Using SNOMED CT in the Digital Health and Care Record for Wales

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MONMOUTH PARTNERS | INNOVATION INSIGHT IMPACT

GIG CYMRU NHS WALES | Gwasanaeth Gwybodeg Informatics Service

INTRODUCTION

SNOMED CT EXPO 2020
Virtual Conference October 8-9

A Healthier Wales: our Plan for Health and Social Care

Abstract

As part of the National Data Resource (NDR) programme the Ontology Service for Wales is one key component in the digital transformation agenda for Wales. Its aim is to develop an 'open platform' approach to digital innovation, through publishing national standards for how software and technologies work together.

The Ontology service will improve data quality and consistency of health and care data, by using SNOMED CT as its standard clinical terminology across Wales. By implementing SNOMED CT through the ontology server, it will enhance the data analytics capability to derive insights from the NDR.
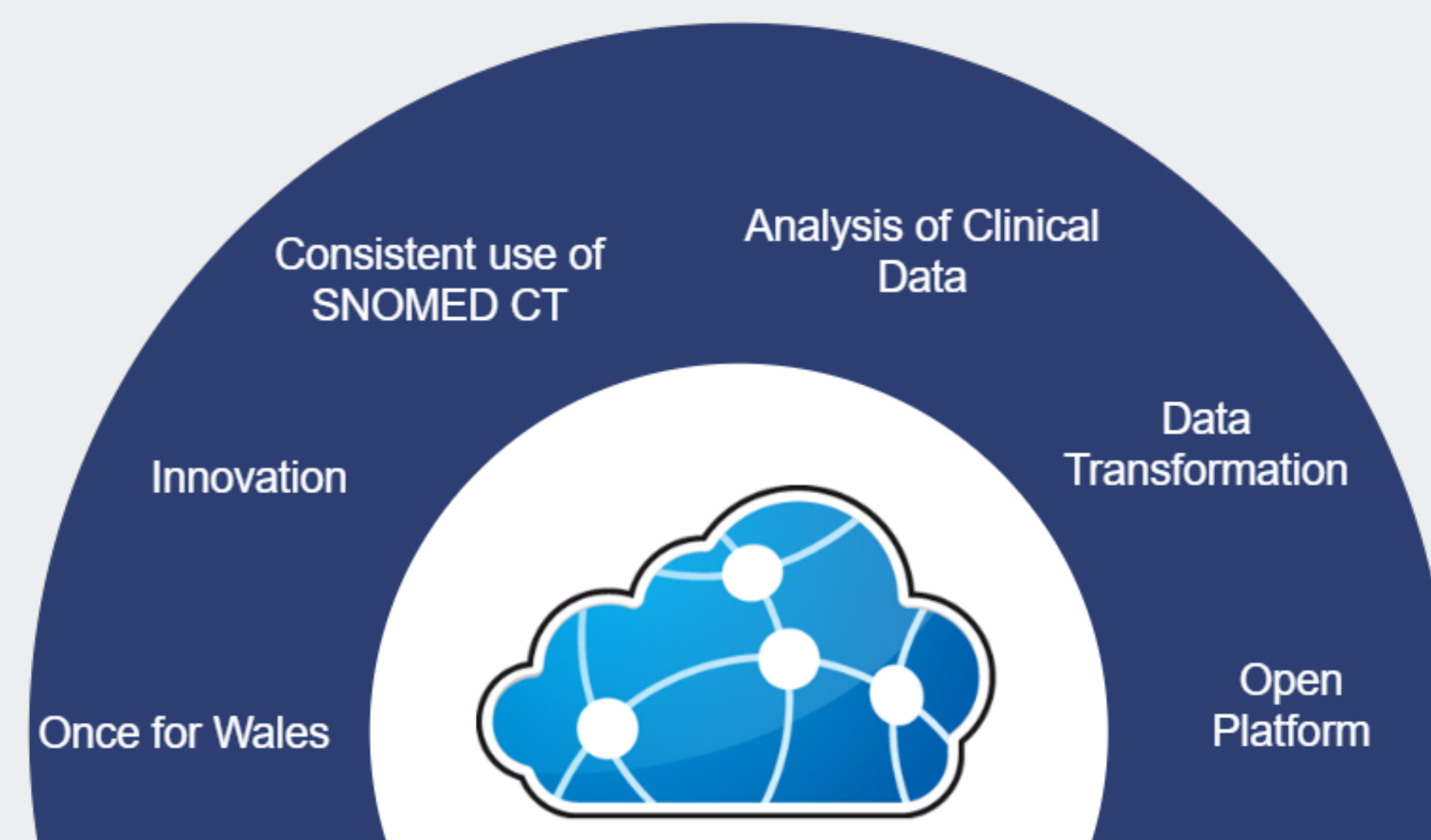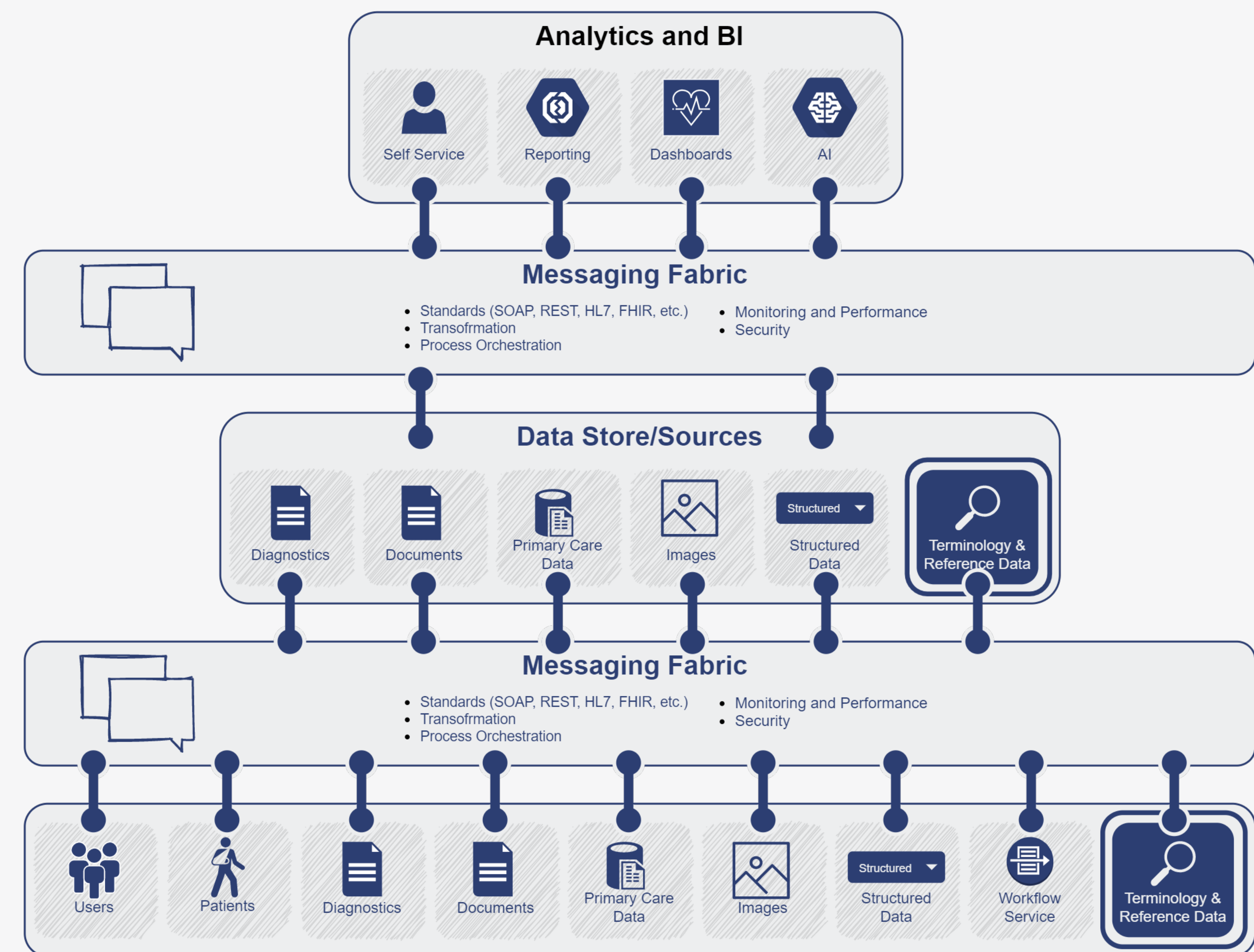
Background

