Digital Health Ecosystem Wales

Making it easier and faster to adopt digital healthcare technology in Wales

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EIDC
Ecosystem Iechyd Digidol Cymru

DHEW
Digital Health Ecosystem Wales

Life Sciences Hub

Bring together industry, clinicians, policy makers, academics and funders to create an environment where it's easier and faster to adopt digital healthcare technology in Wales.

NWIS Ecosystem Team

Securely open up NHS Wales systems and data to developers to ease the burden of integration and improve understanding of the digital architecture

Why do we need an ecosystem?

Barriers

New Partnership Models Required

Create Digital Innovation Culture

Measurement & Data are Hard

Infrastructure is a Blocker

Conversations are Slow

Innovation Pathway Not Clear

Everyone Feels Unsupported

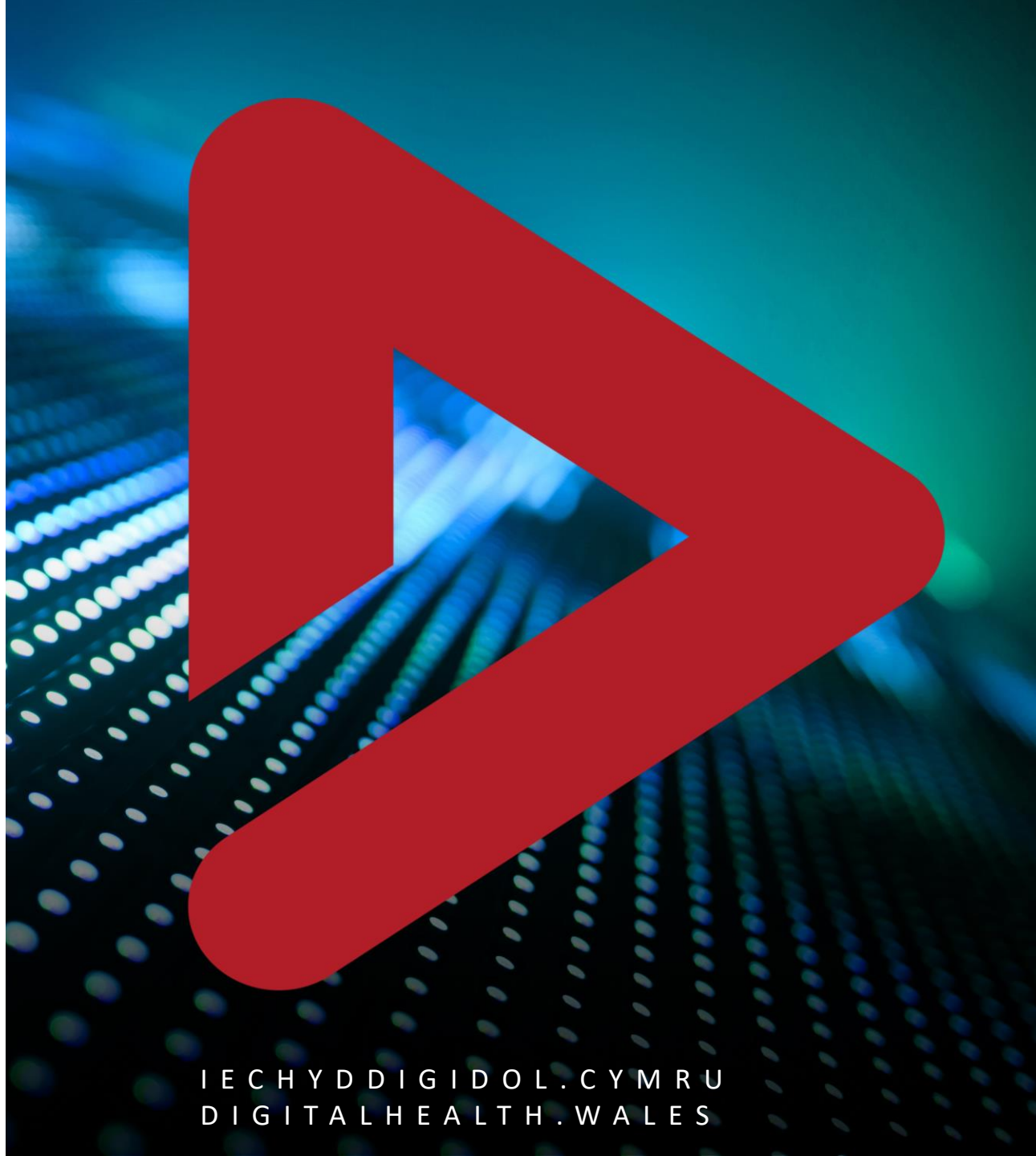
Personality is Too Big a Factor

Finances Are Not Aligned

What should the Ecosystem do?

4 principles/criteria

- Does it make it easier and faster?
- Does it use our ability to convene and connect?
- Does it result in practical action?
- Does it fill a gap?



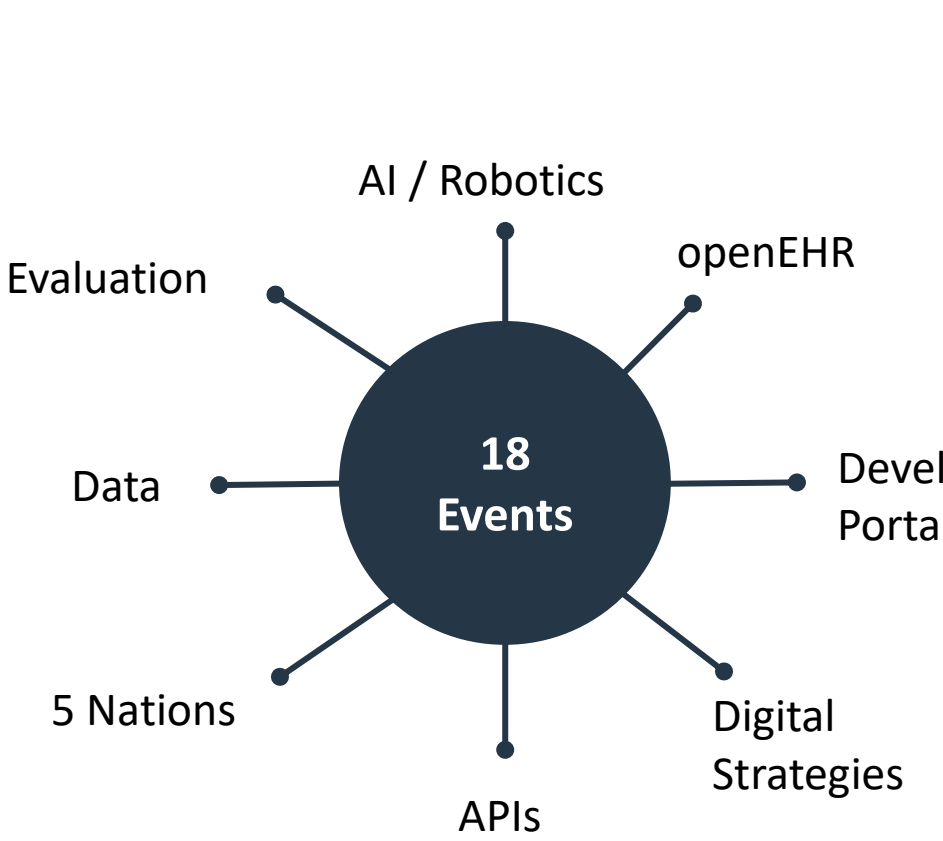
Ecosystem Priorities

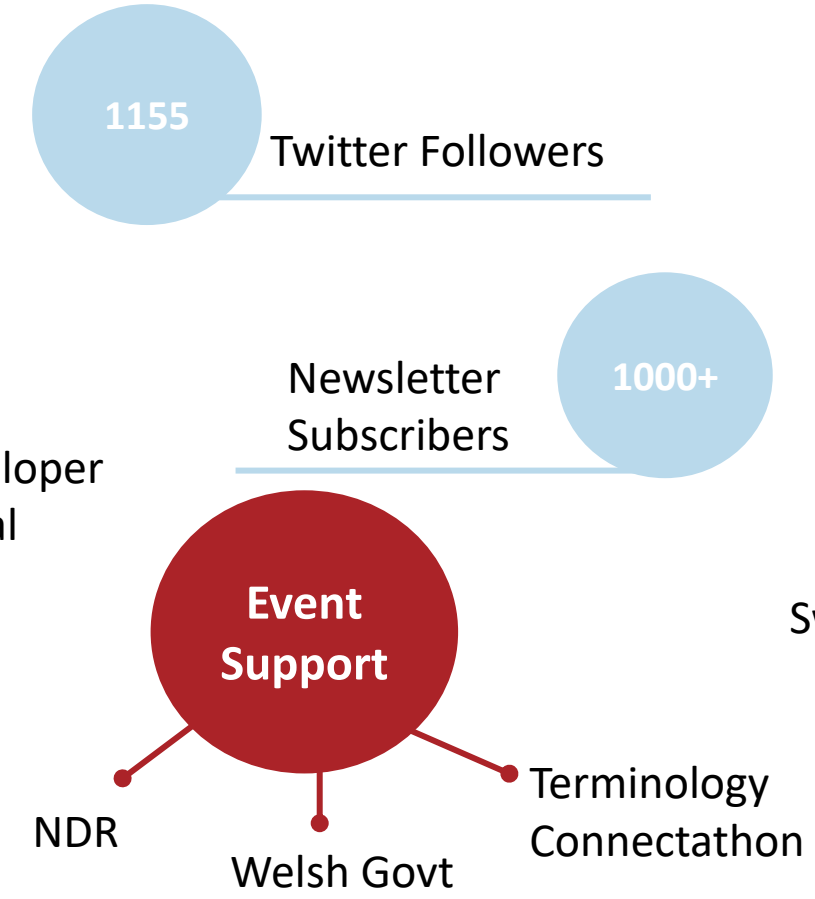
"Making it easier and faster to adopt digital healthcare technology"

