General Practice

Common Interface Mechanism

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| **Synopsis**  The General Practice Common Interface Mechanism (GP-CIM) is a single open source interface to GP systems which enables the exchange of data between GP practices hosted by the four NHS GP suppliers and other healthcare professionals and systems in the NHS.  This document describes the case for, requirements and high level design concepts for the GP-CIM. | |
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# Introduction

## Overview

The General Practice Common Interface Mechanism (GP-CIM) is a single open source interface to GP systems which enables the exchange of data between GP practices hosted by the four NHS suppliers and other healthcare professionals and systems in the NHS.

The functionality of the GP-CIM is intended to be delivered in three stages – the first two stages requiring no development effort by GP suppliers.

## Aims

The aims of the GP-CIM project are to:

1. Provide wider, more consistent and standardised interoperability to and from GP systems to promote better patient care and administration;
2. Lower technical and financial hurdles to interoperability;
3. Enable a successful subsidiary application marketplace which promotes innovation and best of breed solutions;
4. Provide equitable access to GP data;
5. Contribute interoperability technology to the open source healthcare community.



# Existing GP interfaces

There are a number of existing interfaces to GP systems in operation:

* Suppliers’ partner interfaces;
* HSCIC’s IM1 interface;
* Healthcare Gateway’s MIG interface.

The advances to patient care and administration that current interfaces to GP systems have brought should not be underestimated, however there are a number of technical and non-technical limitations with them:

* A different messaging format and communication protocol is required for each supplier (applicable to Partner and IM1 interfaces);
* Different security and IG mechanisms govern the interfaces (all interfaces);
* Access to data can be made from within the practice only (applicable to Partner and IM1 interfaces);
* Interfaces have limited coverage of GP functionality (applicable to the MIG interface);
* They are not run or governed by a supplier-independent organisation and are therefore subject to suppliers’ commercial interests (applicable to Partner + MIG interfaces).

# General Practice Common Interface Mechanism

The GP-CIM has a number of objectives which will be delivered in stages.

## Objectives

The GP-CIM aims to address the limitations of the existing GP interfaces by creating the following:

1. A single server-accessible endpoint for exchanging data with all GP systems in the UK;
2. A single security model for connecting the interface;
3. A single open and standardised data format (both clinical and transport) for exchanging data;
4. Coverage of all functional areas necessary to support shared patient care, including but not limited to:
   1. Patient trace,
   2. Get patient record (HTML and coded forms),
   3. Update patient record,
   4. Appointments,
   5. Task management,
   6. Clinical correspondence including transfer of care and e-discharge documents,
   7. Record attachments,
   8. Notification of changed patients;
5. Information governance controls including a sharing agreement model and patient consent to share preference;
6. Ability to exchange transactional data using synchronous and asynchronous patterns, and bulk data using an asynchronous pattern;
7. An open and supplier-independent organisation providing equitable access to the interface, accreditation and management of the interface;
8. An open source technology resource including code for this interface, for supporting other record sharing efforts in the UK.

## Staged delivery chart

Objectives will be delivered in stages, each stage creating a foundation for the next stage.

* Note:  **Development work is NOT required by GP suppliers** to meet the objectives of **stages one and two.**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Objective** | | | **Stage 1** | **Stage 2** | **Stage 3** |
| **1** | A single server-accessible endpoint for exchanging data with all GP systems in the UK. | | ✓ | ✓ | ✓ |
| **2** | A single security model for connecting the interface. | | ✓ | ✓ | ✓ |
| **3** | A single open and independently standardised data format (both clinical and transport) for exchanging data. | | partial | ✓ | ✓ |
| **4** | Coverage of all functional areas necessary to support shared patient care, including but not limited to: | | | | |
| a | Patient trace; | ✓ | ✓ | ✓ |
| b | Get patient record (HTML and coded forms); | HTML | ✓ | ✓ |
| c | Update patient record; | - | - | ✓ |
| d | Appointments; | - | - | ✓ |
| e | Task management; | - | - | ✓ |
| f | Clinical correspondence including transfer of care and e-discharge documents; | - | ✓ | ✓ |
| g | Record attachments; | - | - | ✓ |
| h | Notification of changed patients. | - | - | ✓ |
| **5** | Information governance controls including a sharing agreement model and patient consent to share preference. | | ✓ | ✓ | ✓ |
| **6** | Ability to exchange transactional data using synchronous and asynchronous patterns, and bulk data using an asynchronous pattern. | | transactional  synchronous only | transactional  synchronous only | ✓ |
| **7** | An open and supplier-independent organisation providing equitable access to the interface, accreditation and management of the interface. | | ✓ | ✓ | ✓ |
| **8** | An open source technology resource including code for this interface, for supporting other record sharing efforts in the UK. | | ✓ | ✓ | ✓ |

# Stage one requirements

Stage one implements Patient trace and Get patient record (HTML) functionality and the supporting infrastructure to create a foundation for further stages.