SNOMED CT was adopted as Ministerial policy by the Minister for Health & Social Services and was communicated to NHS Wales via WHC (2015) 053.

A formal SNOMED CT Programme was formally established by the NHS Wales Informatics Service (NWIS) in September 2017. Over the last three years NWIS have been working with Monmouth Partners, NHS Digital and CSIRO to implement Ontoserver.

"Structured, standardised and clinically meaningful data is fundamental to ensuring high quality data drives decisions to improve outcomes within our Health Service. The implementation of an NHS Wales Terminology Service is a significant development in our vision to deliver to the people of Wales first-class digital health and care services which will enable more effective, efficient, safer decision-making by providing access to content-rich, person-focused health and care data and information."
Mr Rhidian Hurle, Medical Director NHS Wales Informatics Service & CCIO NHS Wales

Consistent use of SNOMED CT
Analysis of Clinical Data
Innovation
Data Transformation
Once for Wales
Open Platform

Welsh Health Circular 2015

Project established in NWIS 2017

PoC with NHS Digital 2018

PoC OCS Myeloma 2019

Production Ontoserver 2020

Roll out to NHS Wales

NHS Wales Architecture

Analytics and BI

Self Service | Reporting | Dashboards | AI

Messaging Fabric

- Standards (SOAP, REST, HL7, FHIR, etc.)
- Transofrmation
- Process Orchestration
- Monitoring and Performance
- Security

Data Store/Sources

Diagnostics | Documents | Primary Care Data | Images | Structured Data | Terminology & Reference Data

Messaging Fabric

- Standards (SOAP, REST, HL7, FHIR, etc.)
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Users | Patients | Diagnostics | Documents | Primary Care Data | Images | Structured Data | Workflow Service | Terminology & Reference Data

This is the NHS Wales Architecture required for the Digital Health and Care Record for Wales. The Ontology Service has been recognised as a key component in delivering consistent SNOMED CT data to clinical applications. This will enable data analysis for population Health across NHS Wales.