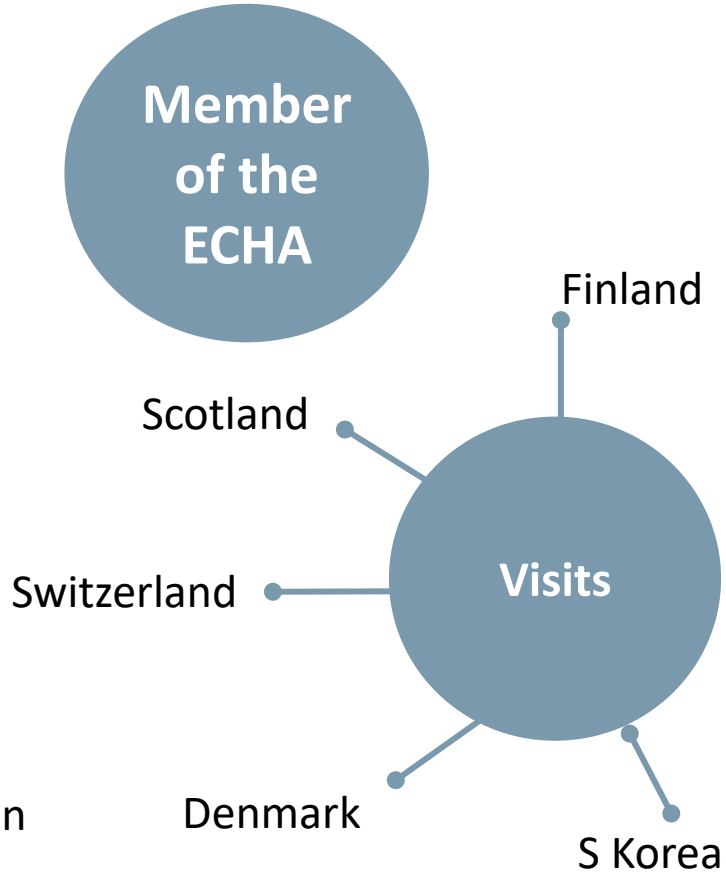
- Connecting People
- Connecting Delivery
- Connecting Systems

Connecting People and Connecting Delivery

Connecting People







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DHEW Digital Health Ecosystem Wales

Covid19 Response – Digital Health

205 enquiries or offers of support received

Themes:

- Additional people
- COVID-19 tracking and tracing
- Remote monitoring
- Making systems more efficient
- Existing products

offers taken up

offers of support reviewed

Connecting Delivery

142 applications for £30K of WG funding – 5 winners

Physio Now – triage chatbot

Digital Solutions Fund

Medapod – remote monitoring platform

MedTRiM – emotional resilience training

Healthy.IO – remote wound assessment

Clinitouch Vie – remote monitoring platform

Networked Data Labs

AI in Health & Care Award

RFID Asset Tracking

AI pilot Kheiron Medical & BTW

TEC Cymru Comms

Network support AAG WTSB

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DHEW Digital Health Ecosystem Wales

Digitalhealth.wales

Home for information about national digital projects and programmes:

- DHEW
- Technology Enabled Care
- National Data Resource

About to come online:

- Advanced Analytics Group
- Care Improvement Cymru

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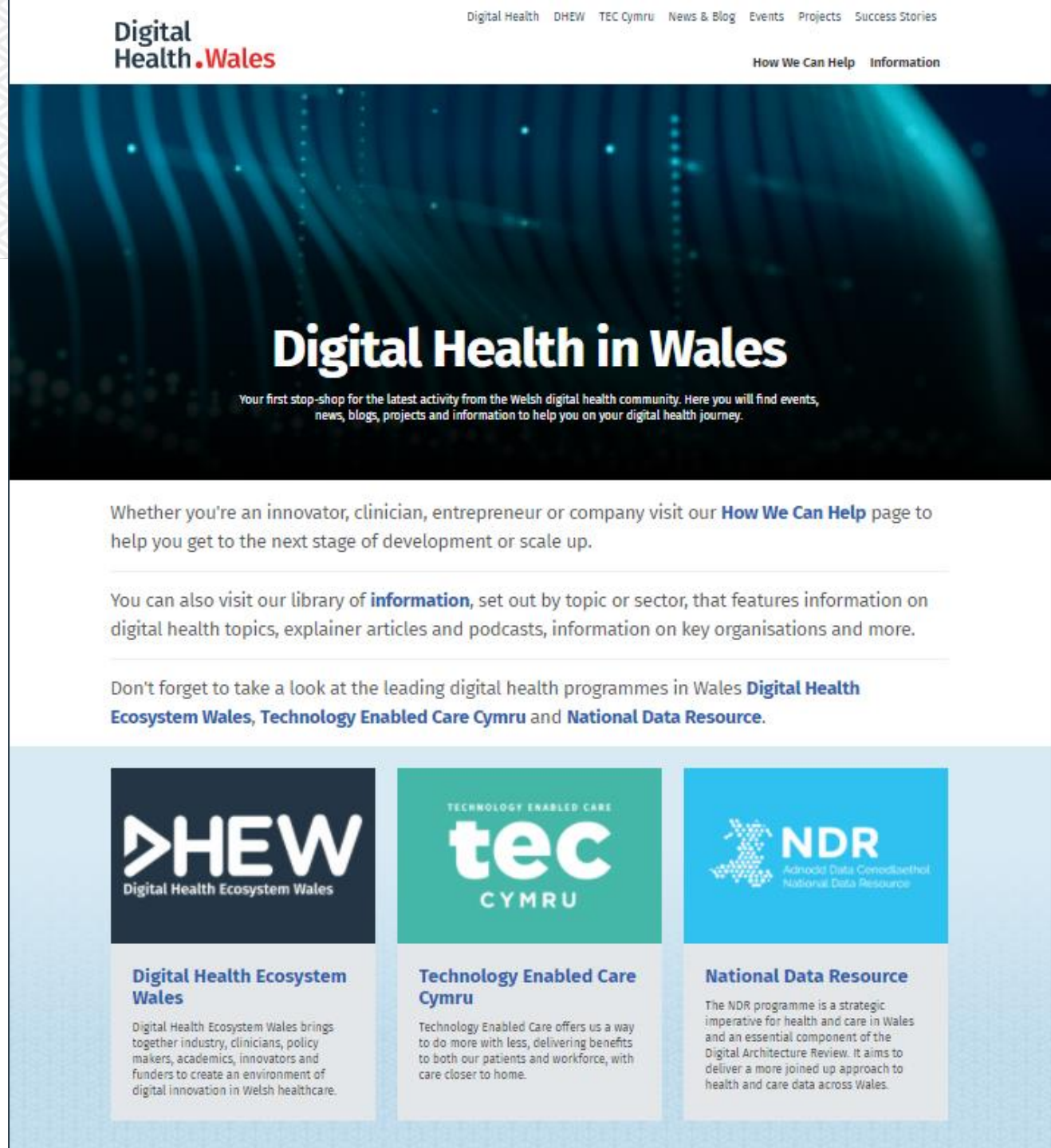


Digitalhealth.wales

- Advice
- Information
- Opportunities
- Resources
- Developer portal

Opportunities or Services

AI in Health and Care Award

Scientific Advice Service

Topics

Artificial Intelligence (AI)

Application Programme Interfaces (APIs)

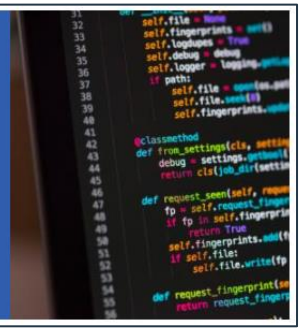
Evidence Standards / Evaluation

NHS Wales Developer Portal

An early beta version of the NHS Wales Developer Portal has been launched in order to get invaluable feedback from developers.

The Portal aims to ease the burden of integration for developers through access to test instances of APIs enabling the rapid prototyping of solutions for NHS Wales. The objective is to open up the architecture in NHS Wales and aid both internal and external developer communities in understanding and interacting with NHS Wales resources.

Take a look and let us know what you think!



Advice or Funding

Are you looking for some advice or funding?

Idea or Unmet Need

Do you have an idea or an unmet need?

Research and Development

Do you need help with research and development?

Sell Outside Wales

Are you looking to sell your product outside of Wales?

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DHEW Digital Health Ecosystem Wales

Connecting Systems -
Creating a Developer Community

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Background to the Ecosystem

- Engagement
- Test APIs with industry using new open and interoperable standards
- Discovery/R&D
  - Baseline infrastructure
  - Adopt new open standards
  - Drive forward Interoperability of health and care systems
- Promotion of Open Architecture

APIs and Interoperability

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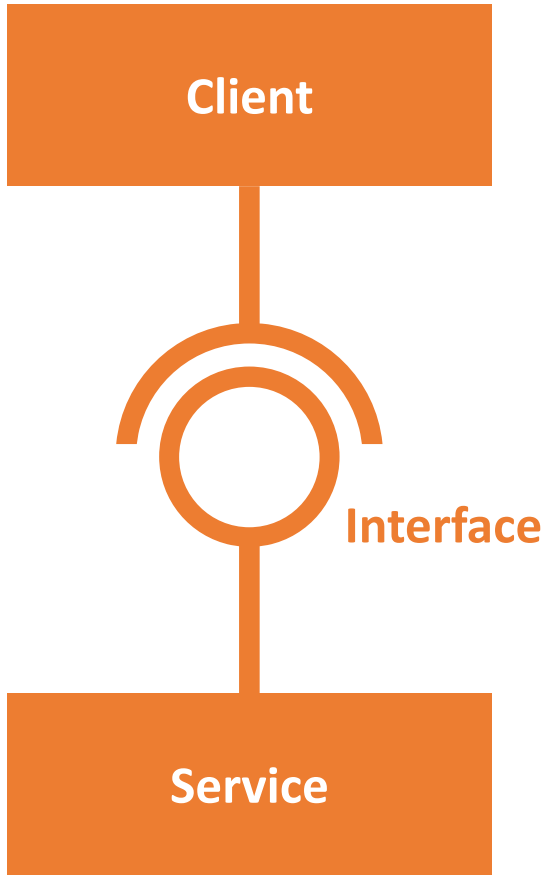
DHEW
Digital Health Ecosystem Wales

APIs

- Application Programming Interface
- Defines a “communication contract”
  - One app *provides* the interface
  - Another app *uses* the interface
- Web APIs send/fetch data over HTTP



APIs

- RESTful (FHIR)
- SOAP
- GraphQL
- gRPC

{REST:API}

APIs

RESTful APIs

Request:

```
HTTP GET: NRDSServicesApi/nrds/gettable/nrds/gppractice?nrd:GPpracticeCode=W00005
```

Returns the all attributes for the entity defined by the tablename optionally filtering using the querystring values.

