Cookbook for Regional Interoperability Detailed Design Paper #029

Data Aggregators and Other Complex Data Providers

INTERNAL REVIEW

Version 1.0 – 5th July 2021

Abstract Interoperability Cookbook Anchor Points

Section	Title
3.1.2	FHIR Service Bus
4	Requirements for Data Providers

Table of Contents

Version Control

Version	Release Date	Released By	Reason for Release
0.9	28/03/2021	R Hickingbotham	Internal Review
1.0	05/07/2021	R Hickingbotham	Incorporate Review Comments

Reviewers

Initials	Name	Role	Organisation
TD	Tim Davey	Solution Architect	YHCR
SS	Steve Shaw	Lead Developer	Synanatics

1   Introduction

1.1   Purpose of this Document

This document is one of a series of design papers which underpin the Abstract of a Cookbook for Regional Interoperability (the Abstract Cookbook). These papers, in their totality, describe the technical components and the standards which form the YHCR System of Systems (SoS). They are intended as a basis for developing or procuring software and so are expressed at a level of precision which aims to avoid ambiguity but consequentially, they are focussed to technical readers.

Design papers are anchored to topics which are discussed in the Abstract Cookbook. In the main they are elaborations of the concepts which were first introduced by the abstract and new content is further detail rather than variations of previously established core principles.

This document (design paper 029 - "Data Aggregators and Other Complex Data Providers") is an exception to the norm as it introduces a new concept that was not anticipated by the Abstract Cookbook. Up until this point a data provider has been treated as the unit of provenance of data. All data passing through the SoS is identifiable as having been sourced from a specific data provider, data consumers can ascertain which data providers are sources of data for a patient and are able to target data interactions at individual data providers.

Treating data providers and units of provenance as synonymous is valid when a data provider is itself a health or care organisation and that organisation has a single point of presence on the SoS. Data consumers identify with organisations and can categorize the sources of data in a way that is meaningful for users. The initial waves of deployment have focussed on onboarding organisations as data providers and a simplified representation of the relationships has not been a problem.

However, the YHCR is now beginning to onboard new, more complex, classes of data providers and the limitations of the current approach are being exposed.

1.2   New Types of Data Provider

A one-to-one relationship between a data provider and a governing organisation breaks down when:

- A single endpoint provides access to data controlled by a number of different organisations. For example, the TPP CRL Adapter is an endpoint which acts as a single data provider through which data controlled by any non-GP SystmOne unit is accessible. This type of data provider is known in this paper as a data aggregator.
- A single organisation has multiple points or presence on the SoS. An example is an organisation that offers most of its data through a single FHIR proxy but has a FHIR compliant system which has a dedicated connection from the SoS.

Of course, governing organisations and their data providers might have both these characteristics: an organisation using SystmOne for community services might have an on-premise hosted system for mental health services: it has two points of presence on the SoS but community services data is accessed through the TPP data aggregator.

1.3   Rational for Change

It is assumed that most users of the YHCR will wish to know about the provenance of data and will understand this as being the organisation which created the data. The provenance of data helps explain a person's pathway through the health and care system and allows clinicians to weigh the importance of data items and resolve apparent conflicts in data.

The YHCR care portal, and other user interfaces in the region, annotate data items with their provenance (currently the data provider) and allow users to filter data by provenance. Treating provenance as the data provider will mean that in certain circumstances the user interface will distinguish different sources of data which are same from the perspective of the end user:

- `Calderdale Maternity System;`
- `Calderdale General Data;`

and amalgamate data from difference sources as being of the same provenance:

- `TPP SystmOne (including RDASH, Rotherham Community, SCH Community etc).`

These are seen as being sufficient reasons for changing the definition of provenance.

Change is also needed for a more technical reason. Recent work with several aggregating data providers (TPP SystmOne, OneAdvanced Adastra, BlackPear and GP Connect) has made it clear that it will not always be possible to publish patient contact to the Patient Identity eXchange (PIX) - design paper 004. This has ramifications for routing data interactions, rebasing search requests and unifying data returned from data providers. The resolution to these issues is closely related to remodelling required for provenance and so is covered here.

