping modal windows for editing a channel and a client.

OpenHIM Admin Console

Edit a channel

* Indicates a required field
** Indicates one or the other field may be supplied - Not both

Basic Info | Access Control | Content Matching | Routes | Alerts | Settings

Basic Info

* Channel name
OpenHIM Bench - Basic POST Test

* URL Pattern
/bench/basic/post Auto-add regex delimiters

Description
OpenHIM Bench - Basic POST Test

Channel Type
HTTP TCP TLS Polling

Authentication Type
Private Public

Whitelisted IP addresses
Whitelisted IP addresses

Edit a client

* Indicates a required field
** Indicates one of the fields are required

* Client ID
testTlsClient

* Client Name
testTlsClient

Domain
test-client.jembi.org

* Roles
x test
Enter a role and press enter...

** Basic Auth Password
Set/change password...

Confirm Password
Confirm password...

** Client certificate
No client certificate

Cancel Save changes Close Save changes

Edit a channel - Routes

Name Primary	Type Secured	Host Port	Path/Transform
Basic POST ★	HTTP Unsecured	localhost 6050	


Add New Route Add Mediator Route

The OpenHIM as the lock for an HIE

The OpenHIM act as the lock by fully supporting the IHE *ATNA* profile:

- Audit Trail (AT)
 - The OpenHIM includes an Audit Repository which allows systems to audit their actions.
- Node Authentication (NA)
 - The OpenHIM includes easy TLS certificate management capabilities to keep your HIE secure and even allows you to generate your own self-signed certificates.

OpenHIM Audit Repository



Admin Console

- Dashboard
- Transaction log
- Audit log**
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- Export/Import

Admin Console root@openhim.org

Audit #5555ef0b9b9d892d17e28926 View Raw Audit Message

Event

Event Time
2015-05-15 15:05:15 +0200

Event Action / Outcome
Create (C) / Success (0)

Event Type
ITI-8 (IHE Transactions) - Patient Identity Feed

Event ID
110110 (Patient Record) - DCM

Audit Source

Audit Source ID
openhim

Active Participant

#1
User ID
openhim-mediator-ohie-xds|openhim

Alt. User ID
8469

Is Requestor
true

Network Access Point
127.0.1.1

Role ID
110153 (DCM) - Source

#2
User ID
pix|pix

Alt. User ID
2100

Is Requestor
false

Network Access Point
localhost

Role ID
110152 (DCM) - Destination

Participant Object

#1
Object ID
7612241234567^^^ZAF^NI

Object Type Code / Role
1 / 1

Object ID Type Code
2 (RFC-3881) - PatientNumber

#2
Object ID
470a65e3-d9f5-420a-bafe-eaf3e2b9903d

Object Type Code / Role
2 / 24

Object ID Type Code
ITI-9 (IHE Transactions) - PIX Query

Object Detail Type
MSH-10

Object Detail Value
NTFjYzBmNDctY2M2Zi00NDc5LWI4YWQtMzdYl2MxOTNiMWVI

Object Query
[Click to view Object Query](#)

Audit Log

Filter Settings List Settings

Toggle Advanced Filters


Filter by Patient:
Patient ID: Assigning Authority: Assigning Authority:

#	Event Action / Outcome	Event Type
1	Read (R) / Success (0)	ITI-41 (IHE Transactions) - Provide and Register Document Set-b
2	Execute (E) / Success (0)	ITI-9 (IHE Transactions) - PIX Query
3	Execute (E) / Success (0)	ITI-9 (IHE Transactions) - PIX Query
4	Create (C) / Success (0)	ITI-8 (IHE Transactions) - Patient Identity Feed
5	Execute (E) / Minor Failure (4)	ITI-9 (IHE Transactions) - PIX Query
6	Execute (E) / Minor Failure (4)	ITI-9 (IHE Transactions) - PIX Query
7	Create (C) / Success (0)	ITI-41 (IHE Transactions) - Provide and Register Document Set-b
8	Execute (E) / Minor Failure (4)	ITI-9 (IHE Transactions) - PIX Query
9	Execute (E) / Minor Failure (4)	ITI-9 (IHE Transactions) - PIX Query
10	Create (C) / Success (0)	ITI-41 (IHE Transactions) - Provide and Register Document Set-b