INTRODUCTION | METHODS | RESULTS | DISCUSSION

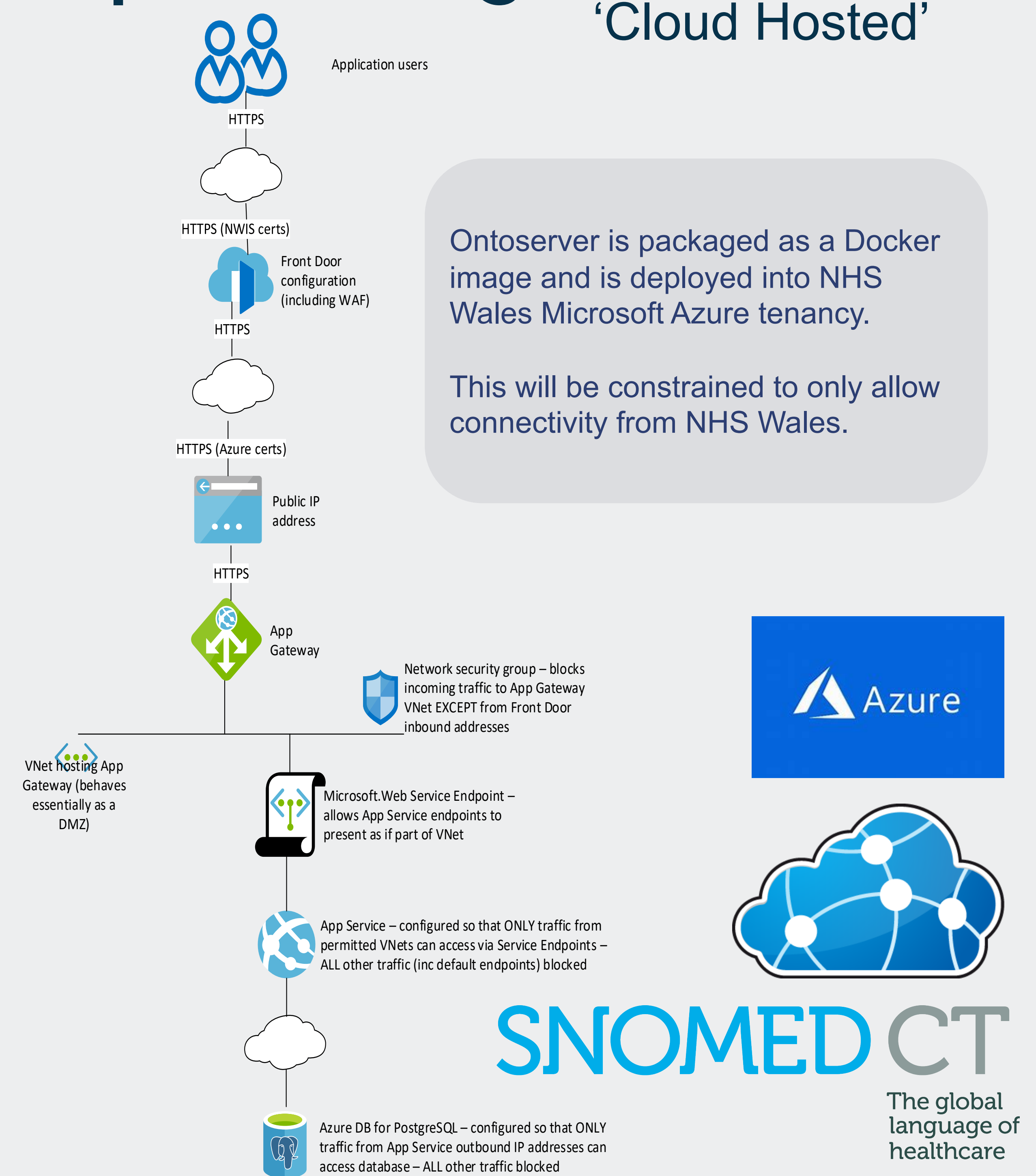# Using SNOMED CT in the Digital Health and Care Record for Wales
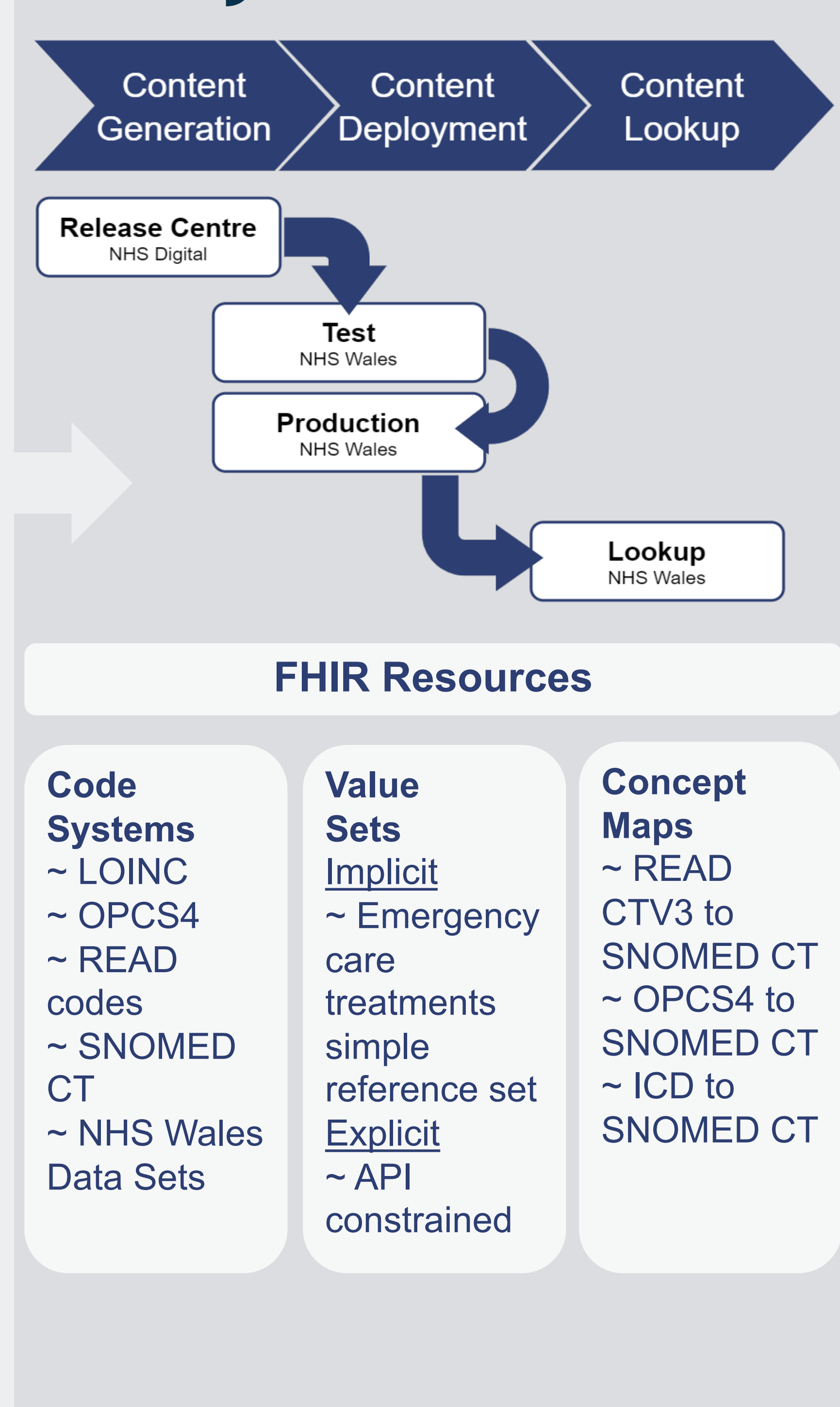
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SNOMED International
SNOMED CT EXPO 2020
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Implementing Ontoserver
'Cloud Hosted'

