HYPERCONNECTED HEALTHCARE

RAPID ECONOMIC AI INTEROPERABILITY

How we connected Artificial Intelligence to all GP Practices and Acute Trusts across South West London within 3 months

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The challenge

01 **Absence** of Clinical Decision Support (CDS) for Non-Obstetric Ultrasound

02 NHSE/I and NHSD sought to implement iRefer, a Royal College of Radiology validated algorithm to help all GP's appropriately access correct imaging and make the most of Acute Trust diagnostic services.

03 iRefer could not be ubiquitously implemented across the SW London estate

This capability was delivered in

3 MONTHS

I'd like to **share** with you how we did that and what we **learnt**

The detailed requirements

✔ iRefer and Ultrasound Requesting Platform live at all GP Practices in the region integrated with all Trusts

✔ User Experience and Interfaces designed by the frontline GPs, Consultants and their Support

✔ Patient demographic information retrieved from NHS Spine

✔ Integration with iRefer AI and Non-Obstetric Ultrasound working group algorithm

✔ Clinical Terminology transformation between SNOMED CT and NICIP

✔ Bidirectional transmission and transformation of HL7 Messages between all systems

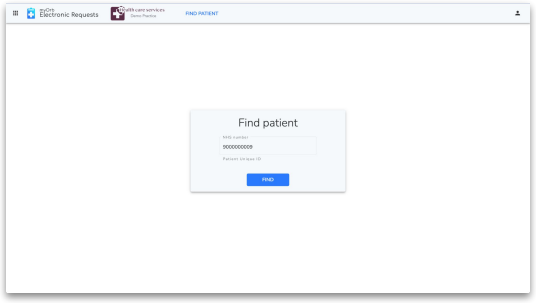
✔ Comprehensive Patient management and tracking throughout the entire care pathway

✔ Metrics, Informatics and Business Intelligence

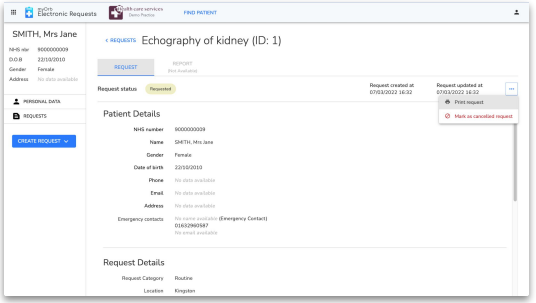
✔ No change or disruption to frontline systems and processes

There was a lot to do in 3 Months

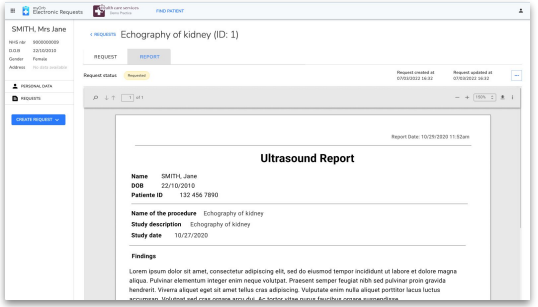
We delivered an end-to-end US Requesting platform designed with GPs