Load 10 more results

OpenHIM Administration
Copyright 2015 Jembi Health
Powered by OpenHIM



OpenHIM Certificate management

 Admin Console root@openhim.org ▾

- Dashboard
- Transaction log
- Audit log
- Clients
- Channels
- Tasks
- Visualizer
- Contact Lists
- Mediators
- Users
- Certificates**
- Export/Import

Certificates + Create Server Certificate

Server Certificate

 **Your Server Certificate and Server Key Match!** 

Common Name:	byo.zw
Organization	Byo
Organization Unit	IT
Country	ZW
Slate	Matebeleland North
Locality	Bulawayo
Email Address	admin@byo.zw
Validity	Start: 2015-04-10 11:53:59 +0200 End: 2016-04-09 11:53:59 +0200

Certificate

```
-----BEGIN CERTIFICATE-----
MIICHTCCAe4CCQDbGP0P9s69azANBgkqhkiG9w0BAQsFADCBhjELMAkGA1UEBhMC
WlxcGzAZBgNVBAgMEk1hdGVlZWxibGFuZCBOb3J0aDERMA8GA1UEBwwlQnVsYXdh
eW8xDDAKBgNVBAoMA0J5bzELMAkGA1UECwwCSV0xZzANBgNVBAMBMj5y56dzEb
MBKGCsQGSlib3DQeJARYMYWRtaW5AYnliLn3MB4XDTE1MDQxMDA5NTM1OV0xMTE1
MDQwOTA5NTM1OV0wggYYxCzAJBgNVBAYTAjpXMRswGQYDVQQIDBJNYXRIYmVsZWxh
bmQgTm9ydGxETAPBgNVBAcMCEJ1bGF3YXlvMQwwCgYDVQQKDANCeW8xZzAZBgNV
BAsMAkiUMQ8wDQYDVQQDDAZleW8uencxGzAZBgkqhkiG9w0BCOEWDGfklWluOGJ5
hw56dzCBzANBgkqhkiG9w0BAQEEAAQRIQAwYXlvYFA0e4cDxlReiRkUz2m5Gz
```

Upload Server Certificate

Drop your certificate file here or click to upload


Upload Server Key

Drop your certificate key file here or click to upload

Enter a passphrase (if required)

Enter a passphrase here if the key requires one. Submit Passphrase

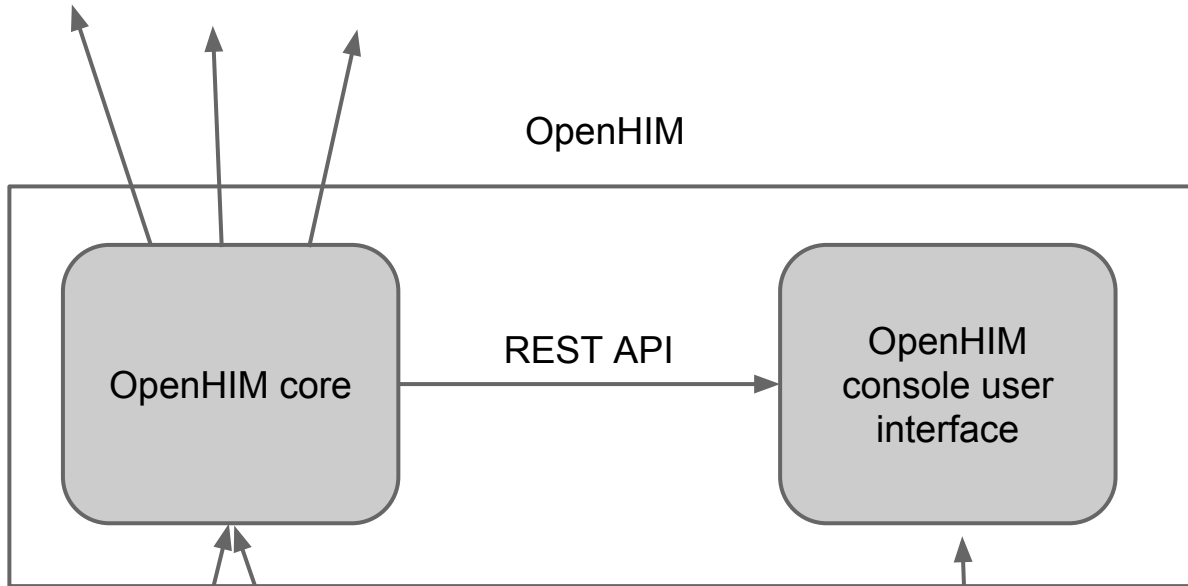
Trusted Certificates + Create Client Certificate