Response:

```
<nrds:ResultSet xmlns:nrd="http://www.wales.nhs.uk/nrds" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:nrds="http://www.wales.nhs.uk/namespaces/NSD">
  <nrds:Row>
    <nrd:AddressLine1>30 Thomas Street</nrd:AddressLine1>
    <nrd:AddressLine2>Abertridwr</nrd:AddressLine2>
    <nrd:AddressLine3></nrd:AddressLine3>
    <nrd:AddressLine4>Caerphilly</nrd:AddressLine4>
    <nrd:GPpracticeCode>W00005</nrd:GPpracticeCode>
    <nrd:LHBcode></nrd:LHBcode>
    <nrd:Postcode>CF83 4AZ</nrd:Postcode>
    <nrd:PracticeName>Meddygfa Tridwr</nrd:PracticeName>
    <nrd:SeniorGPname>KAUSHAL SC</nrd:SeniorGPname>
    <nrd:SeniorGPno>G8615383</nrd:SeniorGPno>
    <nrd:Telephone>0844 4778635</nrd:Telephone>
  </nrds:Row>
</nrds:ResultSet>
```

SOAP APIs

```
SOAP POST: /nrdsservices.asmx
```

Request:

```
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/" xmlns:mes="http://www.wales.nhs.uk/namespaces/MessageRelease2">
  <soapenv:Header/>
  <soapenv:Body>
    <mes:GetResultSetRequest>
      <mes:AttributeValuePair>
        <mes:Attribute>
          <mes:Name>GpPracticeCode</mes:Name>
          <mes:Namespace>http://www.wales.nhs.uk/nrds</mes:Namespace>
          <mes:Description/>
        </mes:Attribute>
        <mes:Value>W97046</mes:Val
      </mes:AttributeValuePair>
      <mes:LookupTable>
        <mes:Name>GPpractice</mes:
        <mes:Namespace>http://www.
      </mes:LookupTable>
      <mes:AttributeToRetrieve>
        <mes:Name>postcode</mes:Na
        <mes:Namespace>http://www.
      </mes:AttributeToRetrieve>
      <mes:AttributeToRetrieve>
        <mes:Name>PracticeName</me
        <mes:Namespace>http://www.
      </mes:AttributeToRetrieve>
      <mes:ExactMatch>1</mes:Exact
    </mes:GetResultSetRequest>
  </soapenv:Body>
</soapenv:Envelope>
```

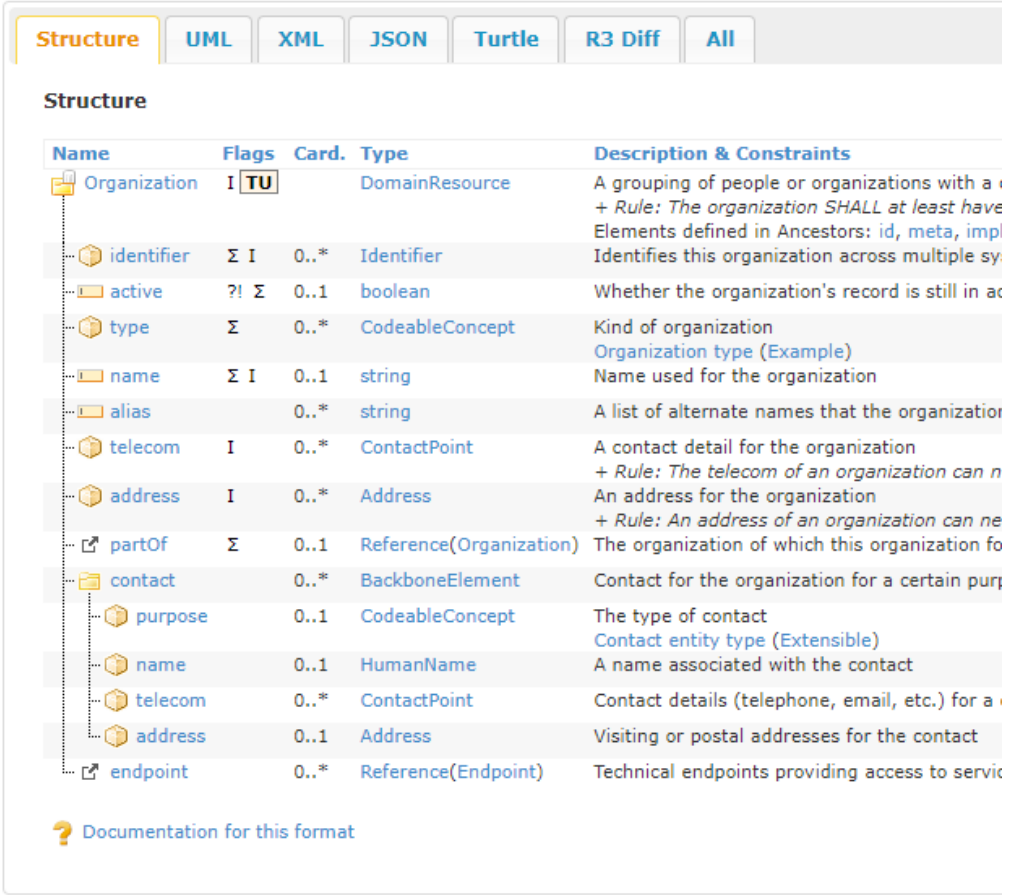
Response:

```
<soap:Envelope xmlns:soap="http://schemas.xmlsoap.org/soap/envelope/" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:xsd="http://www.w3.org/2001/XMLSchema">
  <soap:Body>
    <GetResultSetResponse xmlns="http://www.wales.nhs.uk/namespaces/MessageRelease2">
      <Row>
        <AttributeValuePair>
          <Attribute>
            <Id>ECCCA863-42B0-405F-938B-2863785B5F10</Id>
            <Name>Postcode</Name>
            <Namespace>http://www.wales.nhs.uk/nrds</Namespace>
          </Attribute>
          <Value>CF62 8AZ</Value>
        </AttributeValuePair>
        <AttributeValuePair>
          <Attribute>
            <Id>D5D15286-0B5F-41F7-BC69-01D691CF6431</Id>
            <Name>PracticeName</Name>
            <Namespace>http://www.wales.nhs.uk/nrds</Namespace>
          </Attribute>
          <Value>Ravenscourt Surgery</Value>
        </AttributeValuePair>
      </Row>
    </GetResultSetResponse>
  </soap:Body>
</soap:Envelope>
```

FHIR

FHIR is a standard for health care data exchange

Gives a structure/framework for resources common in a health care setting.



Structure | UML | XML | JSON | Turtle | R3 Diff | All

Structure

Name	Flags	Card.	Type	Description & Constraints
Organization	I TU		DomainResource	A grouping of people or organizations with a *+ Rule: The organization SHALL at least have* Elements defined in Ancestors: id, meta, impl
identifier	Σ I	0..*	Identifier	Identifies this organization across multiple sy
active	?! Σ	0..1	boolean	Whether the organization's record is still in ac
type	Σ	0..*	CodeableConcept	Kind of organization Organization type (Example)
name	Σ I	0..1	string	Name used for the organization
alias		0..*	string	A list of alternate names that the organizatio
telecom	I	0..*	ContactPoint	A contact detail for the organization *+ Rule: The telecom of an organization can n*
address	I	0..*	Address	An address for the organization *+ Rule: An address of an organization can ne*
partOf	Σ	0..1	Reference(Organization)	The organization of which this organization fo
contact		0..*	BackboneElement	Contact for the organization for a certain purp
purpose		0..1	CodeableConcept	The type of contact Contact entity type (Extensible)
name		0..1	HumanName	A name associated with the contact
telecom		0..*	ContactPoint	Contact details (telephone, email, etc.) for a
address		0..1	Address	Visiting or postal addresses for the contact
endpoint		0..*	Reference(Endpoint)	Technical endpoints providing access to servic