**No development effort is required by GP suppliers to deliver this stage** – the existing interfaces to GP systems currently used by the MIG are used to supply data to the GP-CIM.

## Interface functionality

The following message interactions are supported by stage one of the GP-CIM:

* Patient trace
* Get patient record (HTML)

All are implemented in a synchronous transactional pattern for simplicity for the consumer and in implementation.

## Patient trace

Patient trace provides location of a patient’s record using either:

* NHS number; or
* Surname, date of birth and gender, and optionally forename and postcode.

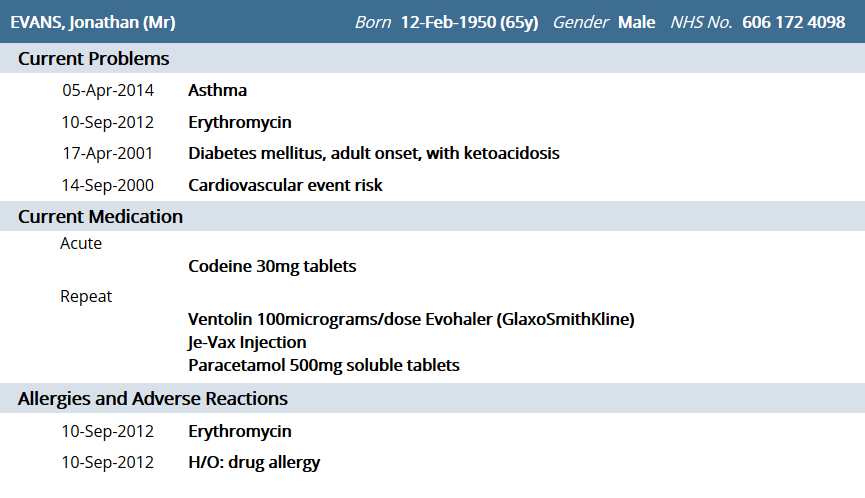
The result of tracing using these criteria will be a list of matching patients, including the ODS code of the practice they are registered at. This ODS code is then used to direct further calls to the GP-CIM.

A maximum of fifty matching patients can be returned from any one trace. If the number of patients exceeds fifty, then no patients are returned with an indicator to determine the limit has been met. Further optional criteria should be provided to reduce the number of matching patients.

Wildcards are supported in the surname, forename and postcode fields.

## Get patient record (HTML)

Get patient record (HTML) returns the patient’s record pre-formatted as HTML ready for display. An example of a summary record is shown below:



It should be possible to request different summarisations of a patient’s record to suit different settings and purposes, for example:

* Summary record, consisting of:
  + Current problems,
  + Current medication,
  + Allergies and adverse reactions;
* Detailed record, consisting of all sections in the list below;
* Other setting targeted summarisations such as child health;

Or one or more client specified sections of:

* Problems
* Diagnoses
* Current medication
* Past medication
* Allergies and adverse reactions
* Procedures
* Vaccinations and immunisations
* Tests
* Encounters
* Referrals

## Patient eligibility

Only regular (GMS) fully registered\* consenting patients with an NHS number can be traced and their record shared via the GP-CIM. Other types of patient such as emergency and temporary, and left or dead patients cannot.

\* Fully registered means that their registration has been accepted by and has not been deducted by the NHAIS system.

## Patient consent to share preference

There are three patient consent to share preference values, which control whether a record can be shared via the GP-CIM:

|  |  |
| --- | --- |
| Consent value | Outcome |
| Implied consent (default value) | Record can be shared via the GP-CIM subject to sharing agreements and legitimate relationship |
| Expressed consent | Record can be shared via the GP-CIM subject to sharing agreements and legitimate relationship |
| Expressed dissent | Record cannot be shared via the GP-CIM |

Implied consent is the default value in the absence of an expressed value. In the case of multiple held consent to share values, the most recently expressed value takes precedence.