#	Common Name	Organization	Organization Unit	Country / State / Locality	Email Address	Validity	
1	tls-test	Jembi	HISD	ZA / KZN / Durban	tls-test@jembi.org	Start: 2015-04-24 10:46:00 +0200 End: 2016-04-23 10:46:00 +0200	

Drop your certificate file here or click to upload

Basic architecture

Infrastructure services (Health worker registry etc.)



OpenHIM

OpenHIM core

REST API

OpenHIM
console user
interface

Requests from PoS systems
(EMRs, Pharmacy systems etc.)



Configure the
OpenHIM to
manage the HIE
infrastructure

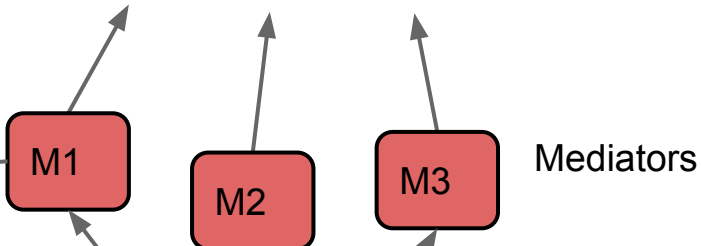
Extending the OpenHIM

What are Mediators?

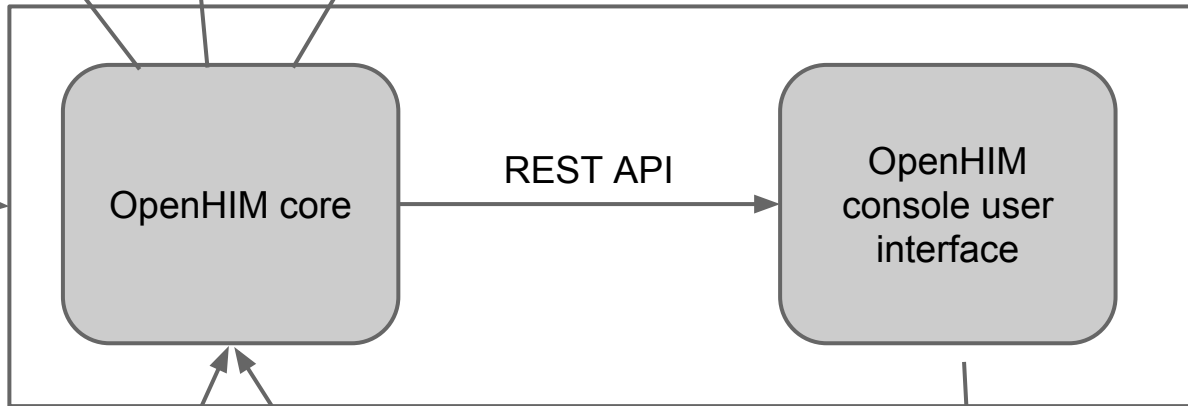
- Mediators allow additional functionality to be added to the OpenHIM
- Micro services running independently from the OpenHIM-Core
- Mediators allow you to:
 - Adapt messages to a different format
 - Orchestrate messages
 - Anything else you want
- Three types:
 - Pass-through - Accepts requests and passes on unchanged
 - Adaptor - Transforms/Adapts request for destination
 - Orchestrator - Performs business functions using the request

OpenHIM Components

Infrastructure services (Health worker registry etc.)