Find patient through NHS number

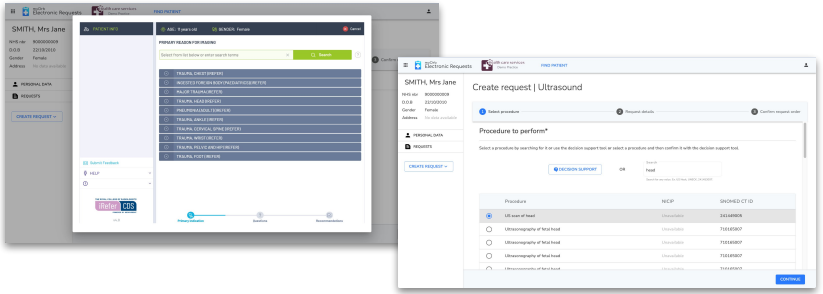


View / Print / Cancel Requests

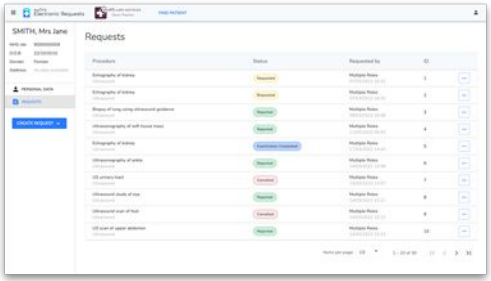


View Reports

Create requests with or without CDS AI

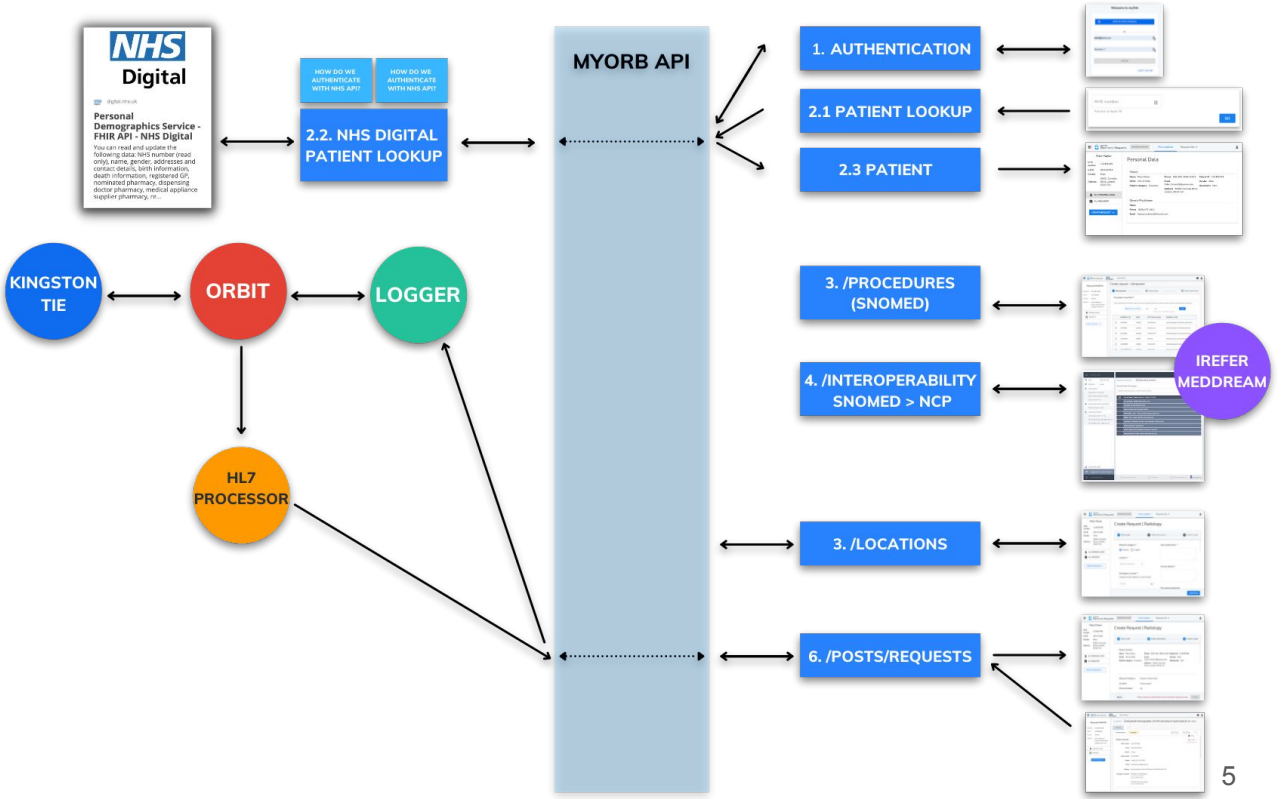


View requests list and its statuses



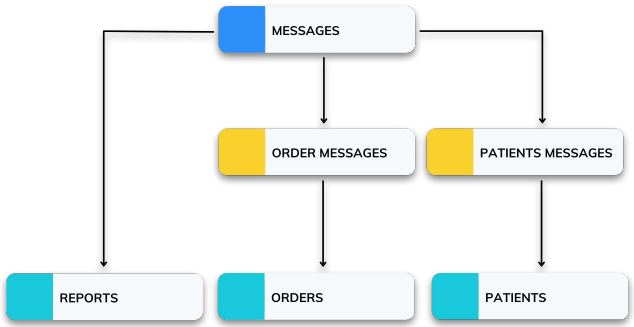
Bespoke Architecture and Data Flows

- Patient demographics from NHSD Spine
- Parallel User Designed Workflow
- Seamless AI integration
- HL7 messages into Hospital Radiology Infrastructure
- Patient Status and Reports to GPs

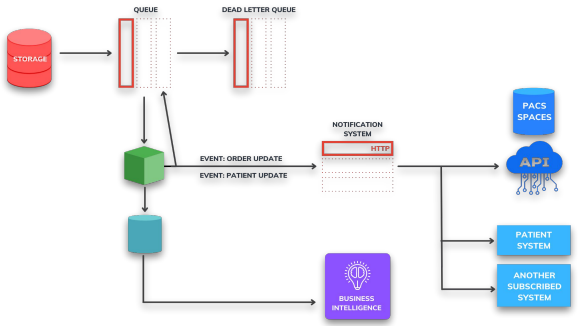


We bidirectionally transformed all Clinical Terminology and HL7

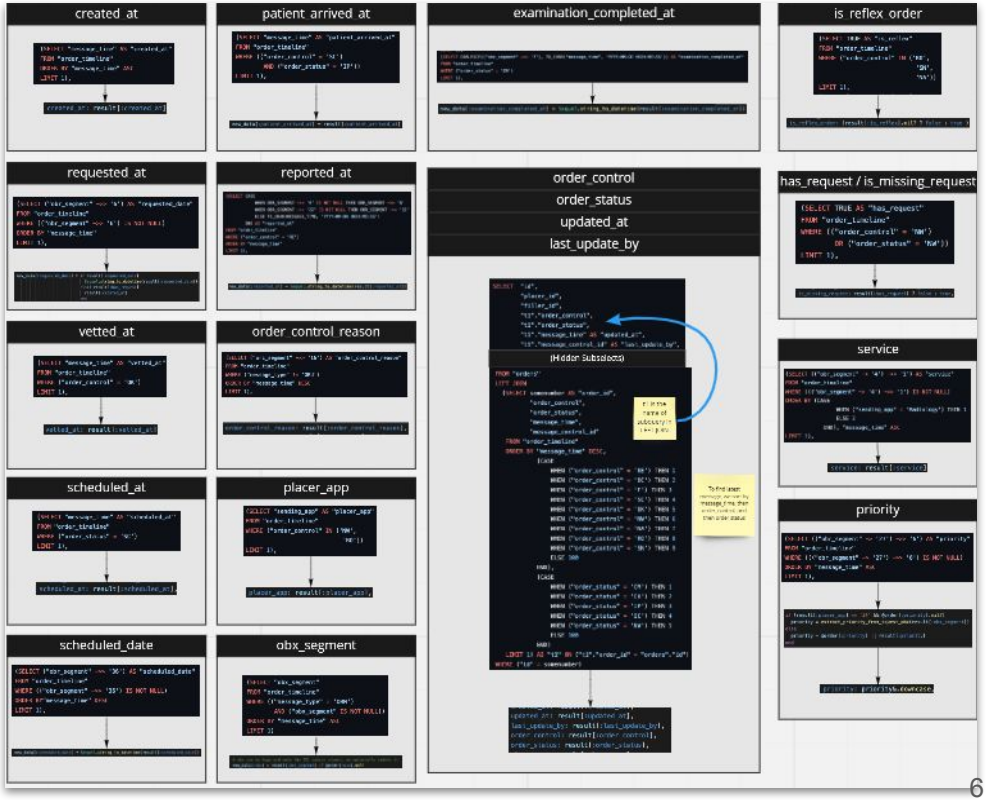
Data Mapping



Detailed Process Flows



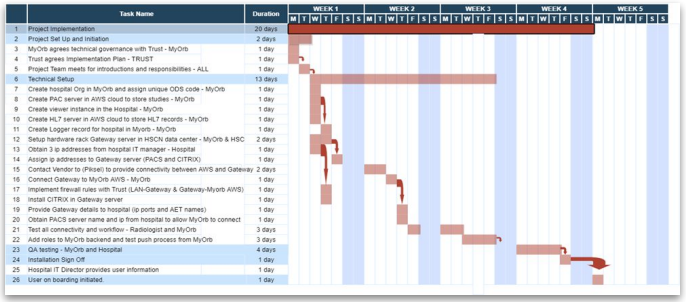
HL7 & SNOMED CT Transformations



And it's busy so we took care of the whole project

Fully managed Platform as a Service

- Public Cloud skill sets still developing in NHS
- Service must be fully managed
- Enables the transition to 'Future of NHS' Strategy



