eRequesting

Long-term target state hypothesis

Contents

January 2024, version 1.2

Australian Government
Department of Health and Aged Care

eRequest

Project approach notes

- This ecosystem hypothesis builds upon the **Health Information Exchange** (HIE) program within the Department of Health and the Australian Digital Health Agency, and will act as the first significant use case for a broader interoperability ecosystem.
- This presentation represents a 'point-in-time' snapshot of a possible future vision of eRequesting. The project is in a **very early state of maturity** and there are many outstanding questions around the capabilities that are required to support eRequesting and a FHIR ecosystem.
- Many of the capabilities described in this presentation are **speculative** and will change as more detailed design is undertaken.
- We are committed to **showing our work early** and engaging deeply with stakeholders. This requires all stakeholders to understand and accept that this work is not yet fully thought through but will mature in the open over the next year.
- Further **discovery, design and industry consultation** work will be conducted over the coming year to resolve questions of scope, policy setting, technical capabilities, timing, phasing, options, costs and responsibilities.
- We will test and refine the hypothesis **over the coming year** through the eRequesting Technical Working Group and direct consultations with key industry operators and groups.
- Some capabilities described are **speculative** and will require **significant consultation** to resolve and validate before they are developed into propositions that government formally endorses.

Key eRequesting value drivers

Reduce duplication of diagnostic services. Studies from the UK's NHS indicate that up to a quarter of all pathology requests may be duplicates or unnecessary. eRequesting has the potential to dramatically reduce over-requesting and improve the selection of appropriate services. This will drive down MBS spend, reduce consumer burden and free up time for clinicians.

Drive consumer choice. A key principle of digital health reform is informed consumer choice, and eRequesting will ensure that requests are digitally available and transportable by consumers and the mechanisms for allowing them to assert this choice are provided by services such as Health Apps and provider directories. Importantly, traditional paper-based mechanisms will co-exist with digital tools, but will be enhanced by eRequesting systems that will securely share electronic requests.

Improve communication and visibility. Clinicians and DI/Path providers report that they spend significant resources on communication and discovery of results, often leading to redundant or missed appointments and the possibility of delayed or incorrect diagnosis. Consumers also report that poor communication and visibility of their health data can be a deterrent to better engagement in their healthcare and it may contribute to redundant consultations and unnecessary pathology or diagnostic imaging requests.

Provide government visibility of healthcare. Government currently lacks the detailed, contemporary data to make rapid policy and funding decisions or to drive new models of care cost effectively. Through a combination of FHIR and eRequesting, government can perform novel analysis and modelling without having to stockpile patient data, giving them real-time access to data that links patients, clinicians, services, providers and outcomes. This will lead to faster and more effective detection of disease outbreaks, defective services or drugs.

Distributed data architecture

- eRequesting is a significant use case for the FHIR standard and data architecture. Many of the concepts in this hypothetical architecture rely on FHIR's distributed data architecture. This means that data about a consumer is never stored in a central repository but is stored in the systems that create the data and made available to any authorised party who needs to view it.

- The government operates a **Record Locator Service** (RLS) service that is a central index of all the records for every consumer – this may be an extension of My Health Record. Whenever any authorised system needs access to consumer records, they first get a list of locations from the RLS, collect an authorisation token from the **Consent and Authorisation Service**, and ask each record-holding system to show them the data they need. They do not ever store this data but continue to reference it when needed. This approach will also coexist with point-to-point data sharing arrangements between systems where they can demonstrate compliance with data sharing rules.

- A distributed data architecture requires a **new mindset** – rather than having to collect all the data we might ever need to solve research and policy development problems, government can access data in a common format, distributed across the ecosystem, as it needs it.

- This distributed approach is also believed to reduce the vulnerability of the Health system to **cyber attacks** – there will never be a government 'honeypot' to attack, instead, consumer data will be held in a wide range of systems, each with their own cyber teams and controls. In theory, this would make an attack directed at finding all the records for an individual far harder to achieve.

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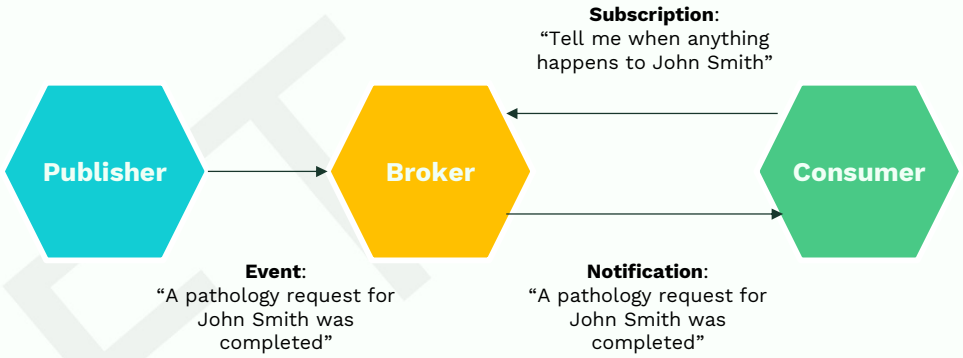
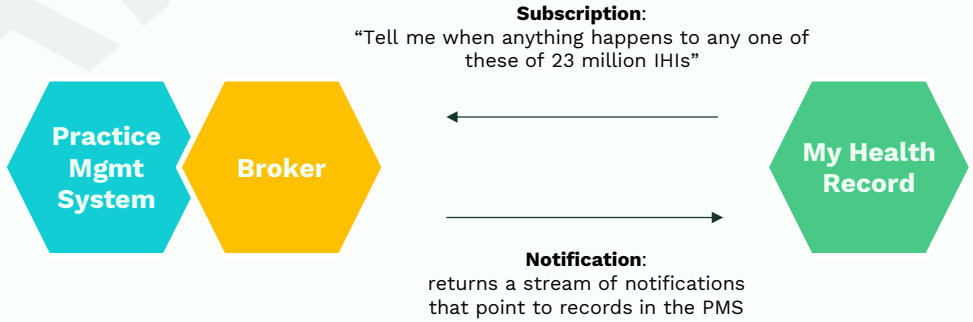
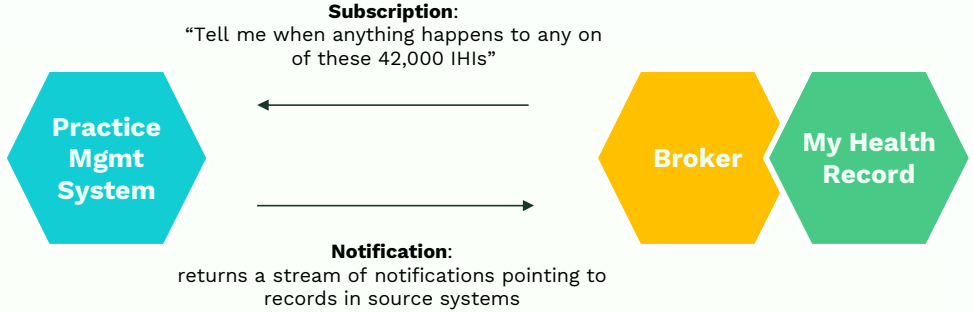
Subscriptions and notifications