Application users

HTTPS

HTTPS (NWIS certs)

Front Door configuration (including WAF)

HTTPS

HTTPS (Azure certs)

Public IP address

HTTPS

App Gateway

Network security group – blocks incoming traffic to App Gateway VNet EXCEPT from Front Door inbound addresses

VNet hosting App Gateway (behaves essentially as a DMZ)

Microsoft.Web Service Endpoint – allows App Service endpoints to present as if part of VNet

App Service – configured so that ONLY traffic from permitted VNets can access via Service Endpoints – ALL other traffic (inc default endpoints) blocked

Azure DB for PostgreSQL – configured so that ONLY traffic from App Service outbound IP addresses can access database – ALL other traffic blocked

Ontoserver is packaged as a Docker image and is deployed into NHS Wales Microsoft Azure tenancy.

This will be constrained to only allow connectivity from NHS Wales.

Azure

SNOMED CT
The global language of healthcare

Syndication

Content Generation → Content Deployment → Content Lookup

Release Centre
NHS Digital

Test
NHS Wales

Production
NHS Wales

Lookup
NHS Wales

FHIR Resources

Code Systems
~ LOINC
~ OPCS4
~ READ codes
~ SNOMED CT
~ NHS Wales Data Sets

Value Sets
Implicit
~ Emergency care treatments simple reference set
Explicit
~ API constrained

Concept Maps
~ READ CTV3 to SNOMED CT
~ OPCS4 to SNOMED CT
~ ICD to SNOMED CT

Implementing SNOMED CT

Education & Awareness

Delivered awareness sessions across NHS Wales. As part of this programme, the Service has produced an introduction video, along with an education matrix

Principles & Guidelines

The SNOMED CT Maturity Index (DSCN 2018/06), which provides the differing levels of SNOMED CT adoption within a clinical application.