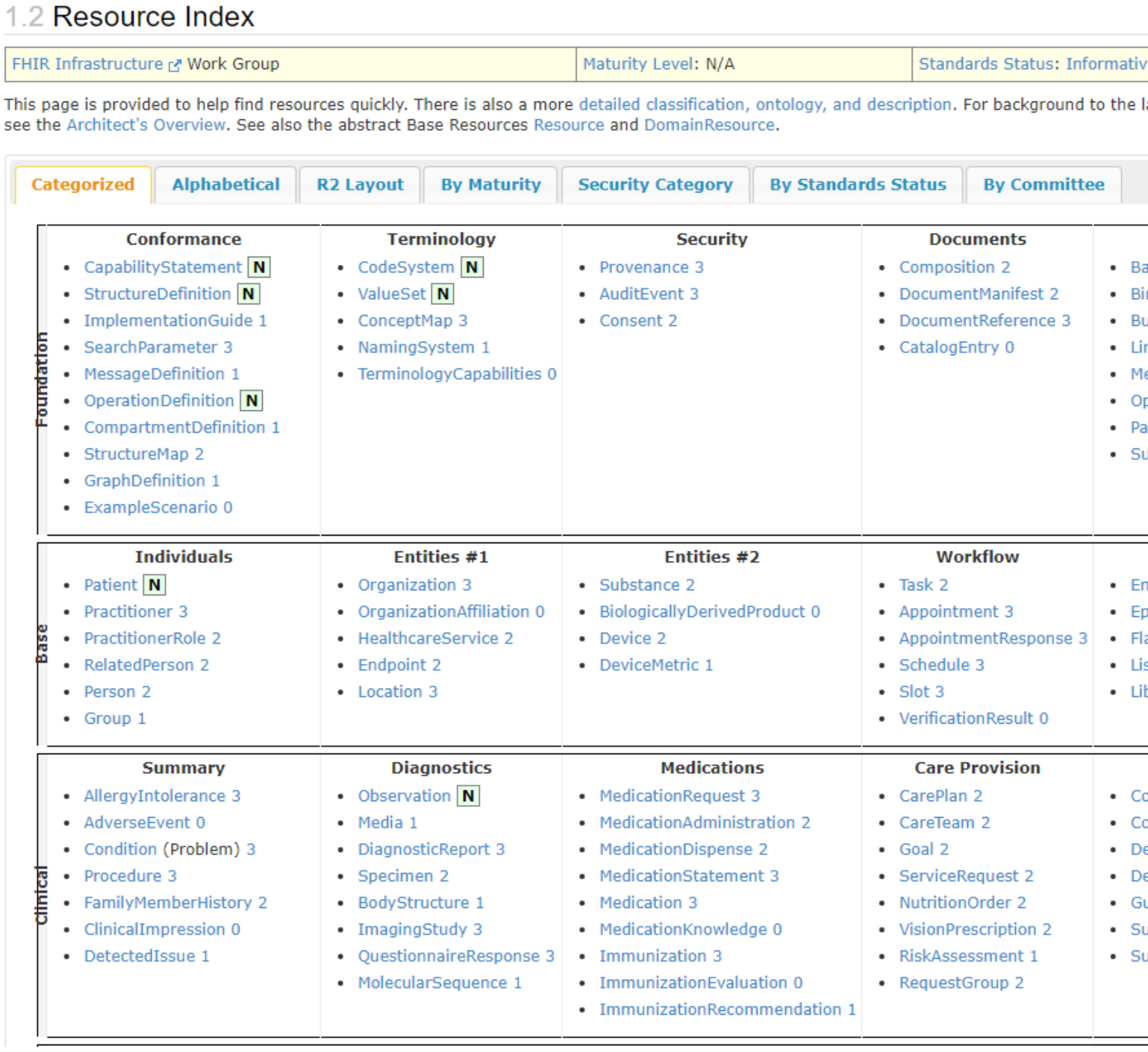
Documentation for this format

FHIR Resources

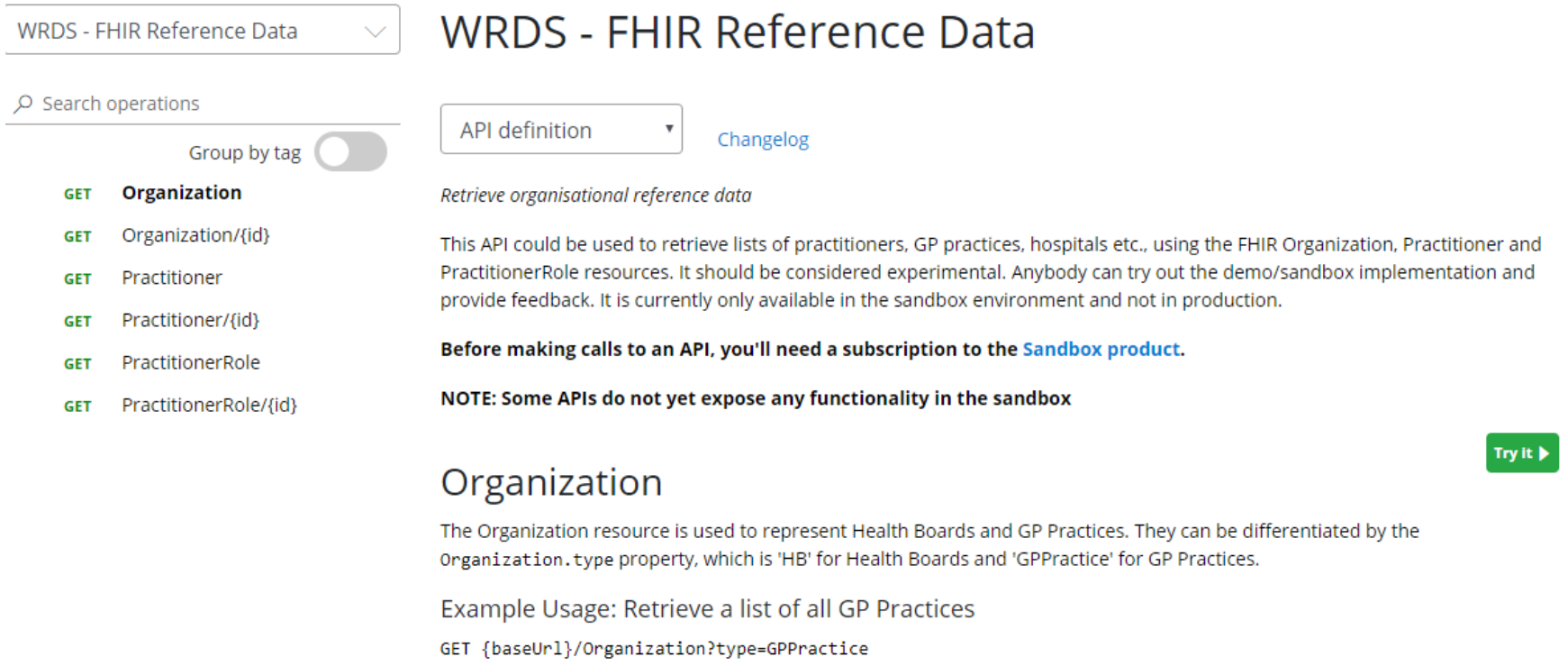
common concepts in Health care.

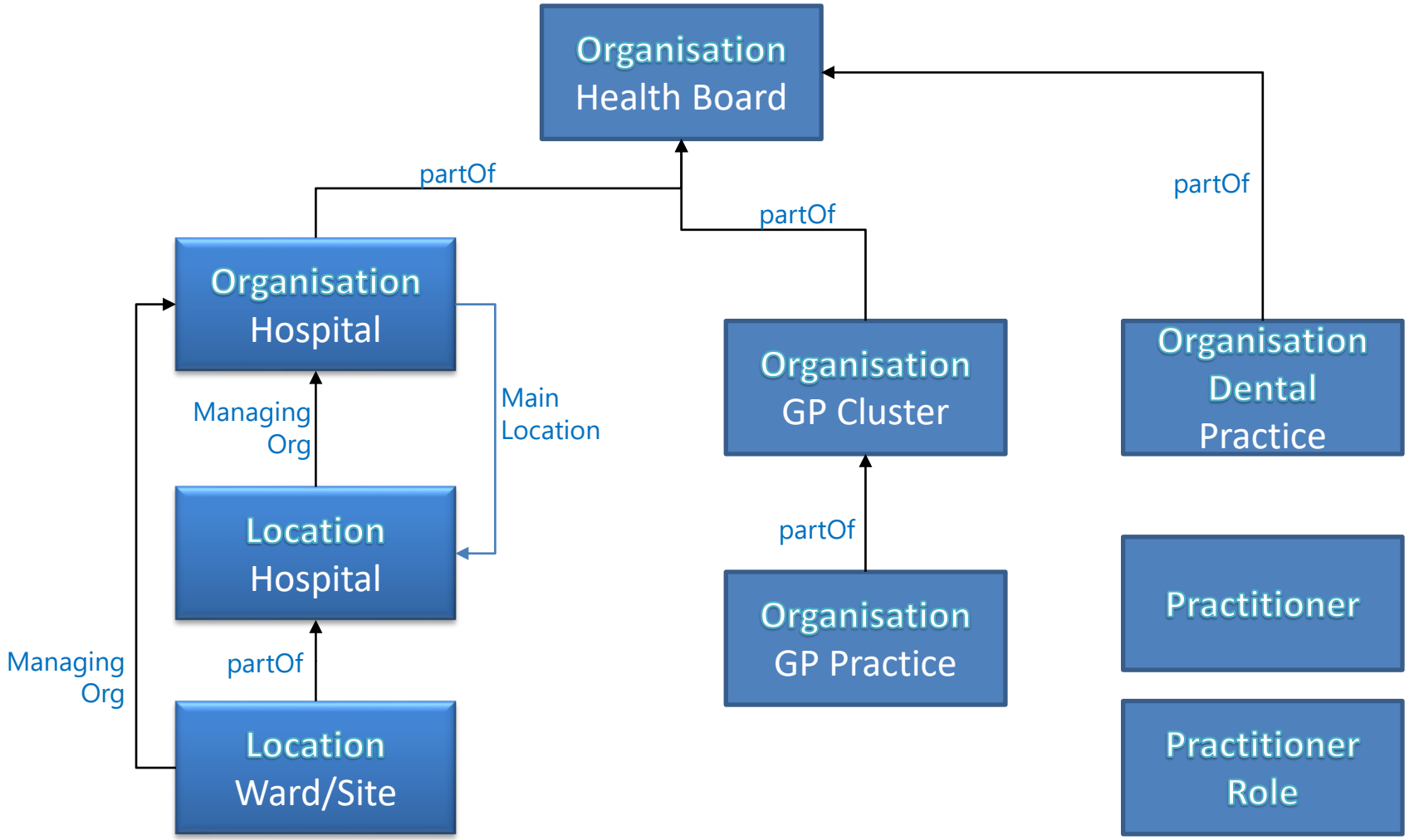
solve real world clinical and administrative problems