- A key feature of FHIR is its modern event-driven subscription framework that can manage billions of notifications per day across the ecosystem.
- This allows every system to subscribe to a **central Record Locator Service**, which in turns subscribes to every system. All systems subscribe to events for consumers that they have a legitimate interest in and receive notifications any time a consumer record is updated, while the RLS subscribes to all customers the have a MyHealth Record. This is a hub and spoke model that ensures there is a central master directory that is always up to date and the single source of truth.
- Additionally, the system allows for **peer-to-peer** subscriptions, such as a Practice Management System subscribing to a particular eRequest that they have directed to a pathology provider. Using this approach, a range of activities not funded by government can still be supported, such as patient-initiated requests or corporately-funded medicine.
- Using the Provider Directory to discover provider endpoints, provider systems can send notifications to any other provider in the ecosystem. Consumers can also perform this task by manually transporting a request between providers using a QR code in an electronic or paper request.
- Technically, eRequesting can operate without subscriptions and notifications however, this method is the more effective than using polling or callbacks and is scalable to cover all FHIR communications.







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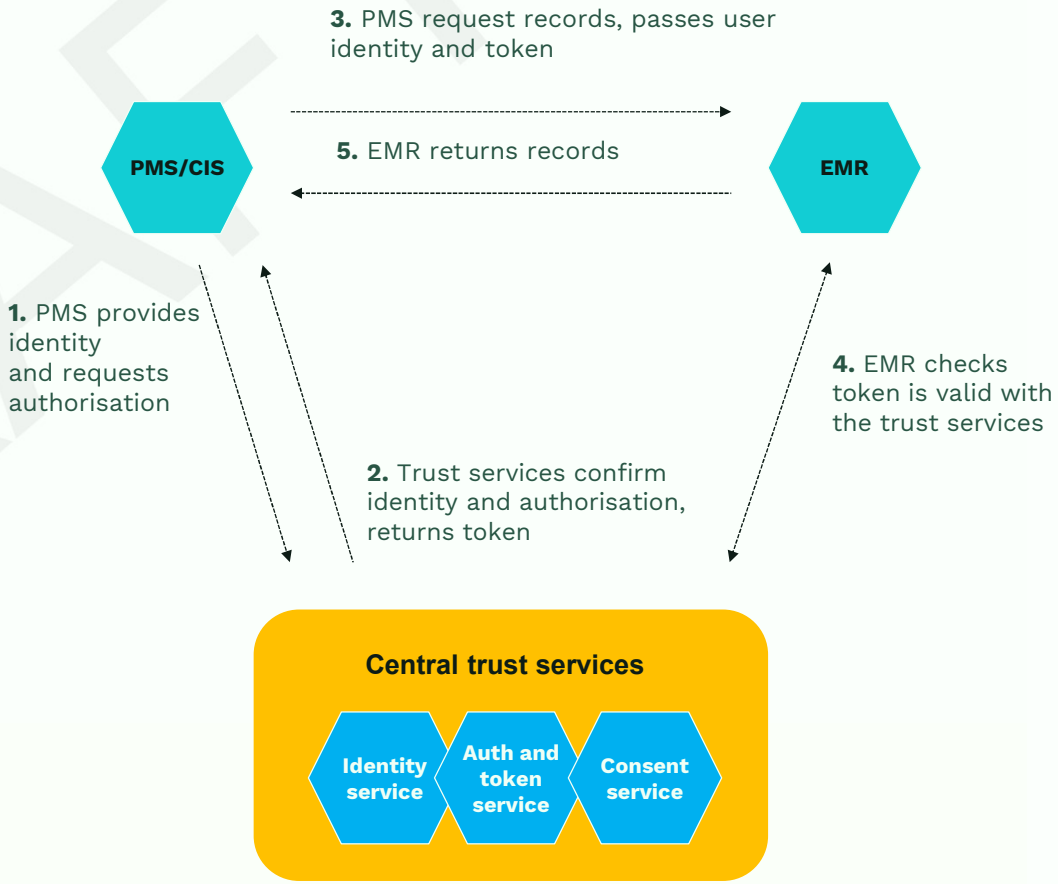
Tokens in a FHIR ecosystem

- **A 'token' is a small piece of data that enables the 'holder' to get access to data or a service.** A token is sometimes also referred to as a credential or a key, but these terms are also used in other circumstances, so for now we will keep using the term 'token'. FHIR uses the JSON standard for tokens, which are called JWT's or JSON Web Tokens.
- A token is created by an **'issuer'** and given to an individual or system that they trust ('holder). Issuers must be trusted by any system that holds or accepts a token, so this is a good role for government to play.
- Tokens can be presented to organisations or services that need to **verify a claim**, such as the right to access a consumer record. Tokens are digitally signed so that they can't be tampered with and have a link to a service where they can be verified for authenticity and validity.
- In a **hub-and-spoke model**, all parties rely on a central trusted identity and authorisation service to issue and verify tokens. This has the effect of making peer-to-peer models comparatively complex and expensive, reducing their viability.
- This **model simplifies data sharing by not requiring parties to know each other** or have agreements in place. They do not need to trust any individual system that requires data if they are bearing a token that can be verified.

Potential token workflow



Government only providing critical services backed by strong policy frameworks

- There are several services that make sense for government to provide **because stakeholders demand a level of trust**, governance and security that the private sector is unable to provide. The Record Locator Service, Consolidated National Provider Directory and the Identity services are key examples of this type of service and will support information exchange at a national level.

- Other services, such as eRequest repositories, may be developed by both the private sector and public sector in **parallel**. This may be done to solve a short-term market failure, or to be the provider of last resort to support smaller software developers to accelerate their eRequesting capability rapidly. This particular capability also represents an area of opportunity for cloud providers such as Microsoft, Google and AWS to extend their FHIR server offerings.

- Additionally, the commonwealth could **create services and opportunities for innovative developers** to build tools that may add value to the larger software platforms.

- The hypothetical ecosystem will only be realised through strong policy frameworks that support the information ownership rights of individuals and guarantee the free flow of data between systems in a safe and authorised way. Strong legislation may be required to requires industry to behave in a way that puts patients first and respects the role of the commonwealth as a primary source of funding and custodian of public health policy.

Ecosystem components

Many of the following components may play a significant part in making eRequesting work, while others may be implemented to harvest additional value opportunities.

It is important to note that the descriptions of the components in this section are an early hypothesis and will evolve over the next few years through detailed design processes.