OpenHIM



Mediators can also communicate back with core

Requests from PoS systems (EMRs, Pharmacy systems etc.)

View information about transaction including what the mediators are doing

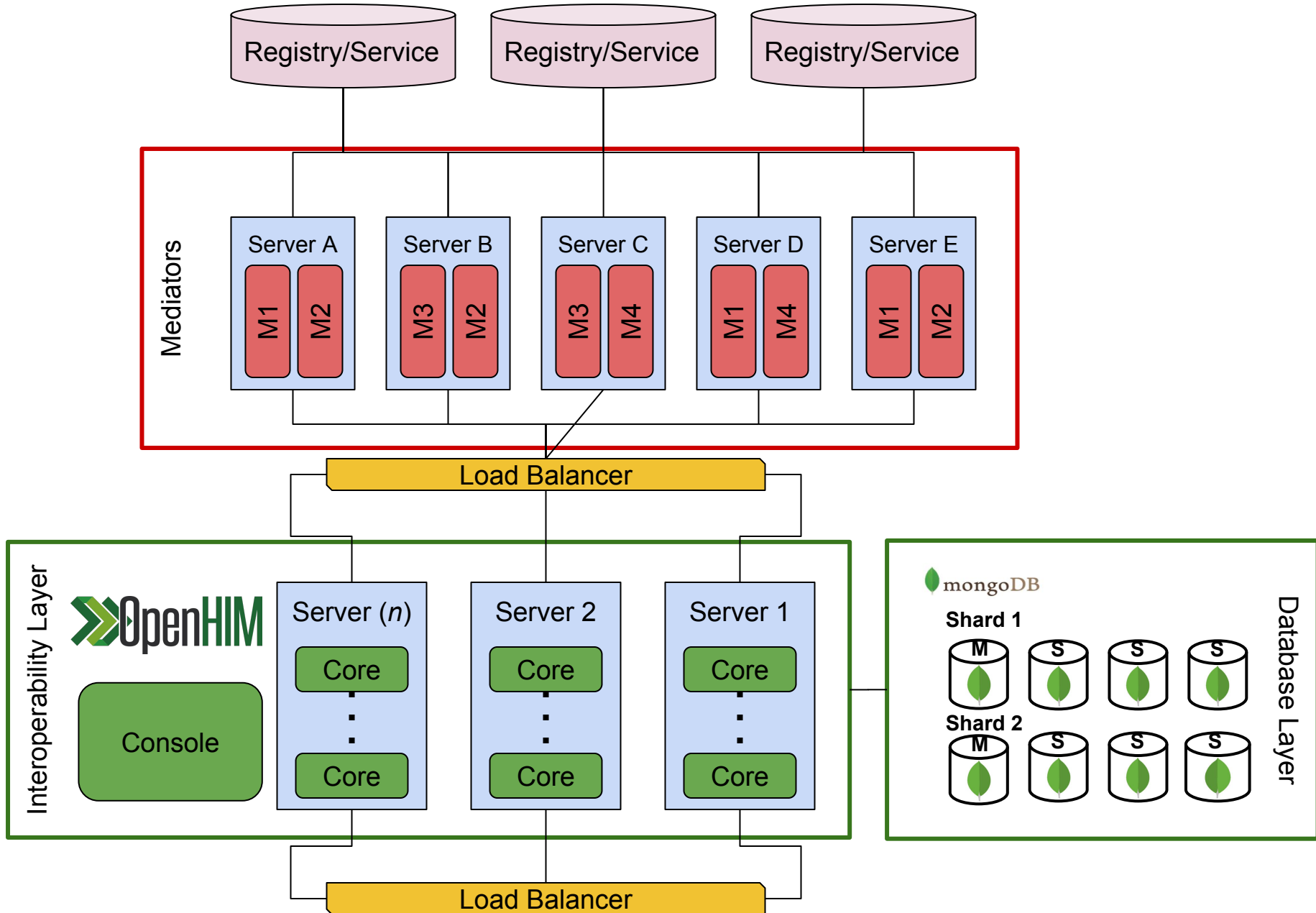
What do mediators report to the core?