1.4   Impact on Earlier Designs

The changes identified by this paper are, in the main, an extension to the original designs and will have minimal impact outside of central infrastructure. Modification will be required in the following areas:

- 003 – "Conceptual Design for FHIR Proxy Server";
- 004 – "Patient Identity Exchange (PIX & MPI)";
- 010 – "FHIR Aggregator Service";
- 020 – "Onboarding for Data Providers".

These papers will be revised and once completed then this paper will act solely as evidence of the process for arriving at the final state design.

1.5   Relationship of this Document with Other Standards

This document does not depend on any other standards.

1.6   Intended Users of the This Document

Developers of the SoS and Data Sources which aggregate data from multiple Data Providers.

2 Complex Data Providers, Search Term Re-Basing, and Data Unification

2.1 YHCR FHIR Aggregation and a Unified Data Model

Design paper 001 – "A Unified Distributed Data Model for FHIR" described the concept of a FHIR endpoint that aggregates data from several different data sources and presents it as if it had originated from a single source. The YHCR is itself a FHIR Aggregator and so assumes a responsibility for unifying its underpinning, federated, data model. Specifically, it performs the following functions:

- for outgoing searches, it re-bases resource references in search terms to regionally identified resources to references to resources known to local data providers;
- for incoming data, it replaces references to local resources provided by data providers with references to regional resources.

The YHCR aggregated data model is unified around *Patients*, *Practitioners*, and *Organisations* and translation of resource references for these concepts is performed by the FHIR Aggregator. Unification around the *Patient* is comprehensive and currently depends on pre-registration of patients in PX whilst unification around *Practitioners* and *Organisations* depends on uniform use of business identifiers by data providers.

2.2 Requirements for Data Aggregators Acting as Data Providers to the YHCR

Data providers will act as aggregators if they supply data which has been created by more than one organisation. A fundamental YHCR design principle has been that central infrastructure requires a minimum level of standards compliance from data providers. This principle applies equally to data aggregators but it is recognised that the standards must be re-phrased to enable compliance from large scale federated aggregators. The following table compares compliance requirements proposed by this design for data aggregators to existing standards for basic data provider.

Basic Data Provider	Data Aggregator
The provider fully supports the FHIR STU3 API specification to a standard level of maturity.	The provider fully supports the FHIR STU3 API specification to a standard level of maturity.
The provenance of data provided can be inferred from the endpoint connected to the SoS.	The provenance of data is tagged on every resource supplied from the endpoint.
The endpoint offers a single representation of a *Patient* resource and is unified by its nature.	The data aggregator unifies data around a *Patient* resource which is assigned an immutable identifier by the provider of the aggregating service.
Patient contact is registered with the YHCR PIX service.	Contact with a patient can be established on demand by issuing a FHIR query[1] which returns a single *Patient* resource if and only if an organisation represented by the aggregator has had contact with the patient and can supply data through the aggregating service.

Details of the organisation which created data are recorded during onboarding in the YHCR Participant Registry.	Details of the organisations represented by the aggregator which have had contact with a patient can be discovered dynamically by issuing a FHIR Linkage query[2].
The data provider writes *AuditEvent* resources which are accessible, subject to appropriate access rights, from their FHIR endpoint	The data aggregator records the YHCR JWT on audit records and is able to provide details of data accessed through a request against this data item.
The data provider's endpoint is secured using mutually authenticated HTTPS and requires a valid JWT signed by the YHCR to gain access.	The data aggregator's endpoint is secured using mutually authenticated HTTPS and requires a valid JWT signed by the YHCR to gain access.

Notes

(1) Patient?identifier=http://fhr.nhs.uk/Id/nhs-number|[nhs number]
(2) Linkage?source.identifier= http://fhr.nhs.uk/Id/nhs-number|[nhs number]&_include=author

2.2.1 Adapters to Data Aggregators

Data aggregators may be other LHCRs, in which case out-of-the-box standards compliance may be achieved if the LHCR is following the YHCR's FHIR based approach to provisioning a shared care record.

However, most commercial aggregators will likely be using proprietary technology which will need to be adapted to YHCR standards. This will be possible if, subject to performance considerations, a core set of capabilities are supplied:

- patient data can be queried on demand over a secure API using an NHS Number as an input parameter;
- data items are identified to the organisation that created them, either through meta data embedded in the result set or through a separate API call;
- the governing organisations who provide data through the service for a patient can be determined through an API call.