	Task Name	Duration
1	Project Implementation	20 days
2	Project Set Up and Initiation	2 days
3	MyOrb agrees technical governance with Trust - MyOrb	1 day
4	Trust agrees implementation Plan - TRUST	1 day
5	Project Team meets for introductions and responsibilities - ALL	1 day
6	Technical Setup	13 days
7	Create hospital Org in MyOrb and assign unique ODS code - MyOrb	1 day
8	Create PAC server in AWS cloud to store studies - MyOrb	1 day
9	Create viewer instance in the Hospital - MyOrb	1 day
10	Create HL7 server in AWS cloud to store HL7 records - MyOrb	1 day
11	Create Logger record for hospital in Myorb - MyOrb	1 day
12	Setup hardware rack Gateway server in HSCN data center - MyOrb & HSC	2 days
13	Obtain 3 ip addresses from hospital IT manager - Hospital	1 day
14	Assign ip addresses to Gateway server (PACS and CITRIX)	1 day
15	Contact Vendor to (Phicse) to provide connectivity between AWS and Gateway	2 days
16	Connect Gateway to MyOrb AWS - MyOrb	1 day
17	Implement firewall rules with Trust (LAN-Gateway & Gateway-Myorb AWS)	1 day
18	Install CITRIX in Gateway server	1 day
19	Provide Gateway details to hospital (ip ports and AET names)	1 day
20	Obtain PACS server name and ip from hospital to allow MyOrb to connect	1 day
21	Test all connectivity and workflow - Radiologist and MyOrb	3 days
22	Add roles to MyOrb backend and test push process from MyOrb	3 days
23	QA testing - MyOrb and Hospital	4 days
24	Installation Sign Off	1 day
25	Hospital IT Director provides user information	1 day
26	User on boarding initiated.	1 day

Light touch, Rapid implementation

- Server implementation takes one visit to site
- Requires a few IP Addresses and Firewall set up
- Typically 4 Weeks

The project solved many national key priorities

✔ Any patient can be referred from any point of care to any Trust/Community Diagnostic Hub

✔ Patients can be consulted or reported by any Specialist at any location through an Image Sharing Network

✔ Interoperability between all systems

✔ Clinical Decision Support at every decision point throughout the care pathway

✔ Business Intelligence analytics for efficiency, identification of clinical hazard and informatics

✔ **Plug in interface for any additional systems, artificial intelligence and assistive technologies**

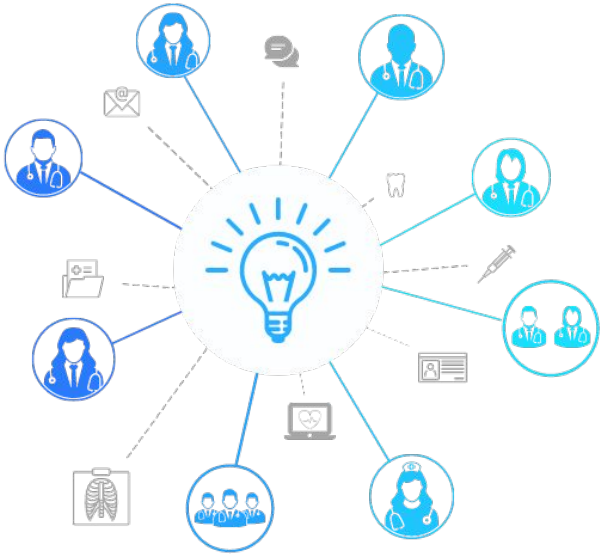
✔ Solves the problem of patients lost between fragmented systems and identifies all data mismatches between systems

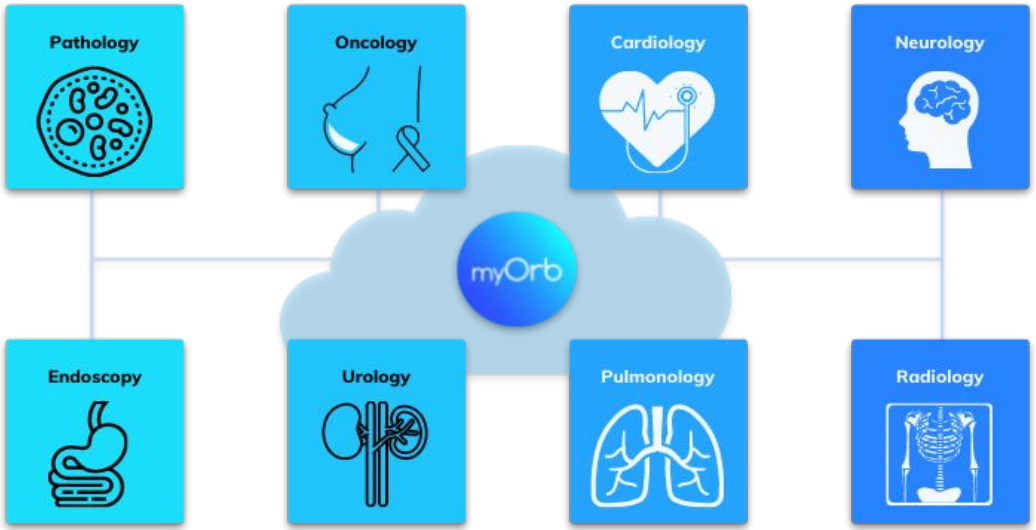
✔ Compliance with GDPR and ready for 'Future of NHS Strategy'

✔ Visibility of the patient journey throughout the care pathway for all participants

✔ **Pathway to migrate to Public Cloud through mixed mode operation with legacy systems**

Expandable to any care pathway and specialty





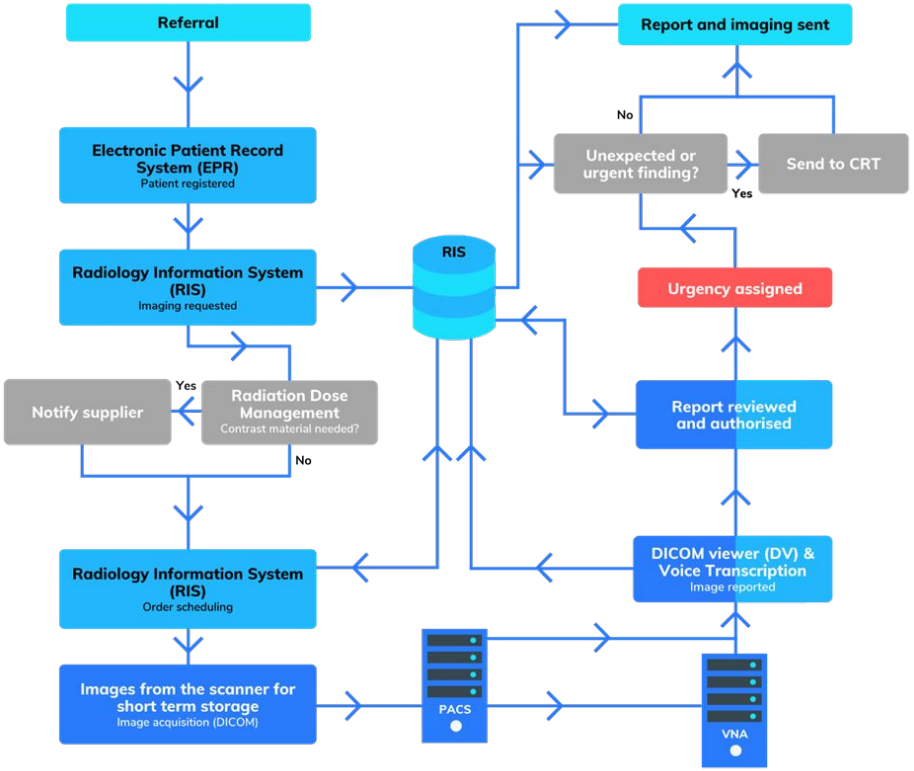
Can be utilised for any need including AI, clinical workflows, diagnosis and business intelligence.
Immediate and long-term economic gains.