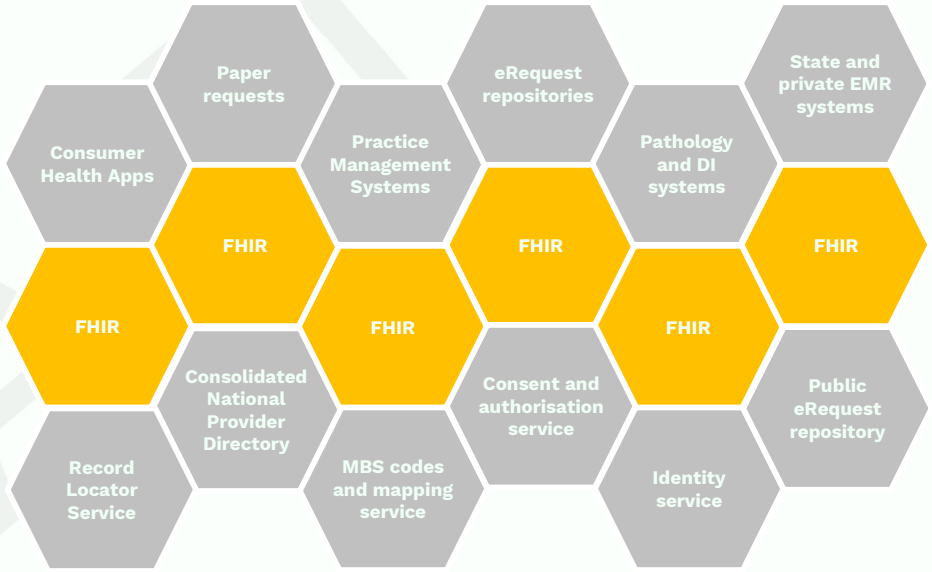
The FHIR standard

FHIR is the glue that binds the ecosystem together.

The FHIR data standard and the constellation of FHIR servers create a mesh of secure channels to solve any data exchange task. Consumer health data is distributed throughout the ecosystem and is stored in the systems that create the data. Data will be available in real-time whenever needed by any *authorised* ecosystem participant. Systems using FHIR will find each other using the Consolidated National Provider Directory and can subscribe to events to receive status updates on requests.

Systems in the FHIR ecosystem can subscribe to events to receive real-time status updates whenever any consumer record they have an authorised interest in is updated.

Health researchers may use bulk queries to retrieve large data sets without data having to be collected enmasse by government.

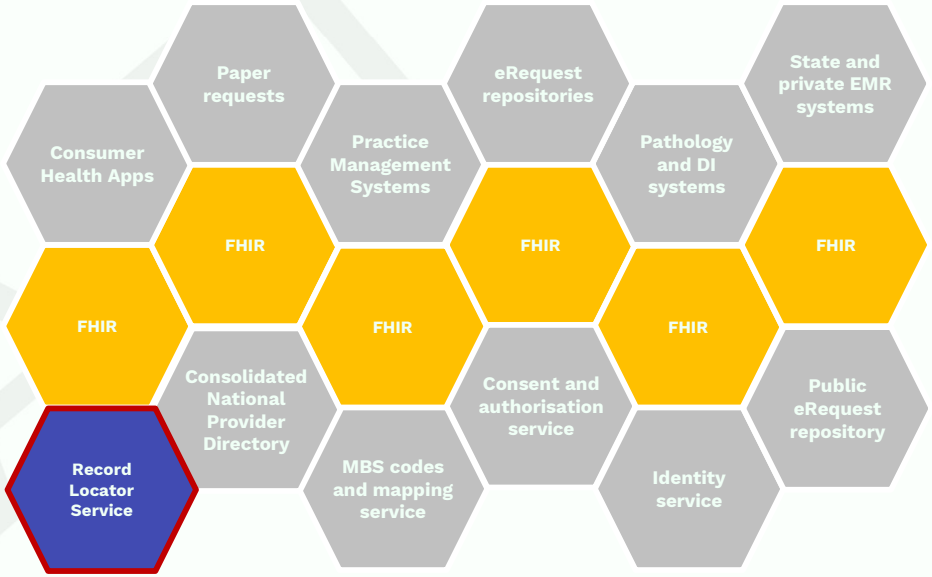


Record Locator Service

The Record Locator Service is a critical piece of infrastructure that allows all participants, including the Australian Government, to navigate a distributed data architecture. All participants in the ecosystem will be **required to update the record locator** when acting on behalf of a consumer. The record locator won't hold clinical data, rather pointers to records in a source system. Authorised parties, including health researchers and policy makers, will use the record locator to retrieve data from around the ecosystem when they require access to consumer records. The granularity of this data is yet to be determined.

Using the FHIR event subscription methodology, the consumer record becomes the 'master subscriber', collecting information on new requests and their status in real time. Authorised providers can also use a 'break glass' mechanism to view client records where a digital consent mechanism is not available. Provider and practice management systems may also subscribe to consumer records to receive notification of updates to the record and retrieve those records from the producer of the update.

Additionally, the Record Locator Service may store tokens on behalf of a consumer, allowing them to pass them to various services to give access to records through their Health Apps. Consumes may never have to interact directly with their tokens, as they will be managed for them by health apps when sending requests or making bookings.

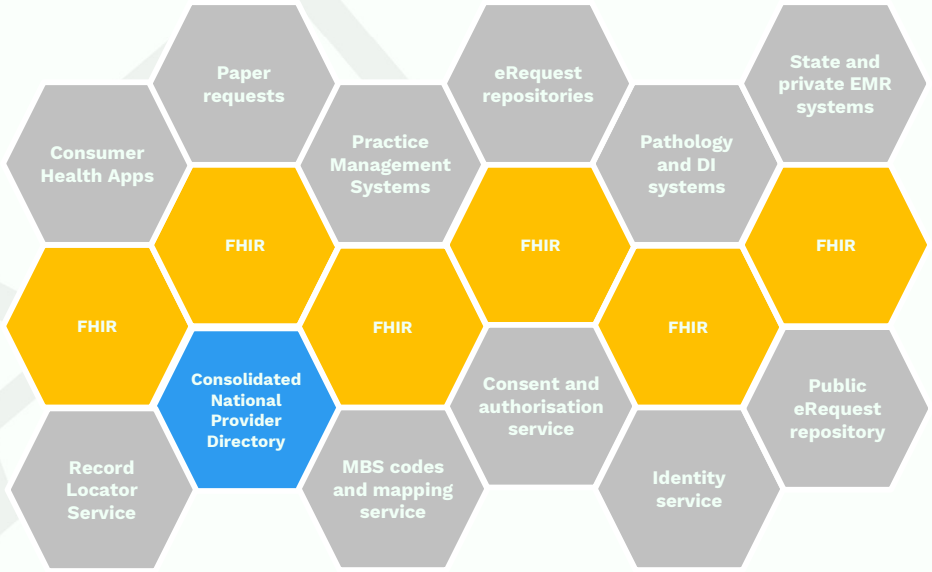


Consolidated National Provider Directory

The Consolidated National Provider Directory may be the definitive and trusted resource for all health systems to **discover and connect** to government vetted health providers, understand their service offerings and navigate to their systems.