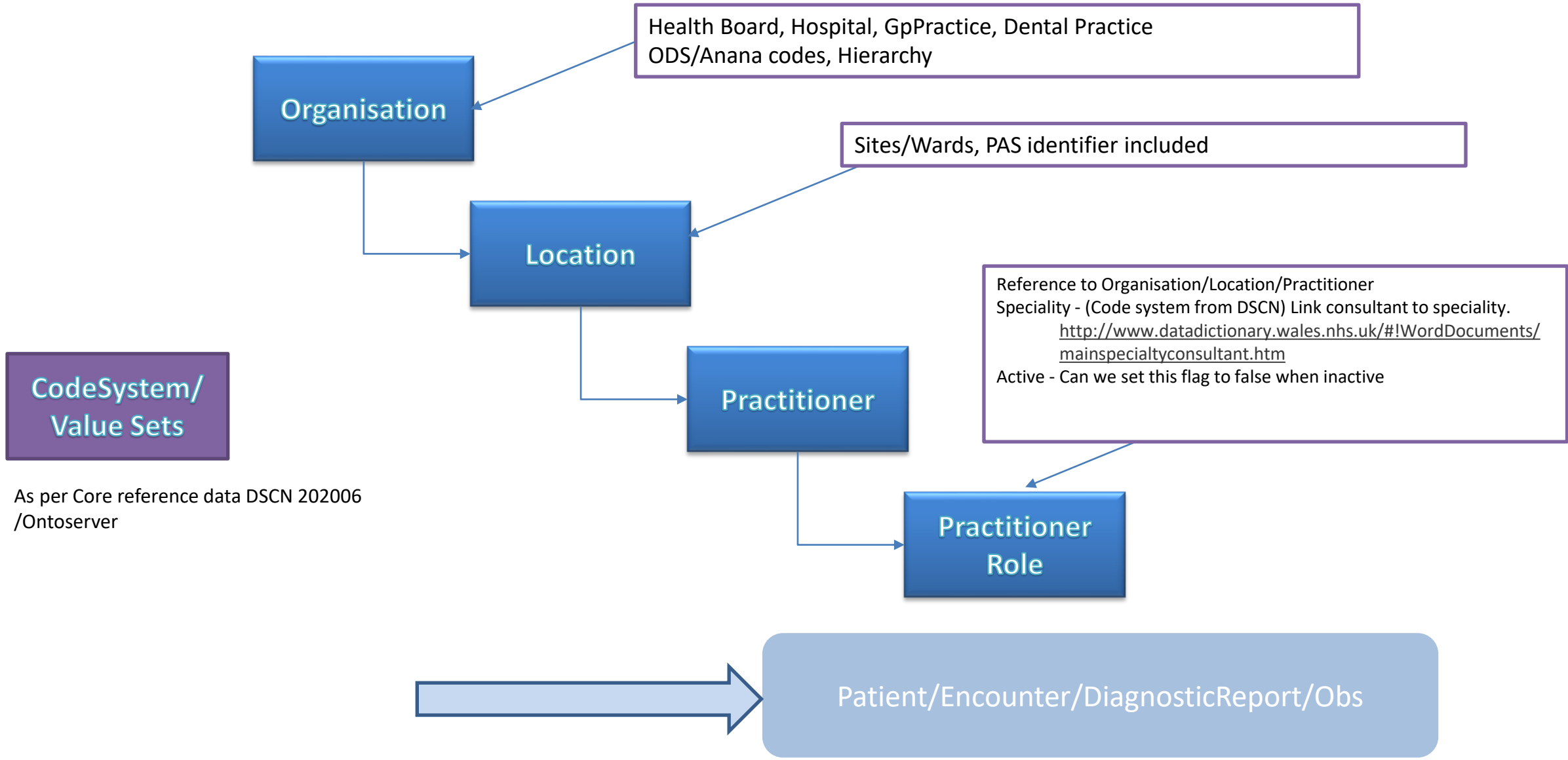
FHIR Profiles – UK Core



Example: Organisational Reference data - FHIR




Organisation
Health Board
partOf
partOf
partOf
Organisation
Hospital
Organisation
GP Cluster
Organisation
Dental
Practice
Managing
Org
Main
Location
Location
Hospital
partOf
Organisation
GP Practice
Practitioner
Managing
Org
partOf
Location
Ward/Site
Practitioner
Role

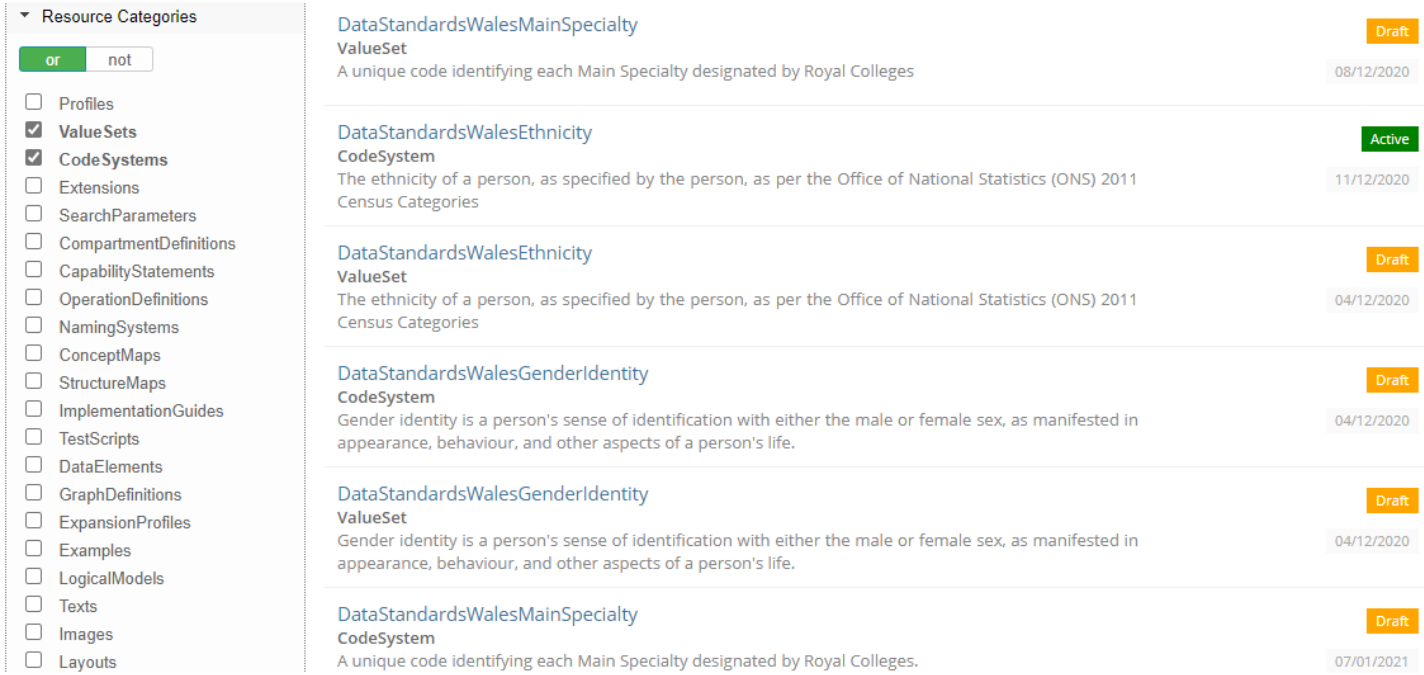

Health Board, Hospital, GpPractice, Dental Practice
ODS/Anana codes, Hierarchy
Organisation
Sites/Wards, PAS identifier included
Location
Reference to Organisation/Location/Practitioner
Speciality - (Code system from DSCN) Link consultant to speciality.
http://www.datadictionary.wales.nhs.uk/#!WordDocuments/mainspecialtyconsultant.htm
Active - Can we set this flag to false when inactive
Practitioner
CodeSystem/ Value Sets
Practitioner Role
As per Core reference data DSCN 202006 /Ontoserver
Patient/Encounter/DiagnosticReport/Obs

FHIR - Profiles

- UKCore Profiles
- Building Welsh Profiles
- Interoperability working group

FHIR - Profiles

- Agreed interoperability standards for Wales
- Collaboration



Developer Access

API Marketplace

Patient-centric APIs are essential to improving the mortality of the human race. The existing raw data which reside in EHR/EMR (Electronic Health Record) systems needs to be transformed and aggregated into more patient-centric APIs which will help modern application developers build innovative healthcare products and applications

https://www.infoq.com/articles/healthcare-API-marketplaces/

Request:

```
<soapenv:Envelope xmlns:soapenv="http:/
www.wales.nhs.uk/namespaces/MessageRele
  <soapenv:Header/>
  <soapenv:Body>
    <mes:GetResultSetRequest>
      <mes:AttributeValuePair>
        <mes:Attribute>
          <mes:Name>GpPracticeCode</mes
          <mes:Namespace>http://www.wal
          <mes:Description/>
        </mes:Attribute>
        <mes:Value>W97046</mes:Value>
      </mes:AttributeValuePair>
      <mes:LookupTable>
        <mes:Name>GPpractice</mes:Name>
        <mes:Namespace>http://www.wales
      </mes:LookupTable>
      <mes:AttributeToRetrieve>
        <mes:Name>postcode</mes:Name>
        <mes:Namespace>http://www.wales
```