How did we go live with Artificial Intelligence across care setting in 3 months?

We've been innovating the technologies, mindset and method for a long time…

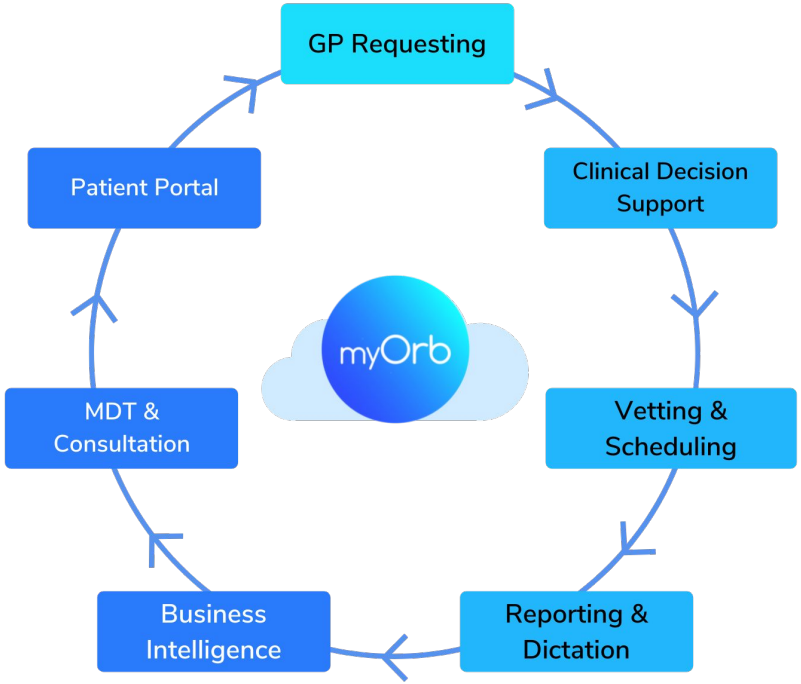
The AI has to integrate into workflows

- Existing systems are fragmented
- Multiple databases
- They're not always interoperable
- There may be paper based processes
- User Interface are hard to adapt

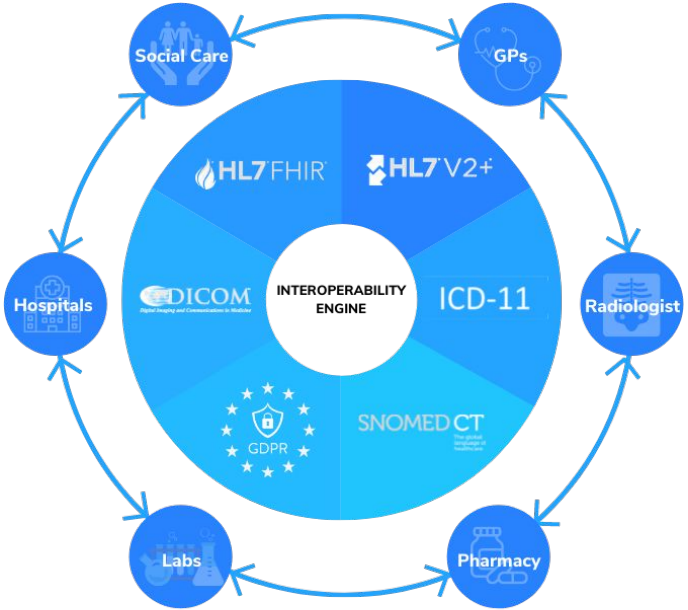


Parallel end-to-end Mix Mode Platform In the Public Cloud

- myOrb has a base module for any workflow
- Mirrors all current systems workflows and data
- Digitises gaps and paper-based processes
- User optimised Interfaces
- Seamless user experience
- Accommodates any AI and assistive Technology
- Integrated Care System



Built upon an Interoperability Engine and Health Information Exchange



- ✔ Plugs into Local and Cloud Infrastructure.
- ✔ Transforms data to standards.
- ✔ Sends messages bidirectionally between systems.

- ✔ Plug in any AI or assistive technology.
- ✔ Data available to any other system.
- ✔ Includes medical imaging, tests and EPR.