The patient’s consent to share preference is held and managed at the patient’s registered GP practice. Requests to get a dissenting patient’s record via the GP-CIM are denied at the GP supplier system, as this is where their consent preference is held.

When a patient moves practice their consent value is transferred via electronic or paper means.

## Sharing agreements

A sharing agreement is an agreement between two organisations allowing the flow of patient data in one or both directions subject to patient consent.

An agreement must be in place between the requestor and provider of a patient’s record for the GP-CIM to fulfil the request. If no agreement is in place, the request is blocked at the GP-CIM and an error is returned to the requestor.

An organisation may participate in any number of sharing agreements as requestor, provider, or both.

## Management and monitoring

The full text of all request and response messages must be logged, viewable and searchable on the following fields:

* UTC date and time of the request and response
* Requestor IP address
* Message type
* Requesting organisation name and ODS code
* Providing organisation(s) name and ODS code
* Requesting healthcare professional name and identifier(s)
* Patient NHS number(s)
* Response status

It must be possible to view the number of messages flowing through the GP-CIM by the following criteria in any date and time period (UTC):

* Requestor IP address
* Message type
* Requesting organisation ODS code
* Providing organisation(s) ODS code
* Requesting healthcare professional identifier(s)
* Patient NHS number(s)
* Response status

It must be possible to create, configure and view sharing agreements. It must also be possible to activate and inactive sharing agreements.

# Stage one messages

Messages for communicating with the GP-CIM in stage one are defined by this project using SOAP and XML. They reduce the complexity of communicating with GP systems using individual supplier formats by introducing a single format to communicate with all suppliers via the GP-CIM.

Stage two and three promote interoperability and standardisation further by defining messages using an open international healthcare standard format such as HL7v3 or FHIR.

## Data formats

Messages in stage one are constructed using XML and transferred synchronously using SOAP over the HTTPS protocol.

Messages will be wrapped as per the diagram below. The Endeavour message envelope contains routing information, audit and provenance for the request. It also contains the GP-CIM message – see next section for message types.



## GP-CIM message types

|  |  |
| --- | --- |
| **Message name** | **Message type identifier** |
| Trace patient request | ENDEAVOUR-CIM-TPREQUEST001 |
| Trace patient response | ENDEAVOUR-CIM-TPRESULTS001 |
| Get patient record (HTML) request | ENDEAVOUR-CIM-PRREQUEST001 |
| Get patient record (HTML) response | ENDEAVOUR-CIM-PR001 |
| Not found response | ENDEAVOUR-CIM-NOTFOUND001 |
| Error response | ENDEAVOUR-CIM-ERROR001 |

XML schema representations will be provided for the above messages.

## Message interactions

Trace patient message interactions are as follows:



Get patient record (HTML) message interactions are as follows:



## Full message flows

The following diagrams show the message flow including upstream GP systems. Message types are not included on these diagrams.

For trace patient, the GP-CIM sends concurrent trace patient requests to all four GP systems, and consolidates the results into a single response before returning to the subsidiary system:



The following diagram shows an example get patient record (HTML) call, in this instance the patient’s record is located at a practice using the INPS GP system.



# Stage one architecture summary

This section provides a high level summary of the architecture involved for interested readers. It is not intended as a design blueprint.

## Architecture

The GP-CIM will use a common data centre architecture as shown below using:

* Load balanced stateless application servers providing horizontal scalability,
* A data storage platform with in-built partitioning and redundancy;
* A management and monitoring console;



## Technologies

The GP-CIM will be open source, and built on an open source platform to promote code sharing and minimisation of cost in horizontal scaling.

The following are suggestions at this stage though may be change during implementation:

|  |  |
| --- | --- |
| **Purpose** | **Suggested technology/product** |
| Operating systems | Linux |
| Load balancer, SSL termination | Nginx/Haproxy |
| Languages | Java, CQL |
| Application server | Tomcat/Jetty |
| Data storage | Cassandra |

## Hosting and connectivity

The GP-CIM interface will be exposed to the N3 network only and will NOT accessible via the internet. Therefore, subsidiary systems must have N3 connectivity to communicate with the interface.

Likewise, onward connections made to GP systems will also be made over the N3 network.

The GP-SIM will be hosted on the in two separate N3 connected data centres with automatic failover should one data centre lose connectivity or be out of operation.

## Authentication

Messages will be encrypted on the wire using transport layer security (TLS) with mutual certificate authentication to identify and authenticate the sending system.