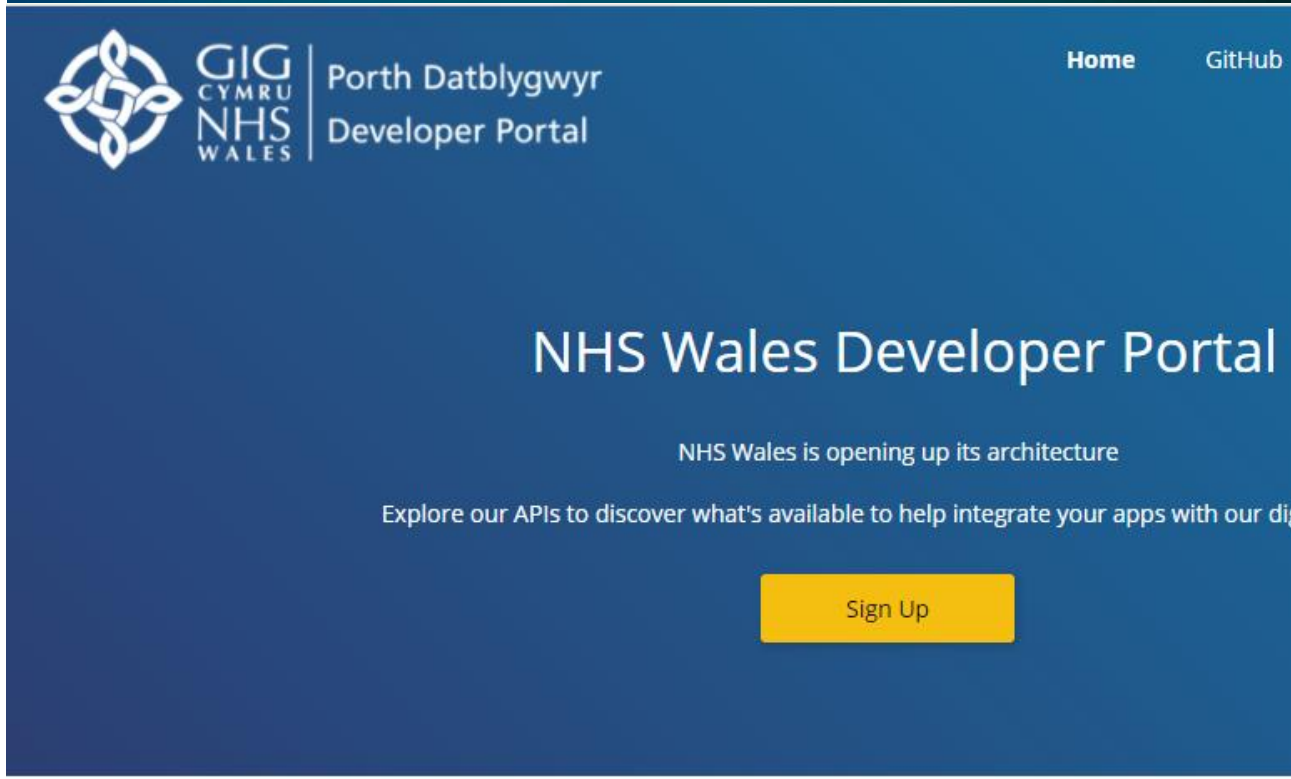
API Catalogue

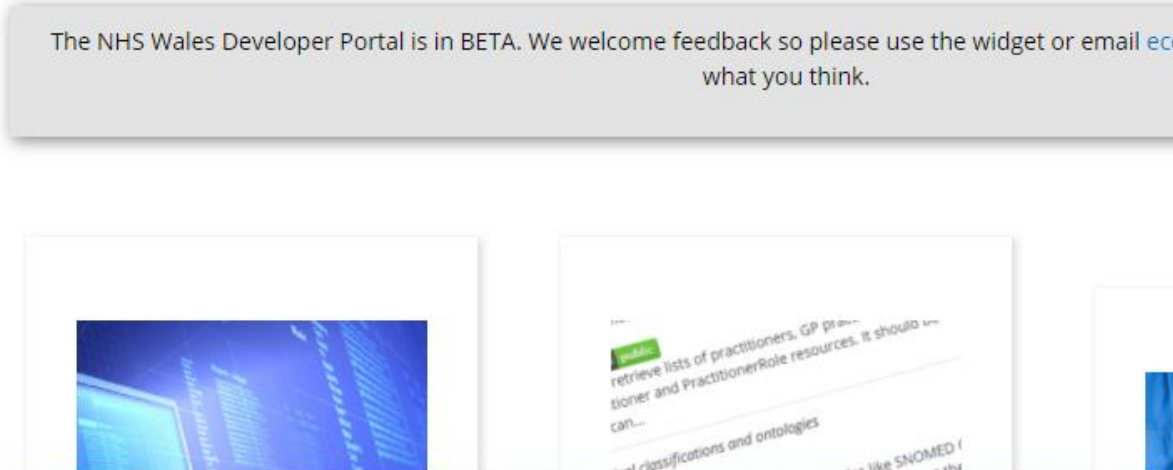
MPI - Master Patient Index SOAP	*Query for patients identifiers matched across multiple systems* These APIs implement the PIX and PDQ Integration Profiles from IHE. You can use Patient Identifier Cross Referencing (PIX) to match patients records across multiple systems. You can perform...
PROMs - Event Request SOAP	*Request that a patient be sent an assessment questionnaire after clinical events* This is the standard API used to trigger PROMs capture by the National PROMs platform (https://proms.nhs.wales) The API is used by patient administration systems to request...
WBNS - Birth Notifications SOAP	*Register births and receive an NHS Number* This API accepts HL7 ADT messages with details of a birth (mother's details, time of birth, gender, birth weight etc.) and responds with a newly generated NHS Number. It is used by maternity systems to notify...
WCCG - Clinical Documents Exchange SOAP	*Send and receive clinical documents such as referral letters* The API is allows registered users and applications to exchange clinical documents. It is used by GP Systems and WCCIS to exchange documents such as electronic referrals with secondary care...
WCRS - Documents SOAP	*Store and retrieve patient documents and perform basic searches* This API is used to store documents in the Welsh Care Records Service (WCRS), the central patient document store for NHS Wales. You can use it to store/retrieve patient documents in a variety...
WCRS - Documents Advanced Search	*Perform faceted search queries against the content and metadata of patient documents* We use Apache Solr to prvoide advanced search against patient documents in the Welsh Care Record Service. You can perform general searches across all document content...
WDS - Patient Demographics SOAP	*Search for patient demographic information such as Address, Date of Birth, NHS Number etc.* This API provides access to the Welsh Demographics Service. You can search for a patient by NHS Number or information such as name and date of birth and a standard...

Developer Portal

- API Catalogue
- Sandbox APIs
- SDK (Software development kit/guides)
- Standards
- Assurance Requirements

- Driver - open architecture approach, opening up access to NHS Wales data resources





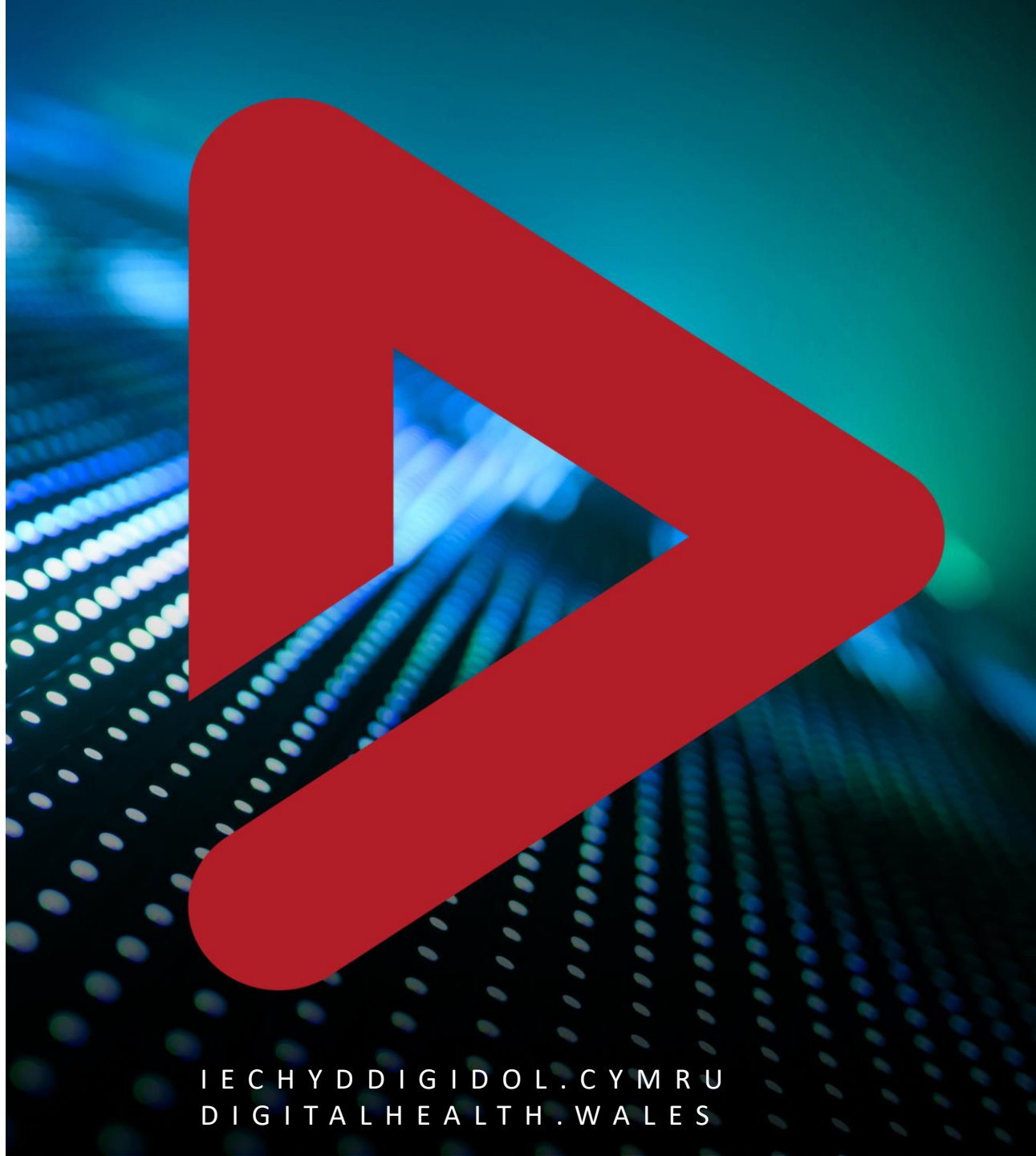
Developer Portal

Original intention was to develop open access APIs. We have Multiple Sandbox APIs

- Reference data
- Demographic data
- Diagnostics observations
- SNOMED CT
- Welsh Care Record Service

It’s a journey not an event

- Sandbox area
- What APIs are useful?