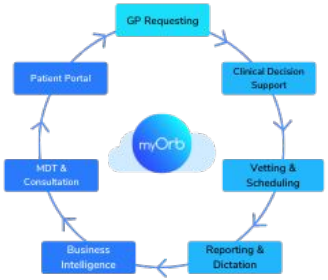
How it all comes together

Data to and from local systems

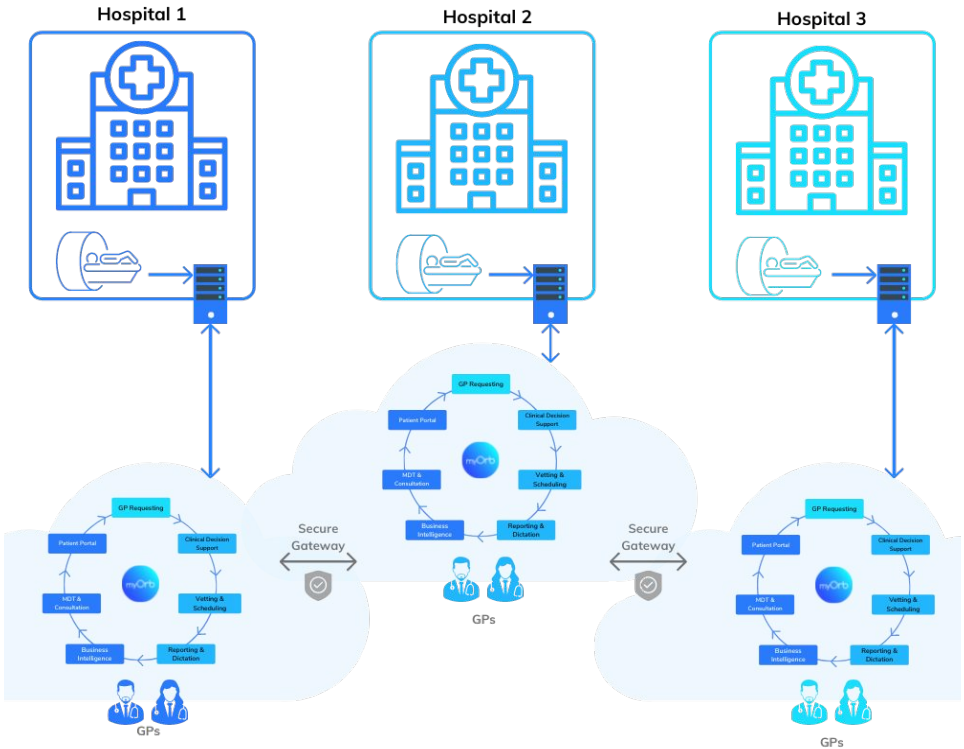
Transformed bidirectionally

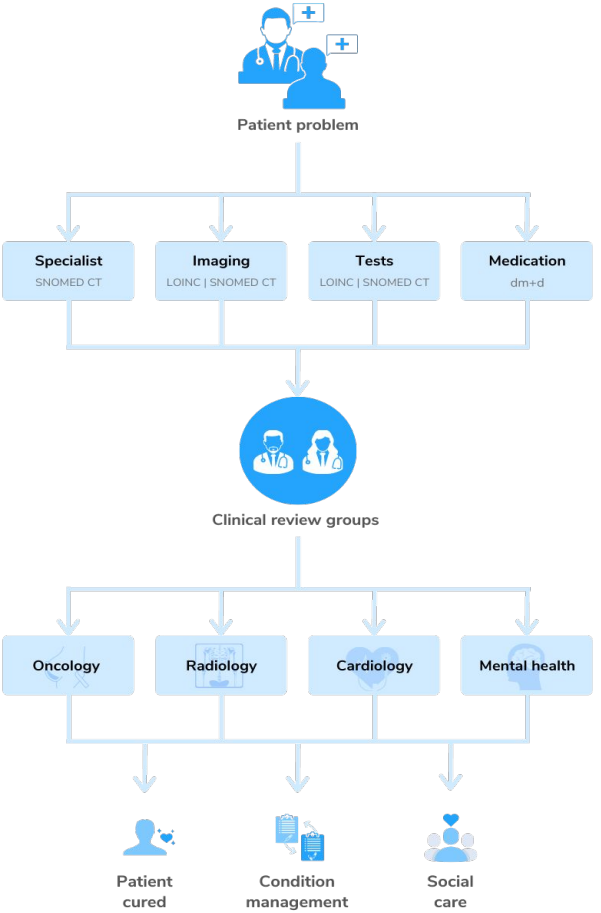
Available to plugin to

Within a seamless end-to-end platform



Rapid scaling for any care pathway





Immediate Integrated Care System

Orbs make information compliant and usable

Information

Primary care record
Secondary care record
Medical images
Diagnostic tests
Diagnostic reports
Photographs
Any other file types