2.3 Multiple Points of Presence on the SoS

The SoS must be able to accommodate health and care organisations that have more than one connection for data provision. This might occur for several reasons but a common one will be that system vendor offers a direct connection for data managed by a healthcare service or speciality whereas other services' data are provided through a different route.

There are two constraints which currently prevent this:

1. The PIX service only permits an organisation to register a patient resource once whereas multiple points of presence requires that a Patient resource is registered for each data provider.
2. A data consumer is unable to discover the organisation associated with a data provider and so is unable to present the true provenance of data to its uses.

Both of the constraints are relatively easily overcome with enhancements to the PIX server (design paper 004 and section 2.4) and the Data Availability Service (design paper 002 and section 5).

## 2.4   PIX Server Enhancements and Use of Linkages for Complex Data Providers

PIX maintains FHIR *Linkage* resources to indicate the presence of data for a patient at a data provider. Linkage resources are explicitly created by data providers through registration of a *Patient* resource on the PIX services.

Currently *Linkage* resources record a one-to-one relationship between a regional *Patient* resource and a local *Patient* resource. The *Linkage* is associated with an *Organisation*. Different *Linkages* can be recorded for the regional Patient and different *Organisations*. The model is illustrated below:
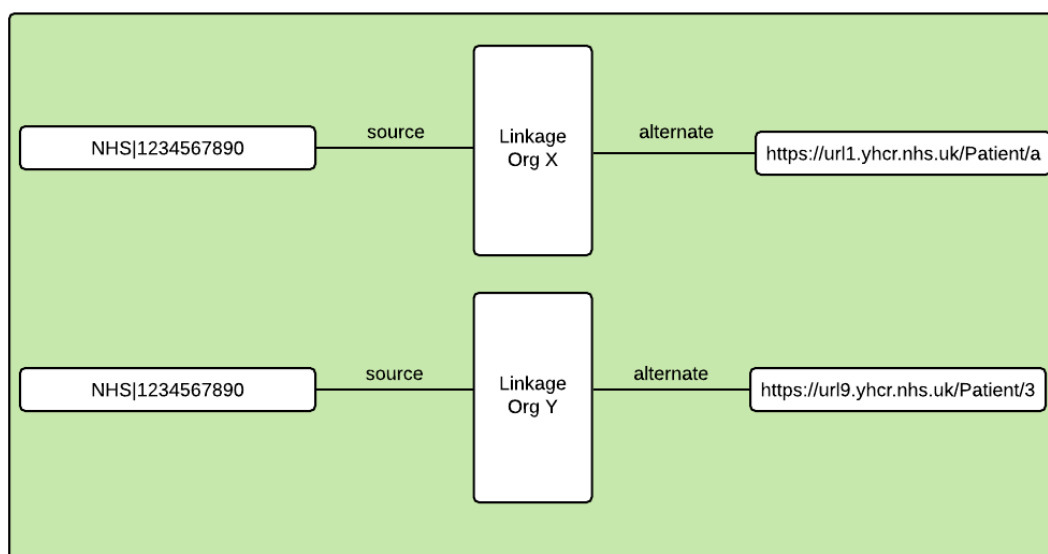
2.4.1   Multiple Points of Presence