Ontology Service

Providing NHS Wales with specialist knowledge on SNOMED CT. The Service will be the gateway between NHS Wales and NHS Digital relating to SNOMED CT.

Road Map

Identified 100+ clinical systems across NHS Wales and working with system owners to identify plans SNOMED CT implementation.

Target Operating System

Defining the Ontology Service operating procedures and activities working with NHS Digital

YouTube
SCAN ME

INTRODUCTION	METHODS	RESULTS	DISCUSSION

Outpatients Continuation Sheet **Myeloma**

The solution is being designed and developed by the NWIS. It is being implemented within existing components and services of the NHS Wales National Architecture. https://nwis.nhs.wales/haembase-cymru/

Implemented within existing components and services of the NHS Wales National Architecture ensuring the data forms part of the wider electronic patient record.

For the first iteration of the form, SNOMED CT content is being used for diagnosis and past medical history. For diagnosis the Ontology Service constrained the searches using SNOMED CT Expression Constraint Language (ECL) to lookup clinical findings and, Situation hierarchy for past medical history.

Through increased use, it was identified an additional sub-type hierarchy was required. An updated set API parameters was passed to Development, which meant the changes were readily accessible at the next clinic. Through SNOMED's ECL, constraining a search can be achieved with relative ease.

The constrained query example can be seen below

```
{{base url}}/ValueSet/$expand?url=http://snomed.info/sct?fhir_vs=ecl/<404684003 OR <243796009
```

A clinician begins typing "back pain" into "Presenting Complaint", which is a structured data field. This is passed to Ontoserver to return all SNOMED CT concepts that match the entry, both the preferred term description and concept ID is stored into the patient digital health and care record.

Dynamically search SNOMED CT using ECL to constrain the lookup criteria (explicit value set)

To develop a data solution for haematological malignancies that accurately gathers data during a patients' cancer treatment.

Capturing data to support patients, able to effectively link diagnostics and prognostics with data on outcome and treatment and that can be utilised for various analyses.

The solution will put the needs of patients first and measure the impact of treatment on patient outcomes to enhance their quality of life.

"It is great to start the new decade in a paperless fashion, collecting data electronically in the new patient clinic, and instantly sharing it with colleagues across Wales! HaemBase is a national solution for all haematological malignancies and will provide the data we need for all patients and clinicians."

Dr Ceri Bygrave, Consultant Haematologist (Cardiff and the Vale University Health Board)