For example, it will serve as a way for Pathology systems to **discover the API endpoints** of Patient Management Systems so that patient-directed requests can be retrieved.

The service may also stimulate **quality-based competition** between service providers.

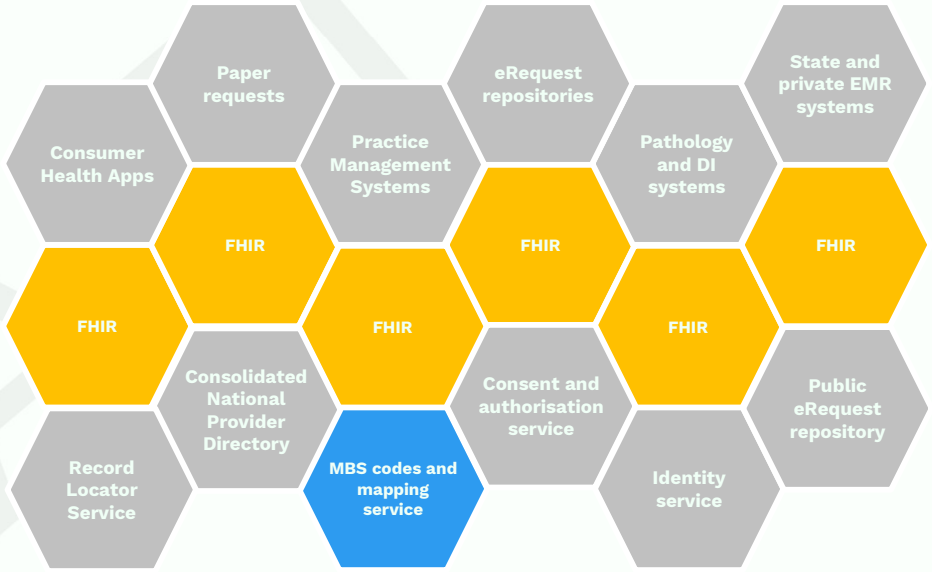


MBS codes and mapping service

The MBS codes and mapping service supports clinical systems and provider service catalogues to navigate the complexity of the MBS schedule's rules.

This will provide easier selection of services by clinicians and consistent mapping of MBS codes to services offered by multiple providers. The service will also help to consolidate service descriptions into a consistent, standards-based terminology set.

When clinicians select services using a consistent schema that is clearly linked to Medicare codes, consumers and providers will have more certainty and predictability over payment for services by government.

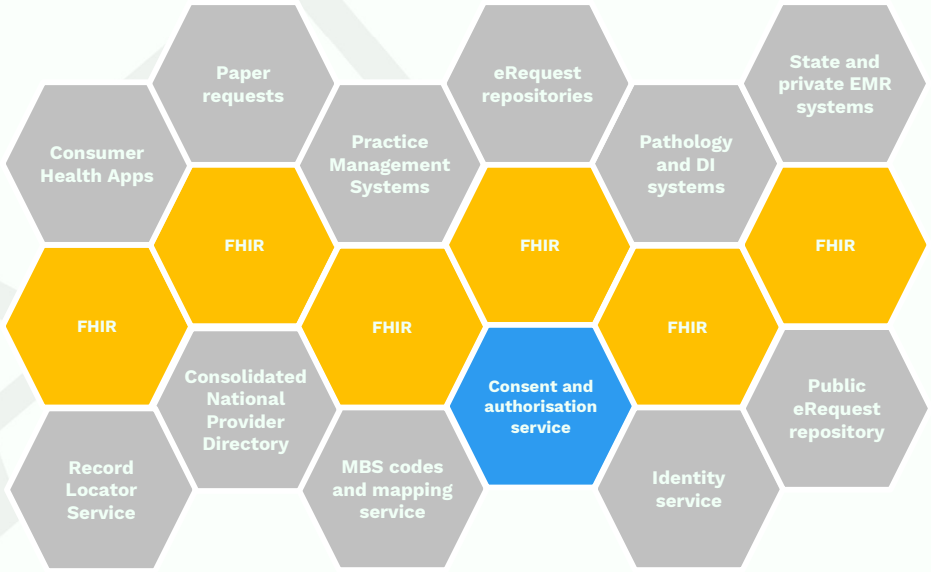


Consent and Authorisation service

The Consent and Authorisation service may support provider systems to easily and quickly **navigate authorisation and consent** questions at the point of care or service and provides Health App providers with mechanisms to support **consumer consent settings**.

The service would be responsible **for issuing and verifying access tokens**. Tokens are requested by systems acting on behalf of consumers to authorise any system or actor in the network that is given the token to access particular information resources or perform actions on behalf of the consumer.

An example of this in eRequesting is when a request is generated by a clinician who believes that a diagnostic imaging provider will require access to previous scans to deliver a better test result. Through a conversation with the consumer, the clinician will establish their consent and the PMS will ask the Consent and Authorisation Service for a token that grants the bearer limited record access. The token is then passed to the consumer app which passes it in turn to the DI provider.

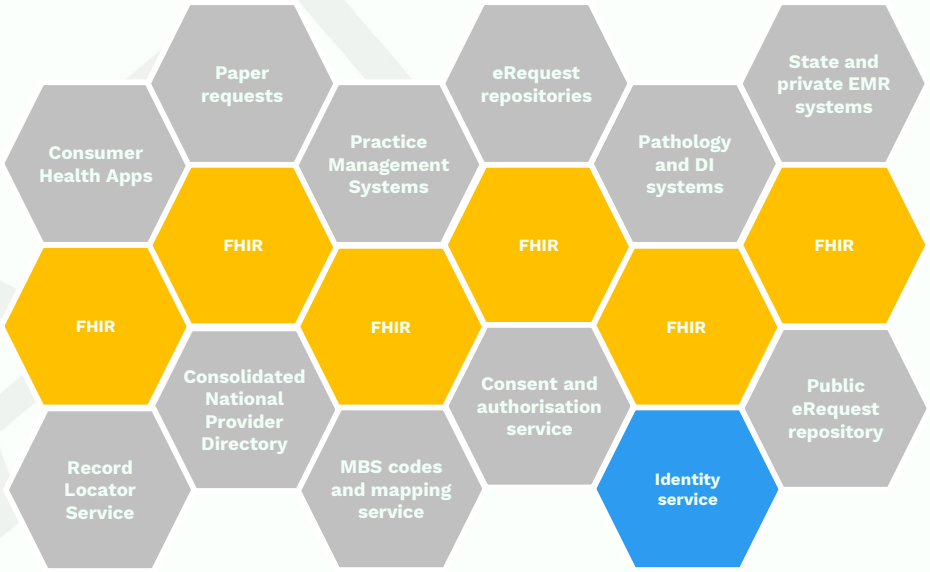


Identity Service

The Identity Service ensures a **consistent approach to identity management and authentication** for all ecosystem participants and provides a set of capability that enhances privacy and security of the entire ecosystem. MyGovID may play a significant role in this service as the future Whole of Government digital identity provider, with future opportunities for additional identity providers to join as the Trusted Digital Identity Framework matures.