An organisation can have multiple points of presence on the SoS through different data providers by allowing the YHCR *Linkage* resource to map a source *Patient* to multiple alternate resources each at a different data provider. Note that the data providers are distinguished by the URL of the resource identifier. The new model is illustrated below:
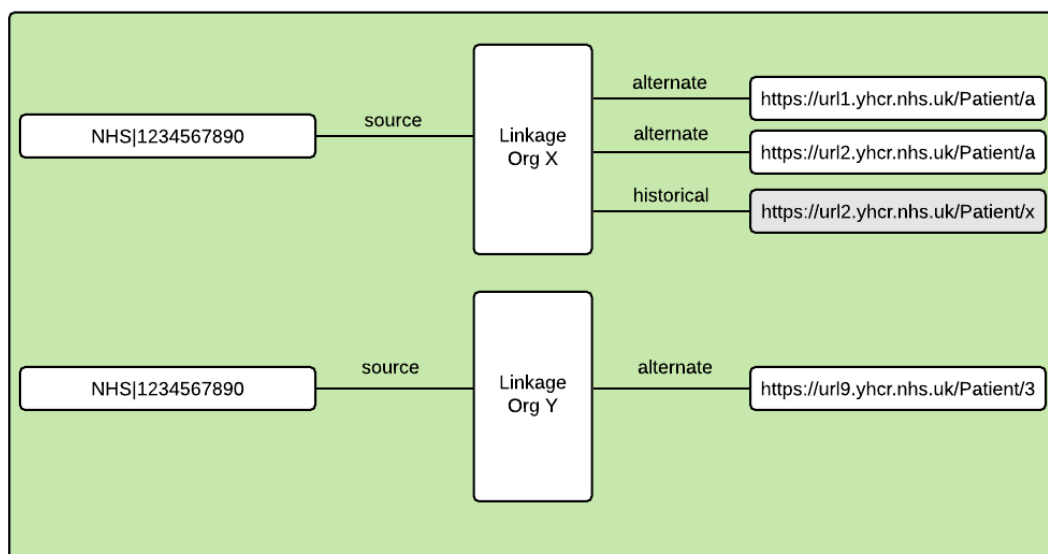
The PIX registration services (individual and batch) will be enhanced to allow multiple registrations to be made for an organisation as follows:

1. When the patient is registered for the first time by any data provider for the organisation then a *Linkage* is created.
2. When a patient is registered for the first time by a data provider, but a previous registration exists for the organisation at a different data provider then a new alternate resource link will be created on the existing *Linkage.*
3. If a patient is registered for a data provider and an alternate resource link already exists but to a different resource, then existing alternate link is made *historical* and a new alternate link is created.
4. If a patient is registered for a data provider and an alternate resource link already exists for that resource, then the service completes without making any data change.

2.4.2   Dynamic Link Creation

Data aggregators may not be able to register patient contact with the PIX service. An alternative on-demand approach will be needed to discovering linkages as they are required.

The compliance requirements for data aggregators summarised above stipulate that a data aggregator must be able to respond to a query for a *Patient* resource using the NHS number as an identifier and will return at most a single patient.

The Participant Registry will be enhanced to identify data providers using dynamic linkages. For these providers, PIX will create linkages in response to data consumers issuing patient-centric searches. PIX will issue a patient search to each dynamic linkage provider and use the results to register linkages in the same manner as statically registered linkages. The results will be used for routing and will also be persisted and used for re-basing searches and unifying data.

Dynamic linkages are refreshed for every query and may return different results on different occasions in which case existing alternate linkages are marked as historical and either a new alternate linkage is created, or an existing historical linkage is marked as alternate.

2.4.3   Querying PIX Linkages

Data consumers can target queries at PIX *Linkages*, and this is a recommended approach to obtaining alternative demographics for patients. PIX will be enhanced to propagate these queries to dynamic linkage sources and to aggregate results.