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DISCUSSION
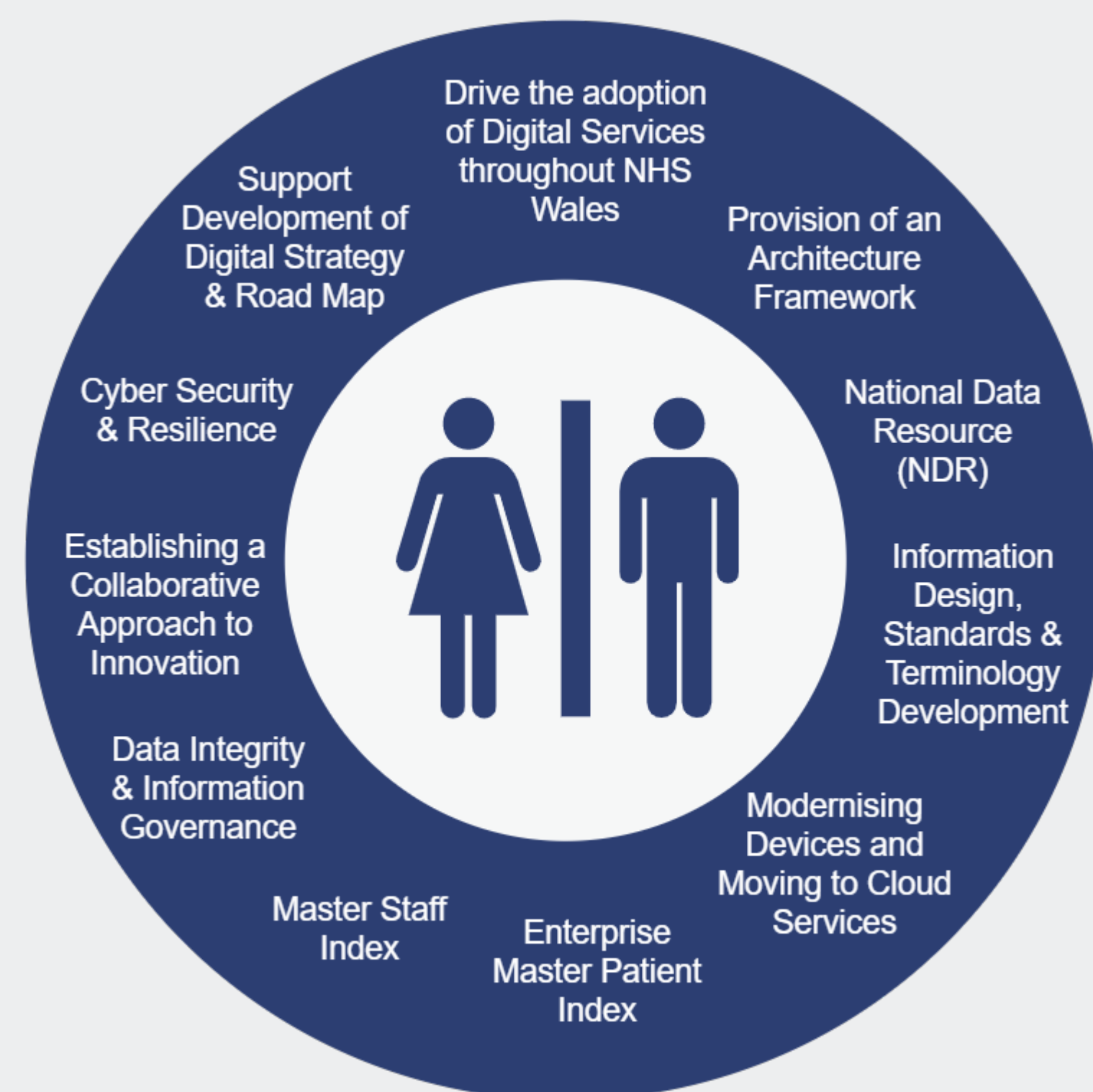
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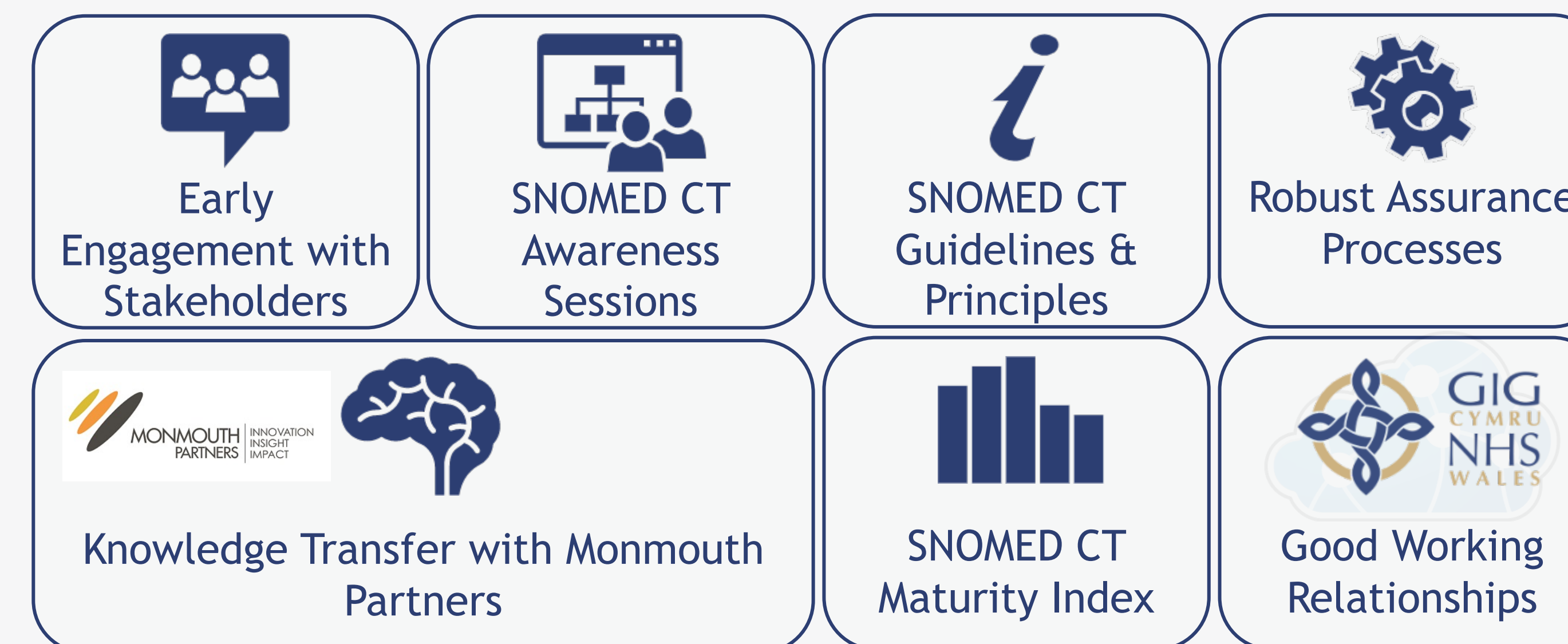Virtual Conference October 8-9