The goal of government is to have fine-grained visibility of the actions of every individual operating in the digital health ecosystem and ensuring that only authorised people have access to sensitive patient data.

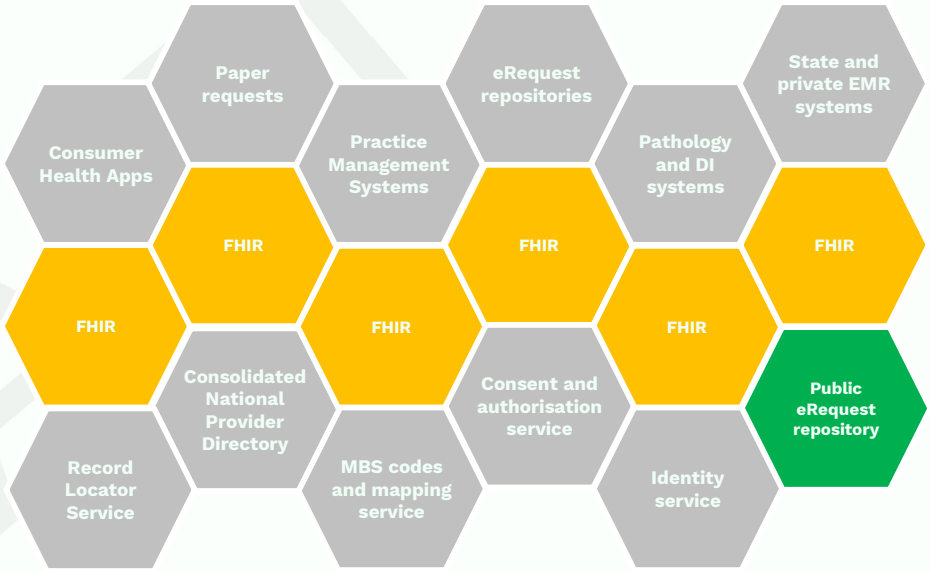
The service will work closely with other government ecosystem services to ensure critical transactions such as issuing access tokens and retrieving data are only performed with trusted identities.



Public eRequest repository

Government expects that industry will make significant progress in developing **a federation of eRequest repositories** however, it may develop the first eRequest repository in the ecosystem to stimulate adoption or protect against market failure.

Development of a public repository may support smaller system developers to rapidly build capability and comply with regulations however, a federation of commercial repositories is the preferred solution.



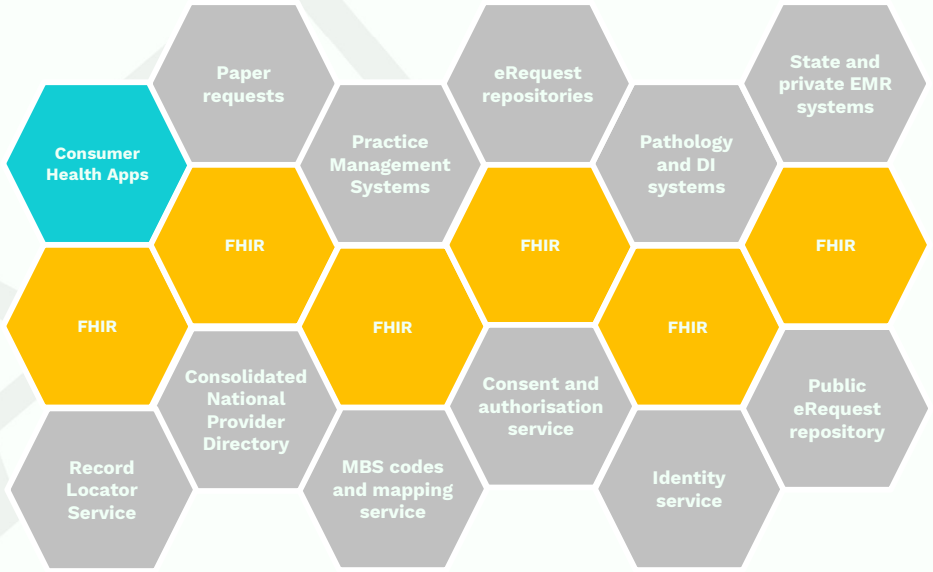
Health apps

Government and private health app providers may innovate to create a wide range of useful solutions for consumers and connect to an ecosystem of health utilities such as fitness trackers and blood-glucose monitoring devices.

Apps will be a user-friendly gateway for consumers to navigate their data in the ecosystem and can facilitate consent in a variety of care settings.

All eRequests and results will be available in a consumer health app and can be used to support self-directed care options. Health apps can use the Consolidated National Provider Directory to **support consumer choice** when finding service providers to fulfil requests, broker appointment setting and manage consent and access to data.

Apps will be a simple and transparent way for consumers to **manage and distribute eRequests** to providers who need to see their health records. An example of this might be where a pathology request is managed by a health app and the token associated with it is shared with a pathology provider as either a QR code or sent through a digital booking process.



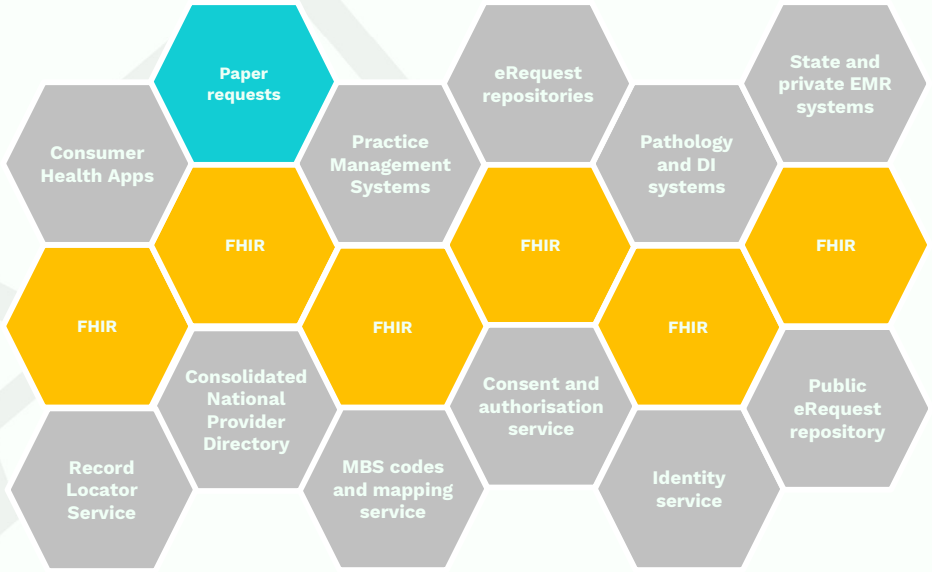
Paper requests

Paper requests will play an important role in transitioning to a digital future and maintaining **inclusivity for non-digital citizens and practitioners**.