2.5   Search Term Re-basing and Data Unification with an Enhanced PIX Service

The following illustrates how PIX will be used to process a search for data at an organisation with multiple points of presence on the SoS one of which is a data aggregator using dynamic linkages.
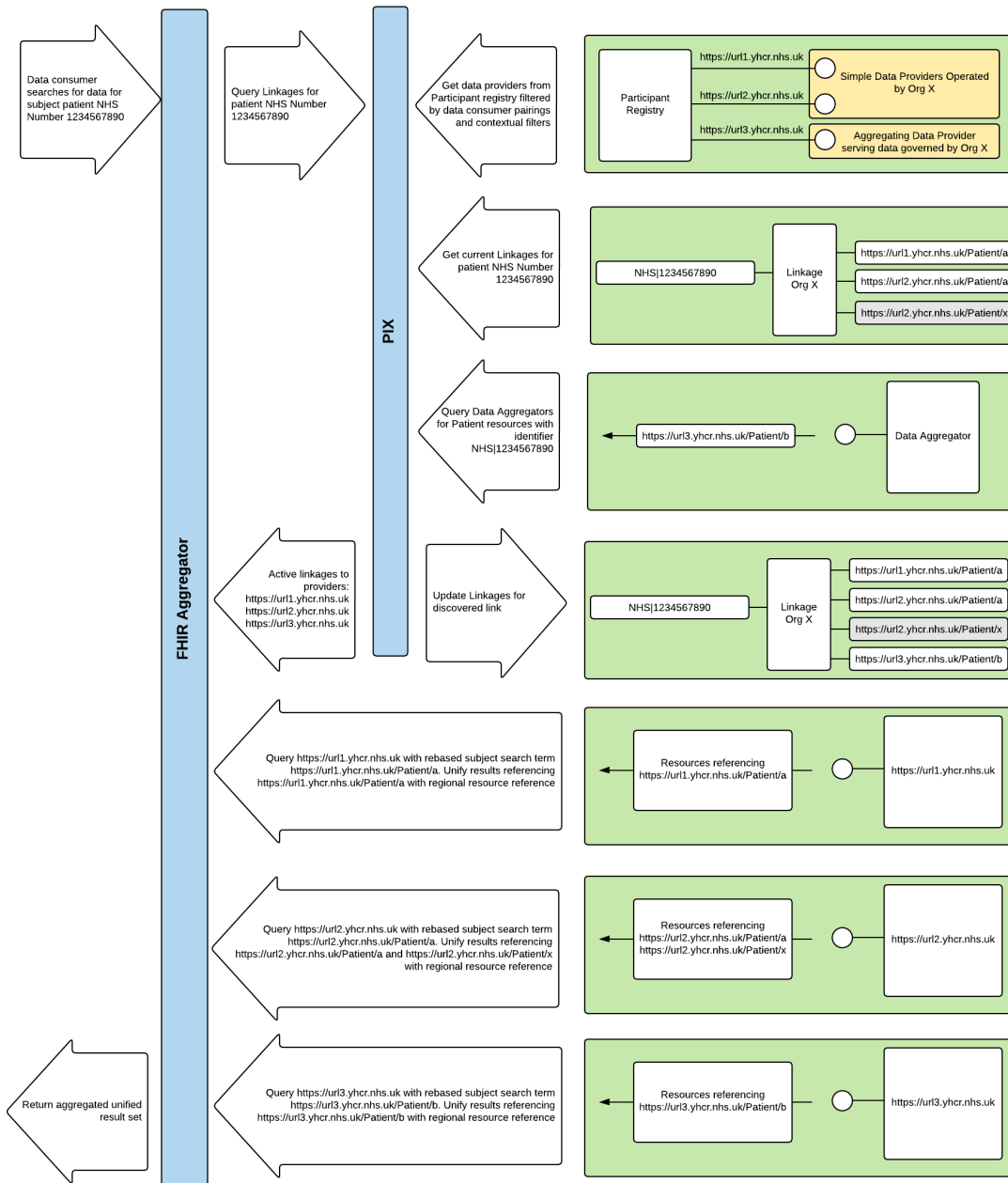
2.6   Explicitly Routed Queries and Linkage Discovery

The processing path illustrated above is for queries which are routed based on provider's contact with patient who is the subject of the query. There is a second class of interactions which are targeted at specific data providers. These occur when interactions use search terms which either explicitly reference the data provider or references a local patient identifier. Such interactions bypass PIX routing and are sent directly to the referenced data providers.

PIX Linkages are still used for rebasing query terms and unifying patient references in search results and PIX will still dynamically create linkages even when a route is explicitly expressed,=.

3 Identifying FHIR Resource Provenance

3.1 Resource Meta-Data Tags

Design paper 010 – "FHIR Aggregator Service" already mandates that data released from the SoS must identify its provenance to a data provider using a meta data _tag. This requirement will be extended to require that the organisational provenance of data also be recorded. Meta data tags have been chosen as they are searchable.

The following tags will be used:

Coding System	Value
https://yhcr.nhs.uk/Source	Data provider identifier as per the Participant Registry
https://yhcr.nhs.uk/Provenance	Organisation ODS code

Data providers may code these tags in resources released to the SoS. If they are included, then the values will be validated by the FHIR Aggregator as follows:

- for non-aggregating providers both the source and provenance will be validated against the Participant Registry
- for aggregating providers, the source will be validated against the Participant Registry.

If values are not provided then the source tag will be added by the FHIR Aggregator and, additionally for non-aggregating the providers, the provenance.