Conclusions

The OCS Myeloma has been a successful small-scale implementation of SNOMED CT, with targeted areas of the Digital Health and Care Record being underpinned by SNOMED CT. This implementation can in the future be scaled. The methodology of this implementation can be applied to any part of the Digital Health and Care Record for Wales.

The use of the Ontology Server, along with Code Systems, Value Sets and Concept Maps will improve data consistency and quality, including the maintenance and distribution of SNOMED CT content and other nationally agreed data and information standards across Wales Health and Care. These elements will allow innovation by enabling an open platform into NHS Wales. This greatly facilitates the standardisation of data, so it can be used consistently across settings.

The consistent collection and use of this data will facilitate the analysis of clinical data within Wales to improve population health.

Drive the adoption of Digital Services throughout NHS Wales

Support Development of Digital Strategy & Road Map

Provision of an Architecture Framework

Cyber Security & Resilience

National Data Resource (NDR)

Establishing a Collaborative Approach to Innovation

Information Design, Standards & Terminology Development

Data Integrity & Information Governance

Modernising Devices and Moving to Cloud Services

Master Staff Index

Enterprise Master Patient Index

Successful **Practices**

Early Engagement with Stakeholders

SNOMED CT Awareness Sessions

SNOMED CT Guidelines & Principles

Robust Assurance Processes

Knowledge Transfer with Monmouth Partners

SNOMED CT Maturity Index

Good Working Relationships

Future **Directions**

Road Map

Critical Care

Histopathology

LINC

Adverse Reactions

111

Nursing Documentation

Data Dictionary

References

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3. **DSCN Maturity Index** | http://www.nwisinformationstandards.wales.nhs.uk/sitesplus/documents/299/20180808-DSCN%202018%2006-SNOMED%20CT%20Maturity%20Matrix-v1-0.pdf
4. **YouTube video** | https://www.youtube.com/watch?v=QTilSv0E5D8
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6. **National Data Resource** | https://digitalhealth.wales/national-data-resource

NDR
Adnodd Data Cenedlaethol
National Data Resource

| INTRODUCTION | METHODS | RESULTS | DISCUSSION |