Participants

GP
Consultants
Patients
Social Care
Administrators
Informatics
Management

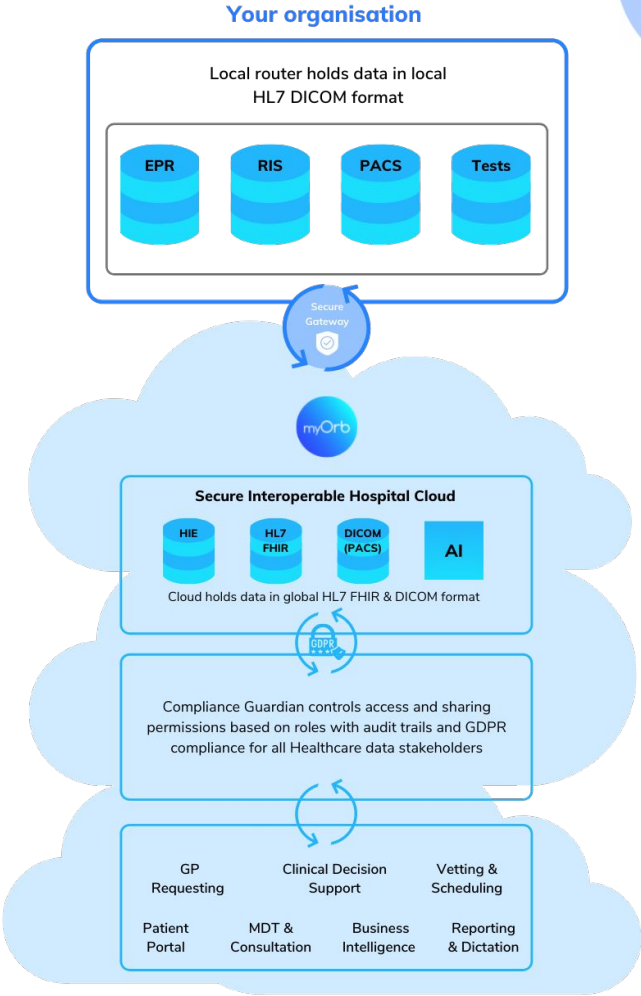
myOrb

Communications & Interoperability

HL7 FHIR / V2 / V3 / All
DICOM
Reports
Flags / Comments
Alerts
Email
Chat

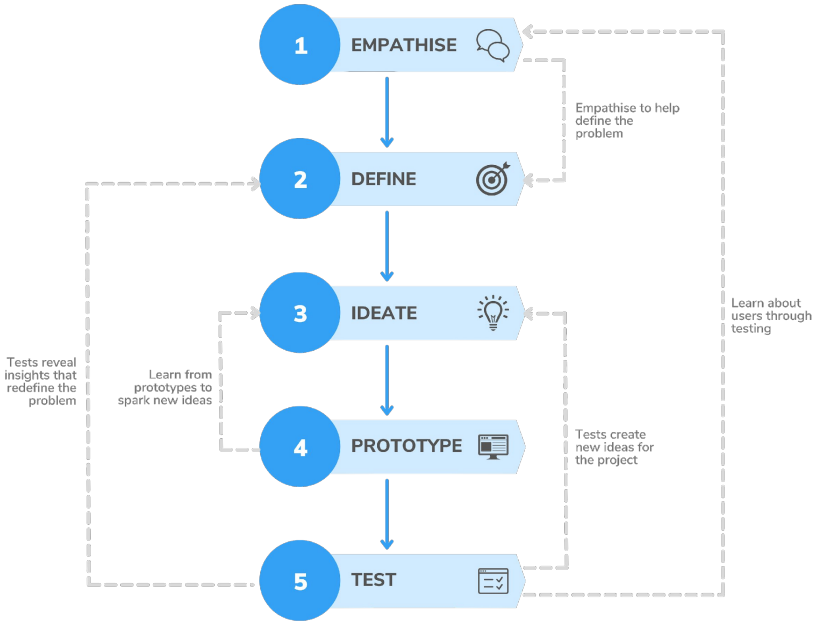
Compliance & Technology

SNOMED CT
GDPR
ICD
RCR / GIRFT / NHS
Audit trail
Any device
Always up to date

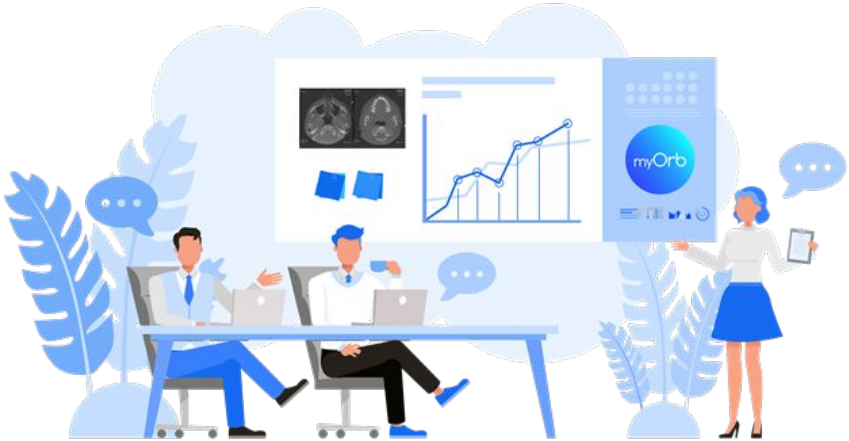


How we quickly adapt a workflows for artificial Intelligence

Design Thinking Methodology

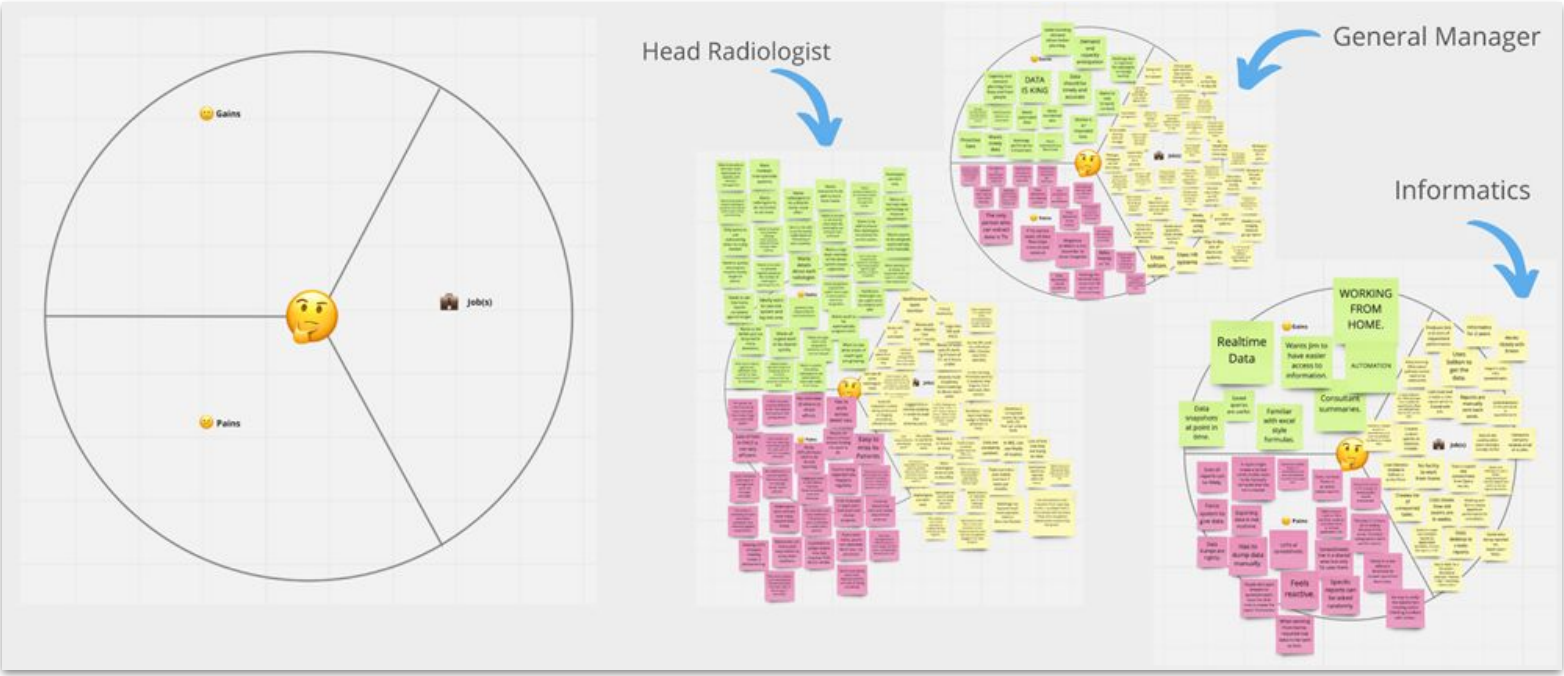


Doctors, Frontline and Support talk directly to designers and engineers



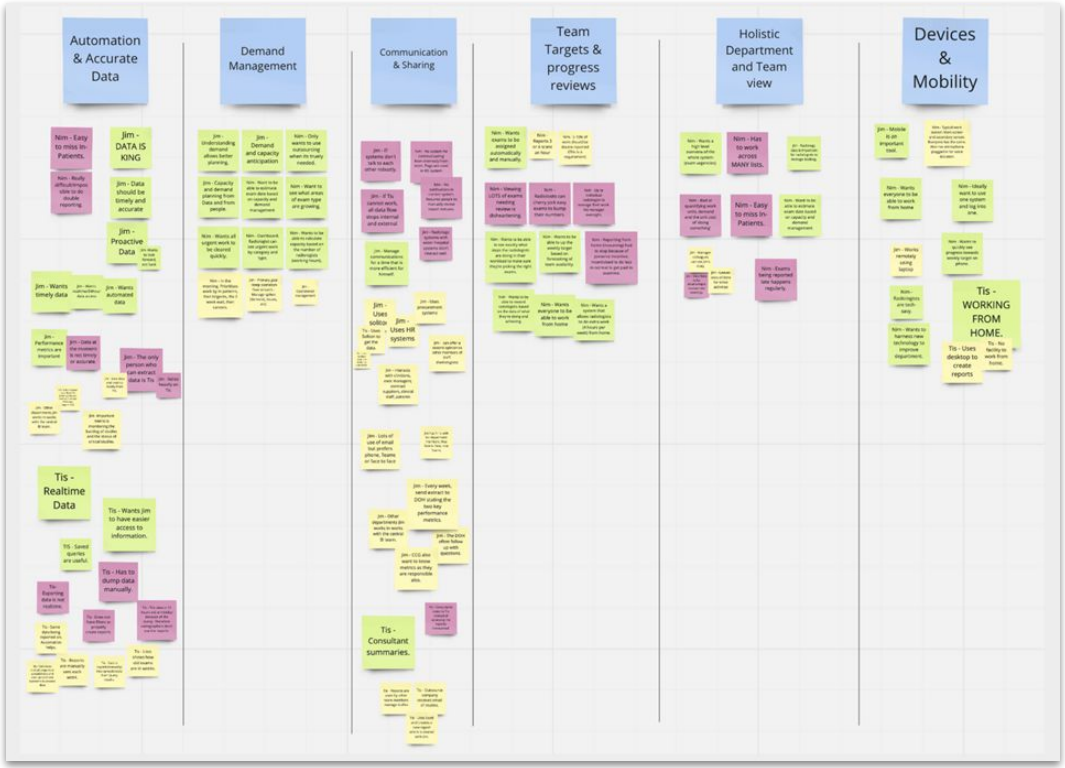
How we applied design thinking to Business Intelligence