3.2 Associating Governing Organisations with Data Providers

The Participant Registry will be used to identify the relationships between a data provider and organisations from which data is available from the data provider. The relationship will be used to facilitate routing and, under certain circumstances, to restrict data which is accessible from a data provider to that originating from pre-approved organisations.

Currently data provider entries in the Participant Registry only reference the *Organisation* which operates the FHIR endpoint, assuming this to be synonymous with the organisation which provides the data. For aggregating data providers this is not the case, and the registry will be enhanced to distinguish the concepts of *Operating Organisations* and *Governing Organisations*. For simple data providers there will be a single *Governing Organisation* and a single *Operating Organisation*. For data aggregators there will be a single *Operating Organisation* but multiple *Governing Organisations*. The list of *Governing Organisations* which are represented by a data provider can either be operator managed or automatically maintained.

For operator managed lists, *Governing Organisation* references must be manually created and maintained in the Participant Registry. This will be performed the Onboarding Suite (design paper 020). FHIR resources will only be released by the FHIR Aggregator from these data providers if their provenance is one of the *Governing Organisations* identified in the Participant Registry. Operator managed lists allow the YHCR to selectively control the release of data release from an aggregating data provider. This feature will

For automatically maintained lists, *Organisation* references are added by the FHIR Aggregator as organisations provide data through the aggregator. Note that Linkage queries issued by data consumers using the Data Discovery Service to discover potential sources of data for patients will cause the lists to be frequently updated (refer to section 5.2).

4 Routing in the FHIR Aggregator

A role of the FHIR Aggregator is to route data interactions from a data consumer to data providers. There two key categories of interaction:

1. Patient centric interactions which are targeted at a patient or group of patients.
2. Non-patient centric interactions which are typically searches which are not targeted at a patient.

The FHIR Aggregator routes either implicitly, whereby the FHIR Aggregator determines the data providers to which to send the interaction, or explicitly, whereby the data consumer specifies how to route the interaction.

4.1 Implicit Routing

4.1.1 Patient Centric Searches

Patient Linkages managed by PIX are used to determine the data providers which have data for a patient. The behaviour is not changed by this design, although, as specified in section 2 *Linkages* may now be dynamically constructed by the PIX server.

4.1.2 Other Searches

Non-patient centric searches are routed to all data providers who support interactions for the data consumer's reason for access as specified by contextual data filters set up for the data provider (see design paper 031 – "Filters in the FHIR Aggregator"). This behaviour is not changed by this design.

4.2 Explicit Routing

4.2.1 Interactions Targeted at a Data Provider

A data consumer can target an interaction at one or more data providers either by specifying a source tag as a search parameter or by explicitly referencing a resource id at a local data provider.

An example of a targeted interaction is:

```
QuestionnaireResponse?_tag=https://yhcr.nhs.uk/Source|HELM
```

This behaviour is not changed by this design.

4.2.2 Interactions Targeted at an Organisation

A new behaviour of the FHIR Aggregator is to allow a search to be targeted at a *Governing Organisation*. The organisation ODS code is provided in the provenance meta data tag as in this example:

```
QuestionnaireResponse?_tag=https://yhcr.nhs.uk/Provenance|RV8
```

The FHIR Aggregator processes these categories of requests by determining the data providers which operate on behalf of the specified *Governing Organisations* using the Participant Registry. It will issue the search only to these providers. Note that for dynamically maintained *Governing Organisation* lists, the query will only be issued to those data providers for which a relationship with an organisation has already been established. For patient-centric queries, as required for direct care usage, this should not present a problem as dynamic lists are updated for linkage queries issued by Data Discovery Service. Most consumers will use this service to determine *Governing Organisations* which provide

data for a patient before issuing explicitly routed queries. For reasons for access which are non-patient centric ("Indirect care not in the context of a patient" as used by the population health management platform) will only have access to data sources which where a relationship with a *Governing Organisation* has already been established and this needs to be considered in the design of interactions with the SoS.

If the data provider supports the meta data tag and the search term then it assumes responsibility for filtering data before releasing it to the SoS. If this is not the case, then the behaviour must be implemented in an adapter.

4.2.3   Data Providers that Only Accept Explicit Routing

Implicitly routed patient-centric queries are directed at data providers who have Linkage entries recorded in PIX which are created either by the data provider registering contact directly with PIX or, for a complex data provider, responding to the dynamic linkage query (section 2.4.2).