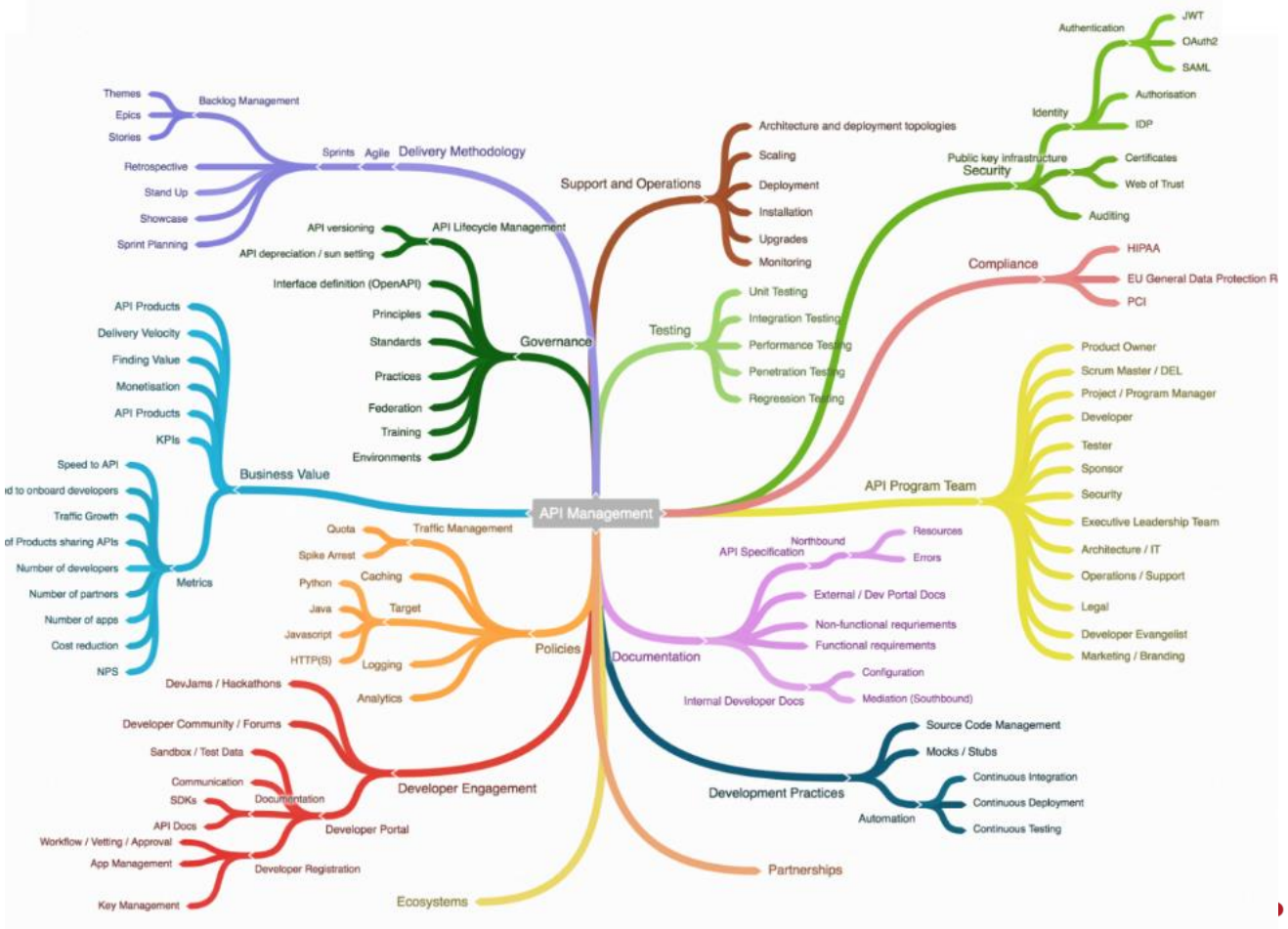
Benefits of the Portal

- Single place for guidance on how to access NHS Wales Resources
- Ease of Integration for systems
  - For 3rd Party suppliers
  - Promote use of consistent standards
- Open and Transparent
- Test Harness
- Reduced burden on developers
  - Developers can be pointed to the Portal to develop a POC or understand integration requirements.
- Open Technical Standards

Next Steps

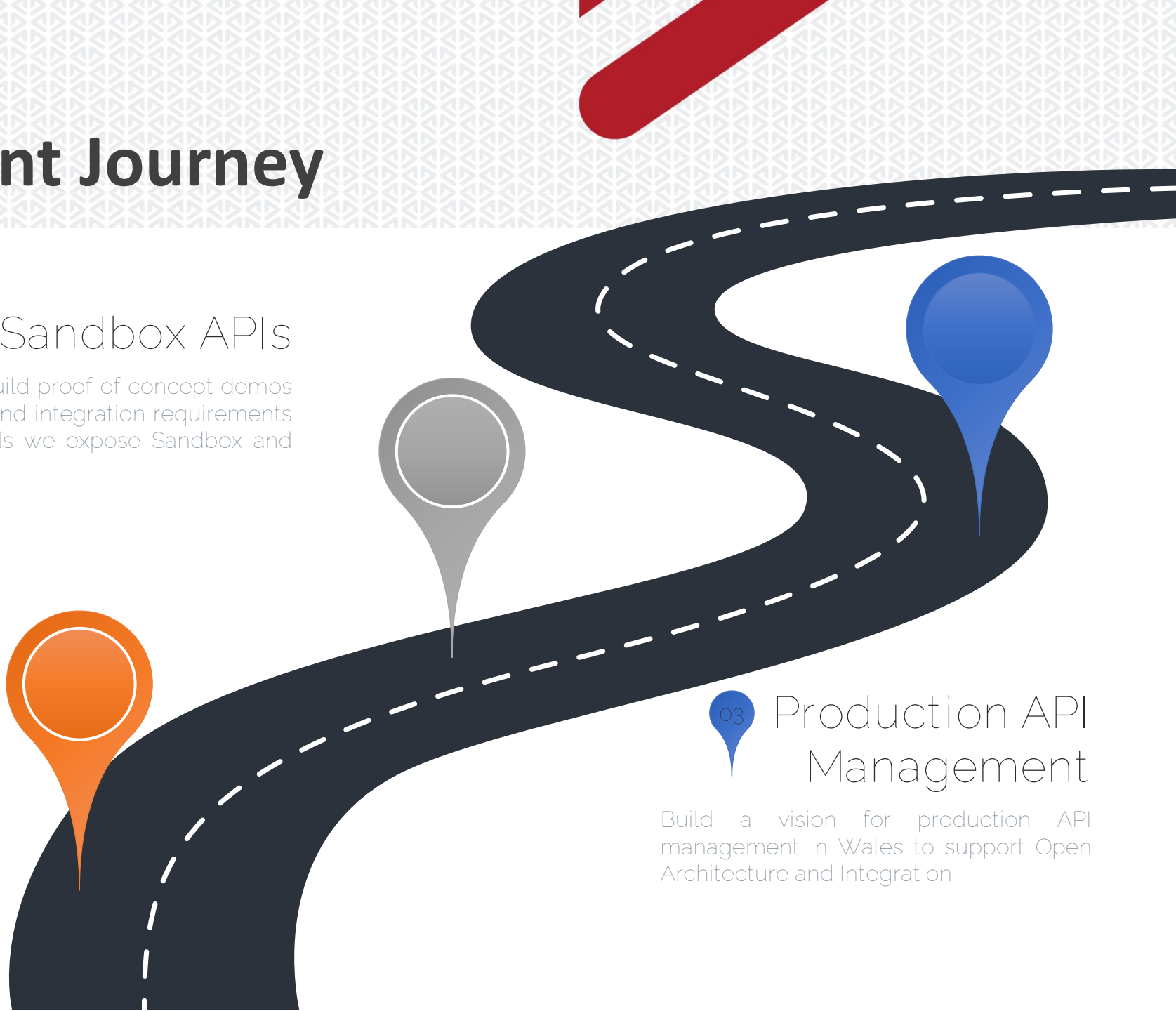
- Feedback and continuously improve the Developer Portal
- Work with Life Sciences Hub Wales to further improve industry engagement on the Developer Portal
- Build a catalogue of developer focused content
- Publishing information standards such as SNOMED Clinical Terms and guidelines for Wales.
- Create an all NHS Wales Developer Portal
  - Wider Organisations
  - Health Boards
  - Social Care Wales
- Production API Management

Why is API Management Important



holistic-api-management.png (1100×719) (theapipractice.com)

API Management Journey



02

Sandbox APIs

In order to build proof of concept demos and understand integration requirements and standards we expose Sandbox and mock APIs

01

API Catalogue

DHEW have started the process of cataloguing NHS Wales APIs

03

Production API Management

Build a vision for production API management in Wales to support Open Architecture and Integration