Paper requests will be an **analogue representation** of the eRequest and will contain 'tokens' that can be used by receiving parties to both retrieve requests and access consumer health records, another critical part of maintaining consumer choice. Tokens may be represented as QR codes or alphanumeric access codes that can be used by providers to view and ‘claim’ a request.

Paper requests are an important way of maintaining patient choice and that act of handing a form to a provider creates **implicit act of giving consent** that is important to maintain.

Paper requests may grow in sophistication and leverage data in the Consolidated National Provider Directory to deliver richer, context aware information to patients such as the location of test centres or preparation instructions.



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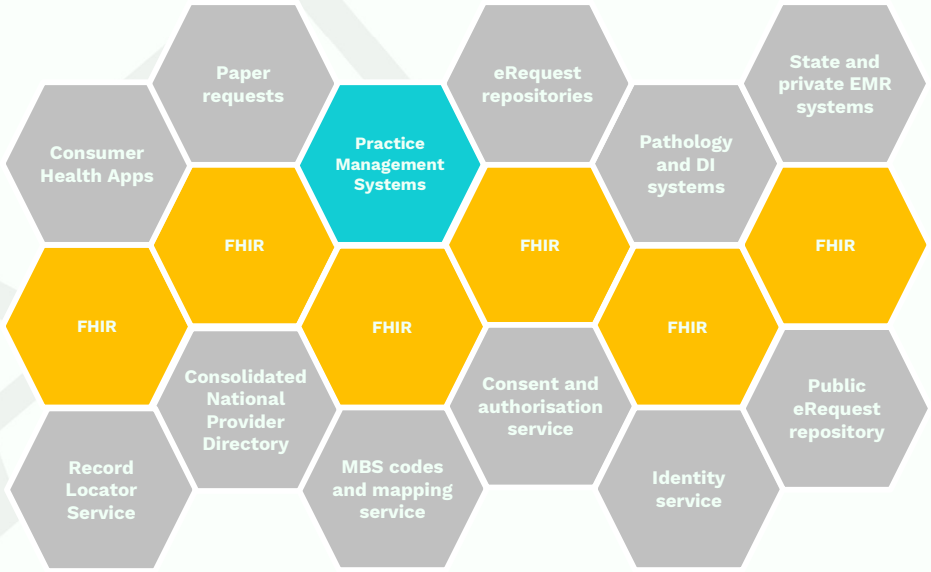
Practice Management Systems

Practice Management Systems (PMS) will maintain **significant stores of patient data** and will make patient records available when requests are made by authorised parties.

They will support clinicians to initiate requests, monitor their status and make results available to consumers in consultations. Practice management systems will present tools to clinicians for making decisions on requests, selecting providers where appropriate and monitoring request status.

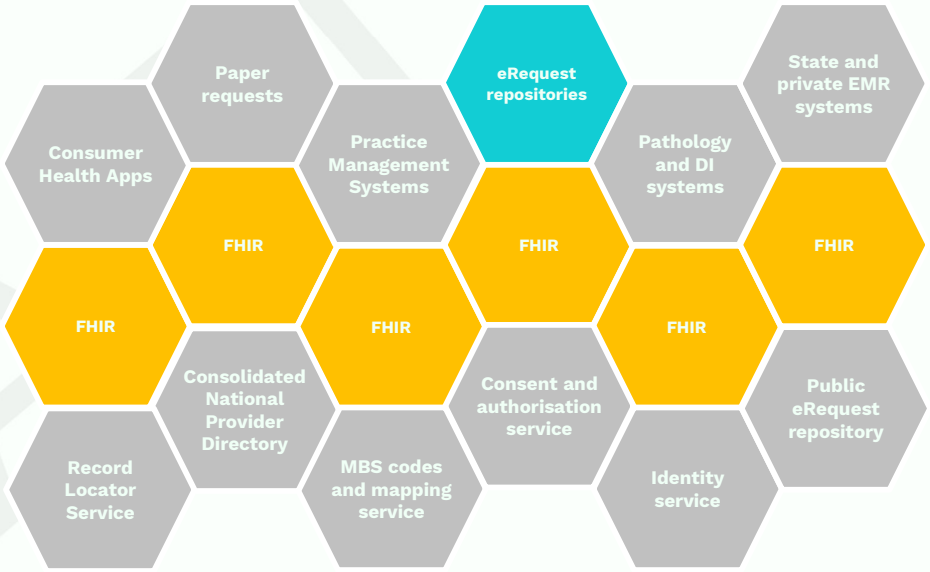
Where a clinician directs a request to a provider, their system will use the provider directory to rout a message to the provider.

When eRequests extend to cover specialist referrals, PMS systems may be both the requester and recipient where both parties are using the same systems.



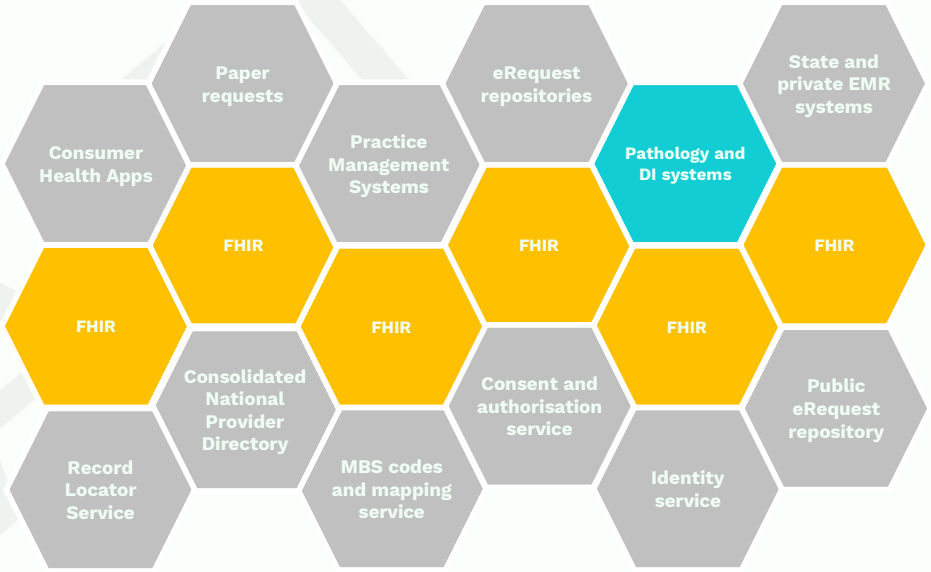
eRequests Repositories

Industry may develop eRequest Repositories that form a **federation of repositories**. They may be stand-alone solutions or be integrated into core patient management systems. A request will only live in one repository but will be available to all authorised parties to view or work on.