Empathise – We ran discovery sessions with the stakeholders and end users



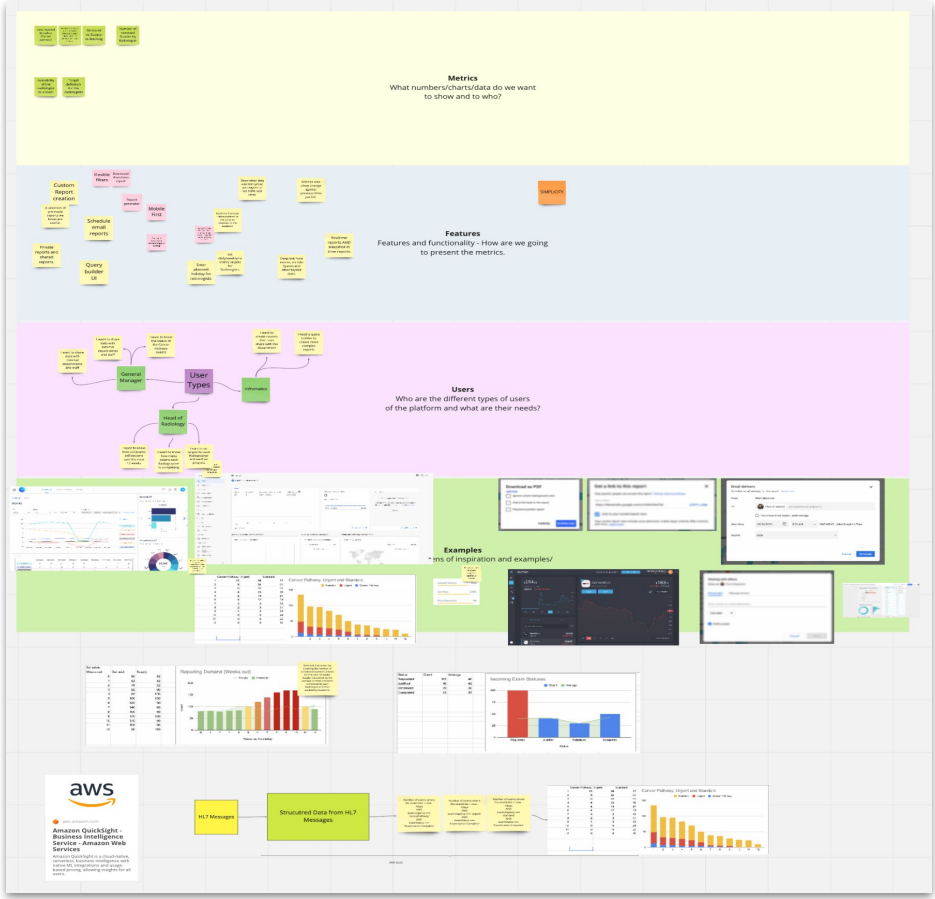
How we applied design thinking to BI

Define – We identified the obvious needs as well as wider more obscure needs



How we applied design thinking to BI

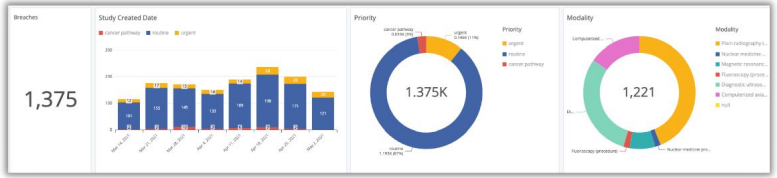
Ideate – We looked at ways of displaying data



How we applied design thinking to BI

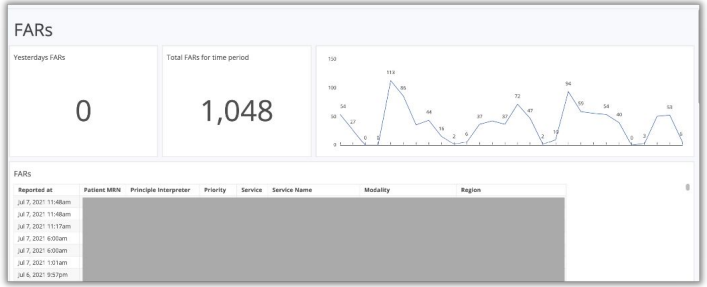
We tested with different iterations and delivered a tested solution