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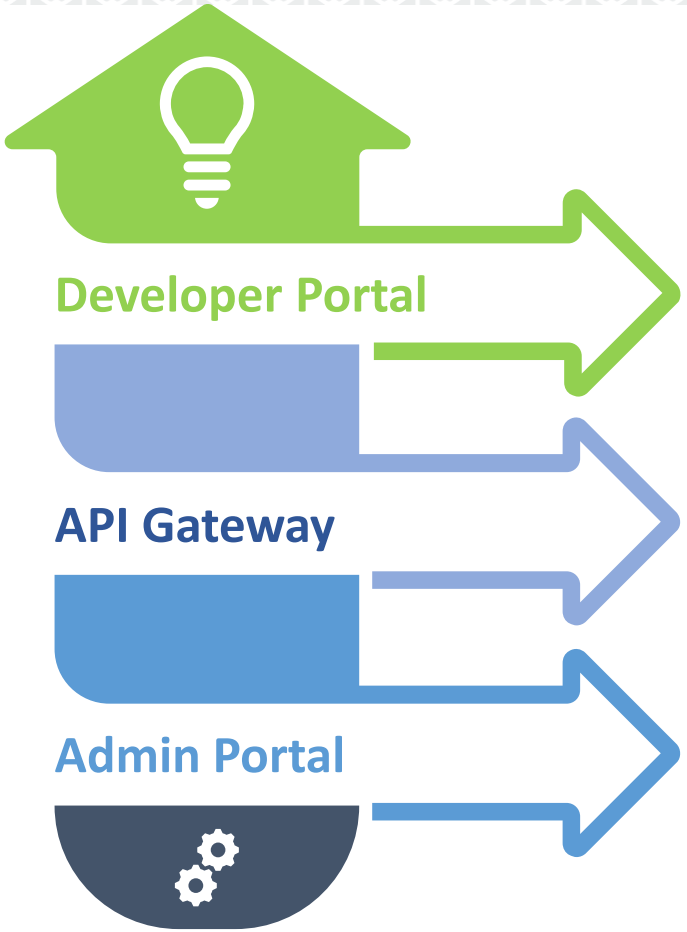
API Management



Documentation / API Catalogue / Standards / Accounts / Access Analytics

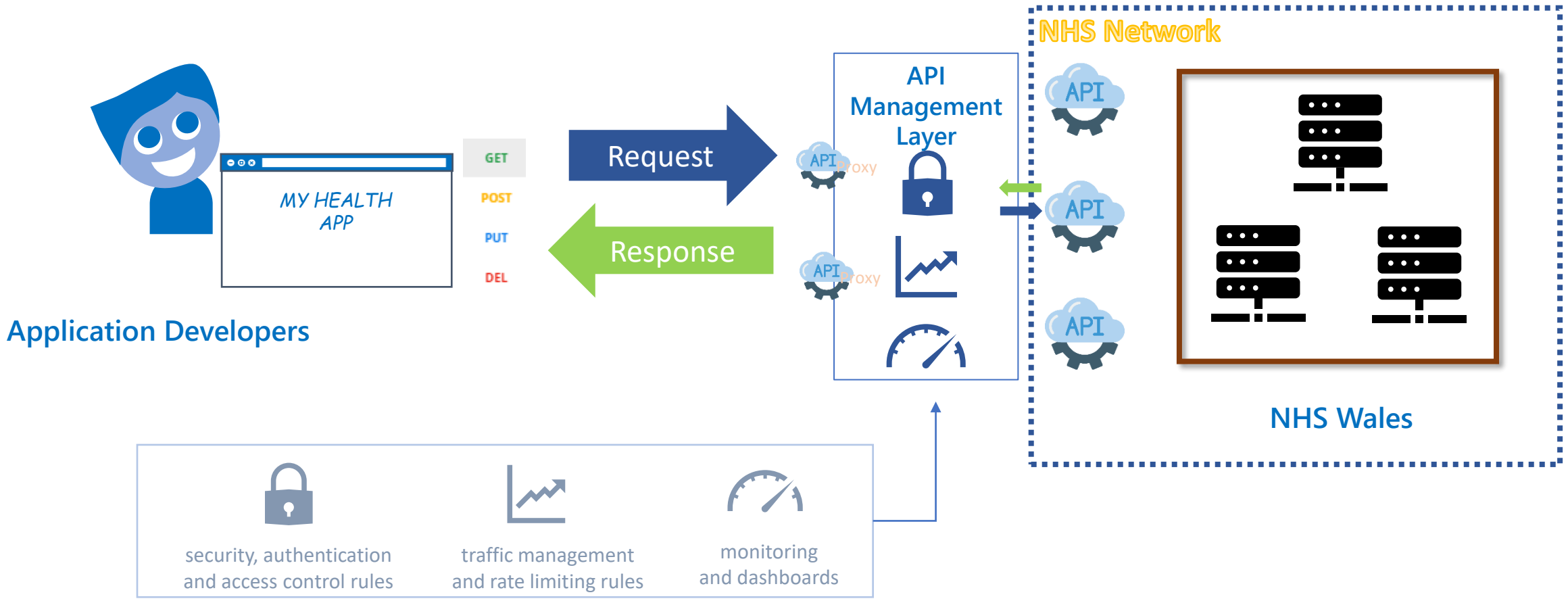
Accepts API Call / Routing / Verifies API Key / Enforces Policies / Transformations / Analytics

Define and Import APIs / Create Products / Set up and administer Gateway / Analyse usage / Manage users

API Management

- Authentication
- Caching
- Security
- Traffic Management
- Auditing & Logging
- Analytics

API Management



Tools and Options

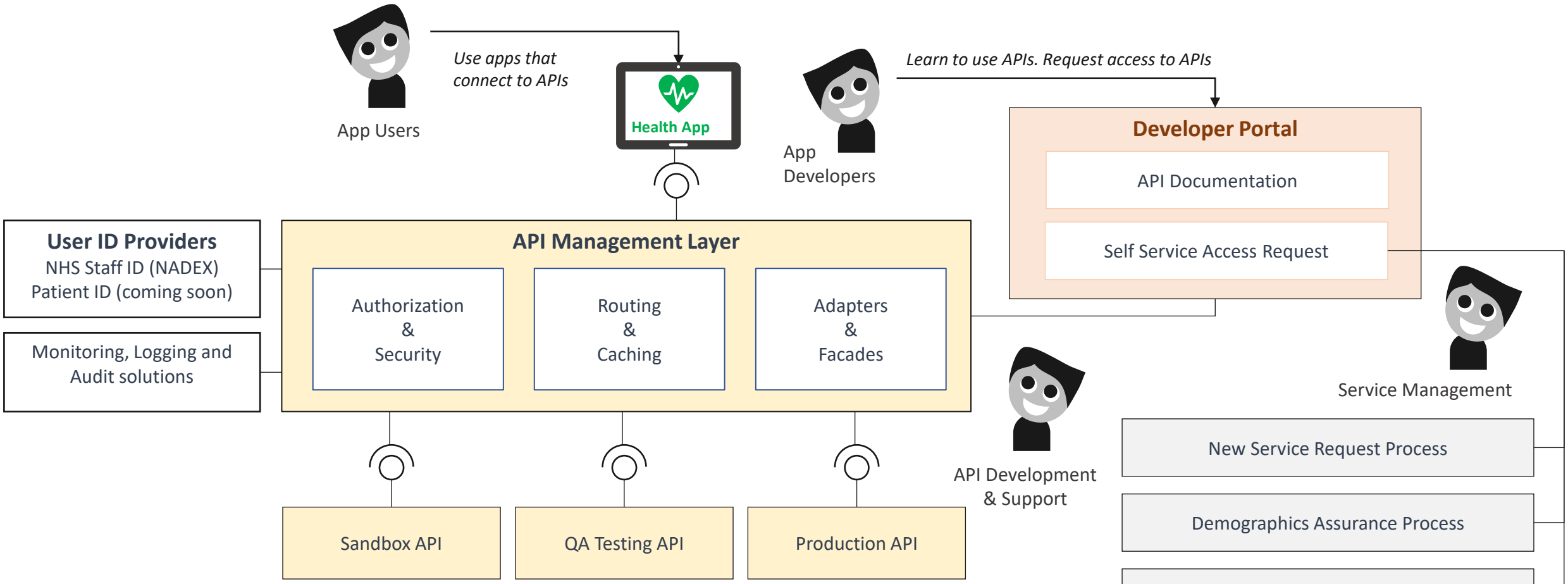
- Enterprise Level
  - Azure
  - Apigee
  - Mulesoft

- Gartner Report
- Cloud/Hybrid/On-prem

Azure API Management

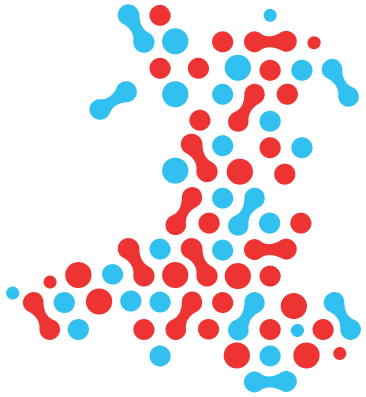
apigee

Connected Experience



Connected Experience

- API Management Supports
  - Opening up the architecture
    - Improve the way data is used.
  - Common interfaces and technical standards
  - Drive Standards based interoperability



NDR
Adnodd Data Cenedlaethol
National Data Resource

Strategic Direction

- Working as part of the NDR wider programme to open architecture
- Production API Management
- One Portal for NHS Wales
  - Roll out over time to wider orgs, other HBs and social care Wales
- A linked up process to paths to production
- Developer engagement

Contact Us

If you have queries, suggestions or ideas of how we can work with you please Drop us a line to discuss the Ecosystem and Portal!

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