- Registration info
 - Information about the mediator and where it lives
 - Default configuration for the OpenHIM core
- Transaction metadata
 - Request and response data
 - Orchestration data
 - Transaction properties
- Metrics (optional)
 - Mediator specific metrics

For more info see:

<http://openhim.readthedocs.org/en/latest/dev-guide/mediators.html>

OpenHIM scalability



Where is the OpenHIM being used?

A few of the production Implementations of the OpenHIM:

- Aggregate Data Exchange, Western Cape, South Africa
- BID Project, Tanzania
- DATIM Global
- DATIM Node
- HITRAC - Zimbabwe
- mOASIS, Mozambique
- MomConnect, South Africa
- mHero, Liberia

Finding out more

www.openhim.org and

<http://openhim.readthedocs.org>

- Latest releases
- Features
- Tutorials
- Links to get involved

OpenHIE Interoperability layer community

- <https://wiki.ohie.org/display/SUB/Interoperability+Layer+Community>
- If you are interested, come join our community!

The screenshot shows the OpenHIM website homepage. At the top, there is a navigation bar with links for About, Deploy, Benefits, Features, Mediators, Tutorials, FAQs, Community, and a Download button. The main header features the OpenHIM logo and the tagline "Facilitating interoperability between disparate Health Information Systems." Below this, there are three main action buttons: "Download!" (with a download icon), "Deploy!" (with a server icon), and "Enjoy!" (with a play icon). The content area is divided into several sections: "What is the OpenHIM?" (describing it as a middleware component), "Features" (listing capabilities like security management and message routing), "Get involved!" (encouraging community participation), and "About" (stating it is developed by Jembi Health Systems NPC). A "Latest OpenHIM News" section contains three recent announcements: "OpenHIM v1.2 released!" (April 30, 2015), "OpenHIM v1.1 released!" (February 26, 2015), and "OpenHIM 1.0 Released!" (November 24, 2014). The footer contains copyright information for 2015 Jembi Health Systems NPC and a note that the site is powered by OpenHIM.

References

- BID Project, Tanzania
 - <http://bidinitiative.org/>
- HITRAC - Zimbabwe
 - <https://www.hitrac.co.zw/>
- mOASIS, Mozambique
 - <https://www.moasis.org.mz/en/>
- MomConnect, South Africa
 - <http://www.health.gov.za/index.php/mom-connect>
- mHero, Liberia
 - <http://www.mhero.org/learn-more>

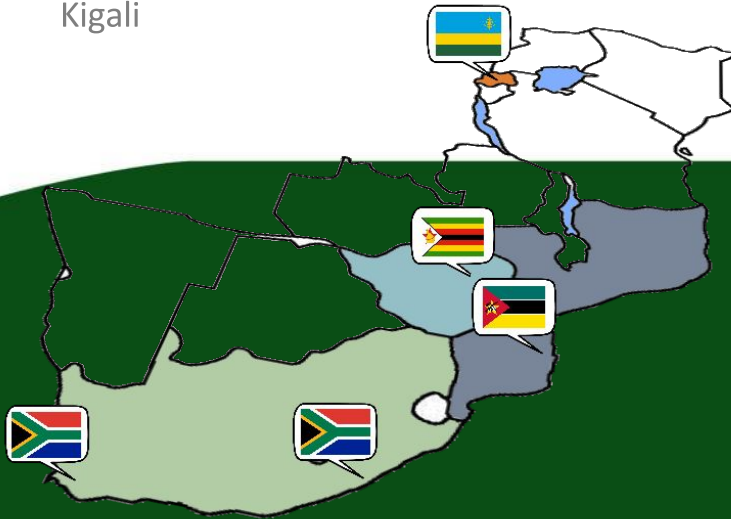
Thank you

Mozambique

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Condominio Diplomatic Village
Casa numero um
Maputo

Rwanda

Kacyiru Road
Plot Number 1760
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