Pathway visualisations

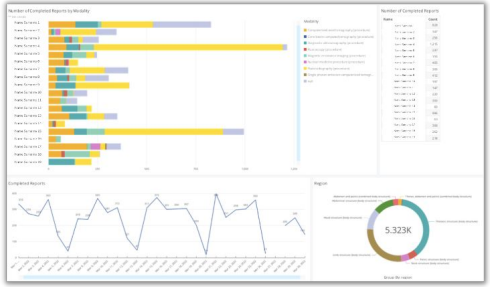


Breach reports

Further action required's

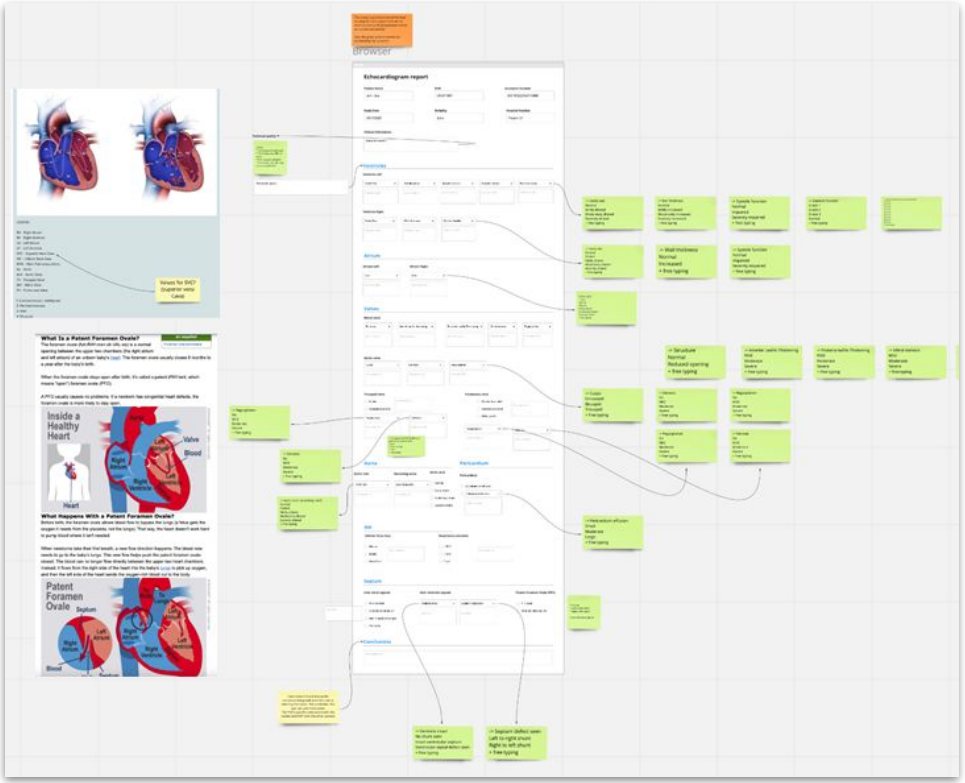


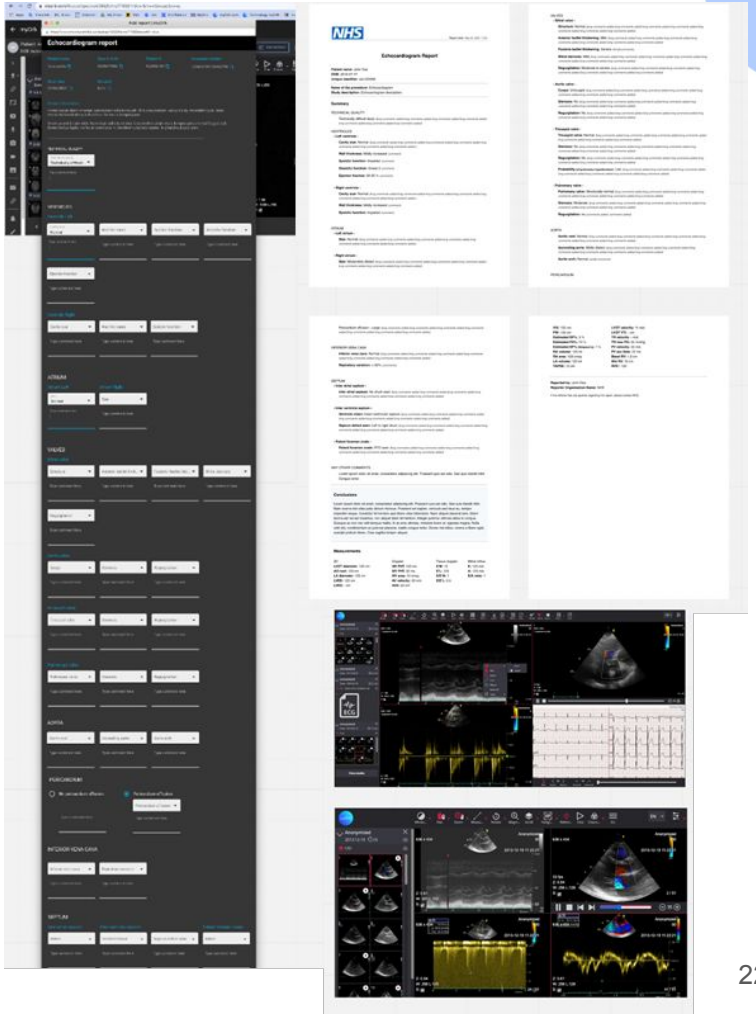
Staff reports



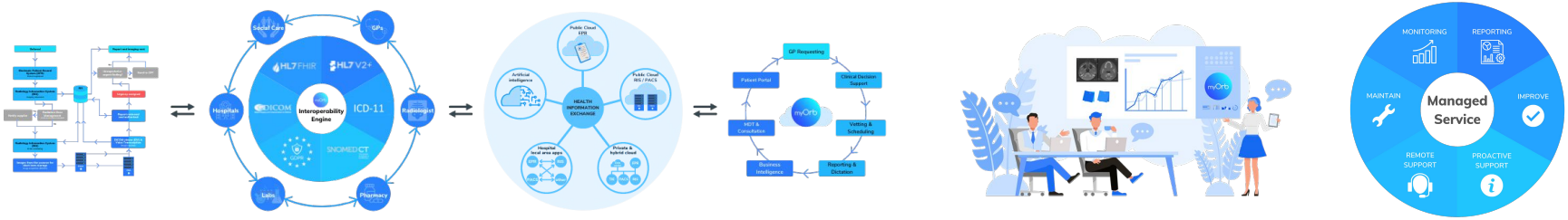
- Real-time data with advanced analytics and metrics
- Quickly create any complex informatics report
- Derived metrics including demand, waiting and turnaround times, scheduled to vetted time, FAR's and resource planning
- Found patients lost between systems and identifies mismatches

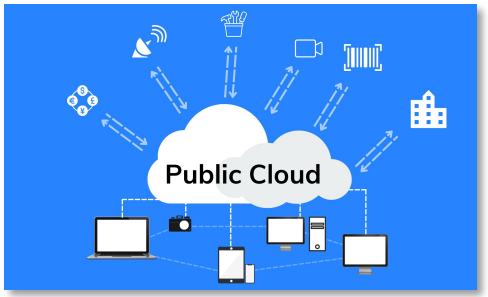
Design Thinking is Adaptable - Echocardiography Example



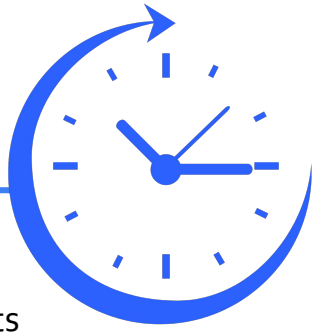


Rapid Economic Artificial Intelligence Interoperability





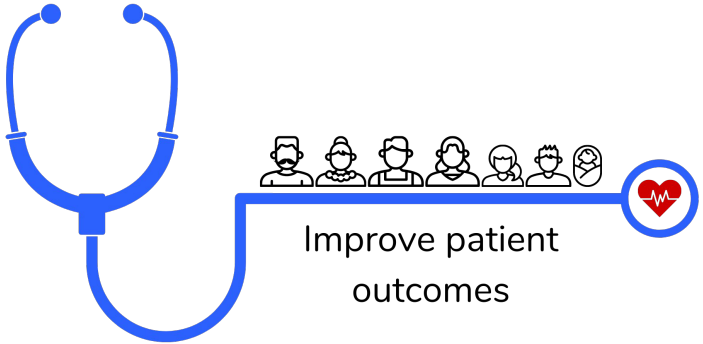
IT'S TIME



Its proven we can solve the 'too hard' pile

- ✔ Interoperability
- ✔ Integrated Care Systems
- ✔ Single source of truth
- ✔ Take pressure off IM&T

We can look forward to a brighter future with the Intelligent Health insights and innovations we have learnt about this week



Thank You

For listening

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