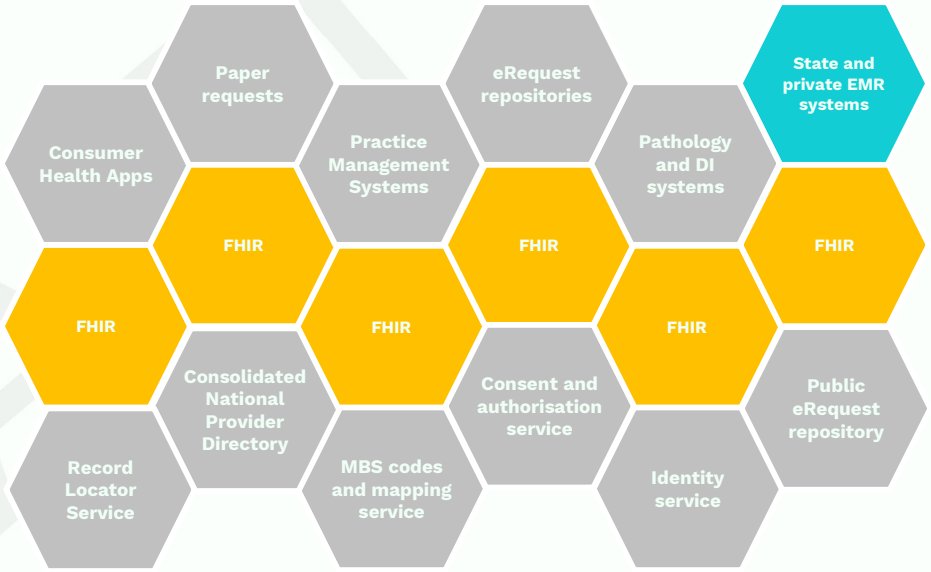
Pathology and Diagnostic Imaging systems

Pathology and Diagnostic Imaging systems will receive requests and create 'task' records that link to the original request. They may also host eRequest repositories where they are creating requests for other service providers. At each step in their workflows they will update the Record Locator or subscribers with the status of the request.



State and private EMR systems

Although they may operate differently to PMS systems, state and private EMR systems may be both issuers and receivers of eRequests in exactly the same way as the PMS and Path/DI systems.



Putting it into practice

The following service blueprint shows how the ecosystem hypothesis may be experienced by consumers, clinicians and pathology providers.

eRequesting future state service blueprint

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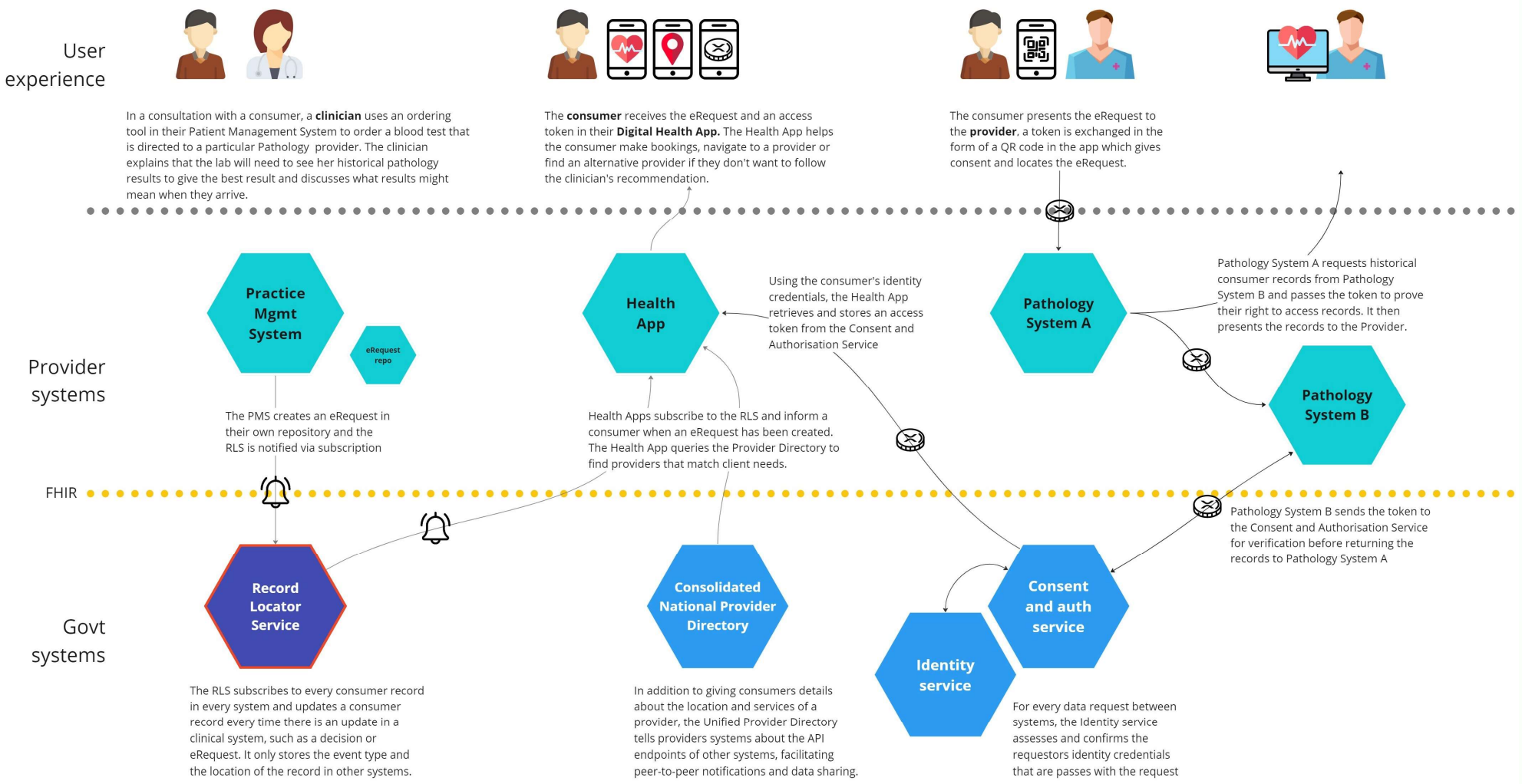
Scenario: Our consumer John, visits his GP Sarah. Sarah concerned that he is very lethargic over the past few weeks. He has recently started a new anxiety medication and Sarah wants to see how his serotonin levels are trending before deciding to modify John's medication.