A data provider which is registered to use dynamic linkages, but which does not provide a *Patient* in response to the dynamic linkage query will be excluded from implicit routing and this configuration can be used to force explicit routing.

Note that if Linkages are not recorded for a data provider, then the FHIR aggregator will not rebase search terms or unify patient resource references in search results. The data provider must accommodate references to the regional Patient resource in search terms and must substitute any references to local *Patient* resources in search results or resource retrievals with references to the regional *Patient* resource.

4.3   A Configuration for the GP Connect Adapter

GP Connect is a unique data source:

- almost every patient will have a record accessible on GP Connect;
- data consumers may need to access GP Connect before regional contact with a patient has been established (eg: visitors to the region attending ED);
- data consumers must be accredited by NHS Digital to use GP Connect.

For these reasons, the GP Connect should be configured in the SoS to require explicit routing: either a Source or Provenance meta data tag must be specified in search terms issued by data consumers. Explicit routing avoids GP Connect being queried for every search issued by every consumer and reflects the reality that NHS Digital will probably require specific treatment of GP data by data consumers; as a consequences searches will be either targeted to GP connect or specifically exclude GP data.

5   Data Availability Service Set Enhancements

The Data Availability service set offers simple mechanisms for data consumers to determine:

a) Data Availability - the existence of data on the SoS for a patient

b) Data Availability Sources - the organisations/endpoints from which data is available.

The services are offered as both Web Socket and RESTful interfaces. Both services are impacted to some extent by this design.

5.1   Data Availability Service

The Data Availability service's function is to provide a simple Boolean response to the question as whether data is available from the YHCR for a patient. This function withstands the separation of concepts of data provider and governing organisation.

The current implementation supports an optional invocation parameter "allSources" which was included to allow a data consumer to exclude or include their own data provider from registered patient contact. This option pre-dates the introduction of participant pairings (see design paper 021 – "Onboarding for Data Consumers") and will be deprecated as part of this enhancement.

5.1.1   Implementation Notes

The service response should be constructed from PIX *Linkages* query. Note that in accordance with 2.4.3 this query will result in linkages being updated from data aggregators. Note that data providers which only accept explicit routing will not offer *Linkage* resources and so data available from these sources will not be represented in the Data Availability Service response. Data Consumers routing queries to these providers should be aware of this and directly interrogate these data providers to determine whether they have relevant data rather than relying solely on a negative response from the Data Availability Service.

Historical *Linkages*, and *Linkages* to data providers which would be excluded from search requests either because of participant pairings or because of contextual filters (see design paper 031 – Data Release Management) must be excluded when determining data availability.

5.2   Data Availability Sources Service

This service conflates the concepts or data providers and governing organisation and requires substantial modification. Data consumers who use this service will be impacted by the change.

The current implementation operates under a single mode: it supplies the organisations and endpoints from which data may be available for a patient.

A future implementation will operate under three modes:

- supply the endpoints (data providers) from which data may be available for a patient;
- supply the organisations from which data may be available for a patient;
- supply the organisations and endpoints from which data may be available for a patient.

An example result set for each mode is detailed below.

5.2.1   Data Provider Mode

```
{
```

```
        "detail": [
              {
                 "dataProviderCode": "RWY-Gen",
                 "dataProviderName": "Calderdale General",
                 "endpointaddress": "https:cald1.nhs.uh/fhir/"
              },
              {
                 "dataProviderCode": "RWY-Mat",
                 "dataProviderName": "Calderdale Maternity",
                 "endpointaddress": "https:cald2.nhs.uh/fhir/"
              } ]
}
```

5.2.2 Organisation Mode

```
{
        "detail": [
              {
                 "organisationCode": "RWY",
                 "organisationName": "Calderdale"
              } ]
}
```

5.2.3 Dual Mode

```
{
        "detail": [
              {
                 "organisationCode": "RWY",
                 "organisationName": "Calderdale",
                 "dataProviders" : [
                 {
                       "dataProviderCode": "RWY-Gen",
                       "dataProviderName": "Calderdale General",
                       "endpointaddress": "https:cald1.nhs.uh/fhir/"
                 },
                 {
                       "dataProviderCode": "RWY-Mat",
                       "dataProviderName": "Calderdale Maternity",
                       "endpointaddress": "https:cald2.nhs.uh/fhir/"
                 } ]

              } ]
}
```

5.2.4 Implementation Notes

Logically, the service response should be implemented using the same approach as the Data Availability service:

- available data providers are determined constructed from PIX *Linkages* query filtered for participant pairings and provider contextual filters;
- for simple data providers and aggregating data providers using operator governing organisation lists, the governing organisation is determined from the Participant Registry;
- for aggregating providers using dynamically managed lists, the governing organisations are determined by issuing the Linkage query specified in 2.2 to each data aggregator.

Appendix 1 – Summary of Changes

This appendix consolidates the various changes detailed in the body of the document as a checklist for developers.

Participant Registry

1. Classify data providers by linkage type (standard/dynamic).
2. Classify data providers by governance association (simple/data aggregator).
3. For data aggregators specify governing organisation list maintenance method (manual/automatic).

PIX/MPI

4. Issue patient queries to data providers supporting dynamic linkages and use results to maintain Linkages.
5. Permit multiple alternate Linkage destinations for a governing organisation.
6. Mark deprecated Linkage destinations as historical.
7. Pre-process Linkage queries to build Linkages for dynamic linkage data providers.
8. Populate automatically managed governing organisation lists in the Participant Registry for manually registered linkages.

FHIR Aggregator

9. Accommodate multiple alternative linkages for a governing organisation when routing requests.
10. Ignore historical linkages when routing requests.
11. Enable explicit routing on both Source and Provenance tags.
12. Populate Source and Provenance tags where not inserted by the data provider.
13. Populate automatically maintained governing organisation lists for data aggregators based on Provenance tags.

Onboarding Suite

14. When responding to data availability requests , update linkages for dynamic linkage data providers.
15. Accommodate multiple alternative linkages.
16. Ignore historical linkage.
17. Implement the multiple mode data availability source service.
18. When responding to data availability source requests, issue dynamic linkage queries to dynamic linkage data providers
19. Populate automatically managed governing organisation lists in the Participant Registry for data aggregators from results of dynamic linkage queries.

Appendix 2 – Maturity Matrix

Section	Narrative	Consultative	Draft	Normative
1 Introduction 1.1 Purpose of this Document	X			
1.2 New Types of Data Provider	X			
1.3 Rational for Change		X		
1.4 Impact on Earlier Designs	X			
1.5 Relationship of this Document with Other Standards	X			
1.6 Intended Users of the This Document	X			
2 Complex Data Providers, Search Term Re-Basing and Data Unification 2.1 YHCR FHIR Aggregation and a Unified Data Model		X		
2.2 Requirements for Data Aggregators Acting as Data Providers to the YHCR 2.2.1 Adapters to Data Aggregators		X		
2.3 Multiple Points of Presence on the SoS		X		
2.4 PIX Server Enhancements and Use of Linkages for Complex Data Providers 2.4.1 Multiple Points of Presence		X		
2.4.2 Dynamic Link Creation		X		
2.4.3 Querying PIX Linkages		X		
2.5 Search Term Re-basing and Data Unification with an Enhanced PIX Service		X		
2.6 Explicitly Routed Queries and Linkage Discovery		X		
3 Identifying FHIR Resource Provenance 3.1 Resource Meta-Data Tags		X		
3.2 Associating Governing Organisations with Data Providers		X		
4 Routing in the FHIR Aggregator 4.1 Implicit Routing 4.1.1 Patient Centric Searches		X		
4.1.2 Other Searches		X		
4.2 Explicit Routing		X		

4.2.1 Interactions Targeted at a Data Provider				
4.2.2 Interactions Targeted at an Organisation		X		
4.2.3 Data Providers that Only Accept Explicit Routing		X		
4.3 A Configuration for the GP Connect Adapter		X		
5 Data Availability Service Set Enhancements 5.1 Data Availability Service 5.1.1 Implementation Notes		X		
5.2 Data Availability Sources Service 5.2.1 Data Provider Mode		X		
5.2.2 Organisation Mode		X		
5.2.3 Dual Mode		X		
5.2.4 Implementation Notes		X		