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eRequesting future state service blueprint (cont)

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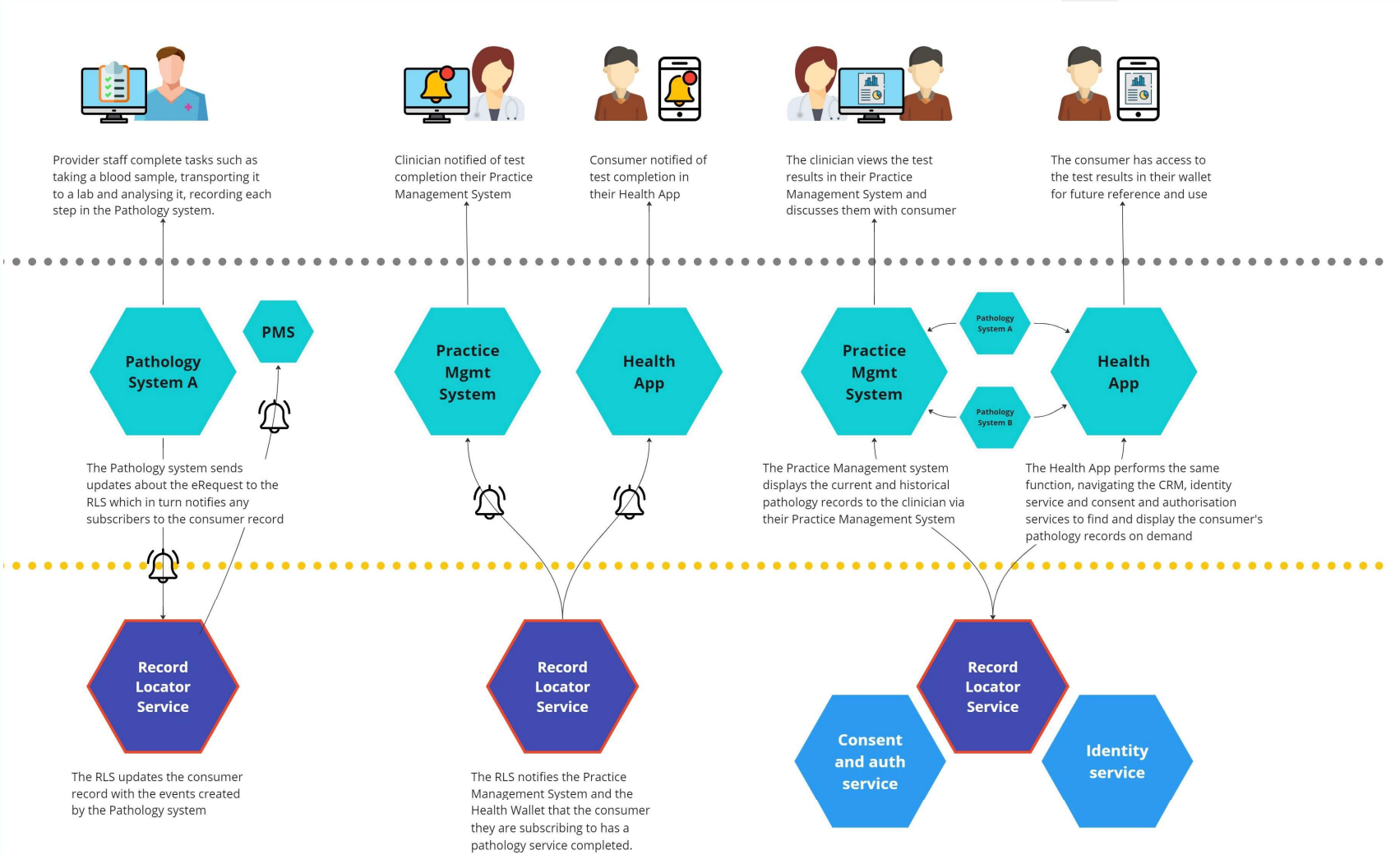

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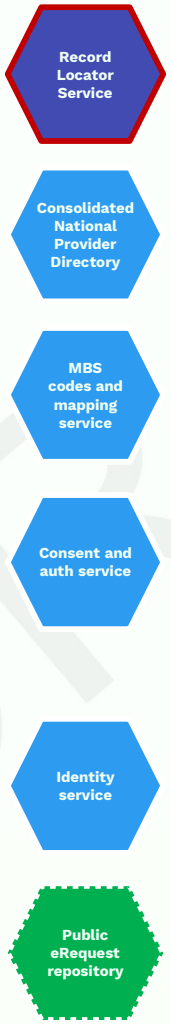
Priorities and dependencies

This project is in a very early state of maturity and there are many outstanding questions around the capabilities that are required to support eRequesting. Further discovery and design work will be conducted over the coming year to resolve questions of scope, capabilities, timing, phasing, options, costs and responsibilities.

System capabilities in our proposed ecosystem have been broken into several categories – industry systems, existing government systems, and new government systems. Some of the new government systems proposed may not be realised by this program but will have a significant impact when developed.

Below are some early thoughts on selected capabilities that appear at this early stage to be priorities.



The **Record Locator Service** may be realised through a modification to existing national infrastructure. This is proposed under phase 2 of the Health Information Exchange capability or may be an entirely new capability. eRequesting can operate without the RLS however it will be significantly enhanced by it, particularly when leveraging subscriptions and notifications approaches.

The **Consolidated National Provider Directory** may also be realised under the proposed Health Information Exchange Capability and is a key component required by the FHIR interoperability standards project. The directory will be critical to enabling eRequesting to operate effectively.

The **MBS Codes and Mapping Service** may be realised through an extension of an existing CSIRO-led capability by making it FHIR-compliant, however it may require alignment with a program of MBS simplification and modernisation to ensure that the majority of claims can be made machine-readable.

The **Consent and authorisation service** is a current capability within My Health Record that may be extended to meet the needs of the FHIR ecosystem. Consent is a complex topic that may require considerable work to resolve and may be out of scope for this project. Organisations may decide to create peer-to-peer data exchange arrangements and find other ways to manage patient consent, a topic that will need to be addressed through policy rather than system constraints.

The **Identity service** is a current capability within My Health Record that may be extended to meet the needs of the FHIR ecosystem. Close attention will need to be paid to the new identity framework proposed by Department of Finance. Exception pathways and mechanisms will need to be considered for people without strong digital identity mechanisms such as tourists, babies and vulnerable cohorts.

The **Public eRequest Repository** may be developed by private service providers, practice management systems, pathology and diagnostic imaging providers, or by government. Industry has expressed some concern about the arrangement of eRequest repositories that may lead to the disclosure of commercially sensitive information such as service times. If these concerns can't be overcome through the design of the FHIR standards or ecosystem arrangement, then government may need to build a centralised repository to overcome a market failure. This is a relatively simple solution that would work as another service in the FHIR ecosystem, secured by existing identity and authorisation mechanisms.