# FHIR Webinar 2

# InterSystems and FHIR

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Sales Engineer / InterSystems

Version 20.5.2021

# FHIR Webinars

The **previous** webinar - given 29.2. and 9.3.

Was more about FHIR,
less about InterSystems' offerings

**This** webinar - 2 - today 20.5. and 24.5.

Is more about InterSystems' offerings
- FHIRaaS service
- our products

We will also do some demos

 

# FHIR Webinar - 2 - Agenda

1. What is so great about FHIR?
2. FHIR and other HL7 standards
3. FHIR offering of InterSystems - Summary
4. FHIRaaS - InterSystems IRIS FHIR Accelerator Service (with demos)
5. InterSystems IRIS for Health
6. FHIR enabling an EHR System (with a demo)
7. Demo about extensibility (search by home municipality)
8. Apple Health App demo
9. Summary

 

4 min.

# HL7 FHIR

Why?

 

# HL7 FHIR is (still) HOT ...

 

# HL7 FHIR is (still) HOT ... But is it just hype? ... or is there reasons for it?

 

# HL7 FHIR is (still) HOT ... But is it just hype? ... or is there reasons for it?

https://argonautwiki.hl7.org/w/images/argonautwiki.hl7.org/1/17/Argonaut_Project_Background_and_Overview_Presentation.pdf

## What's so great about FHIR?

### Flexible to document-level and data-level exchange

- Sometimes individual data elements are important, sometimes entire documents are appropriate

### Based on modern internet conventions

- RESTful API – same browser-based approach as used by Facebook, google, twitter, etc
- Infinitely extensible to detailed resources/profiles to meet any use case
- Supports push and pull use cases

### Attractive to developers from outside of healthcare

- Brings new voices into health care and pushes the industry to innovate at internet speed

 

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  source: https://companiesmarketcap.com, 10.5.2021

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companiesmarketcap.com

## Largest Companies by Market Cap

companies: **4,881** total market cap: **$90.189 T**

Rank by | Market Cap | Earnings | Revenue | Employees | Market Cap gain | Market Cap loss

| Rank | Name | Market Cap | Price | Today | Price (30 days) | Country |
|---|---|---|---|---|---|---|
| 1 | Apple AAPL | $2.173 T | $130.21 | 0.53% | | USA |
| 2 | Saudi Aramco 2222.SR | $1.904 T | $9.52 | 0.14% | | S. Arabia |
| 3 | Microsoft MSFT | $1.901 T | $252.46 | 1.09% | | USA |
| 4 | Amazon AMZN | $1.660 T | $3,292 | -0.45% | | USA |
| 5 | Alphabet (Google) GOOG | $1.591 T | $2,399 | 0.73% | | USA |

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These companies are now investing on **FHIR**

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# Also

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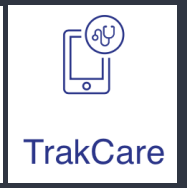


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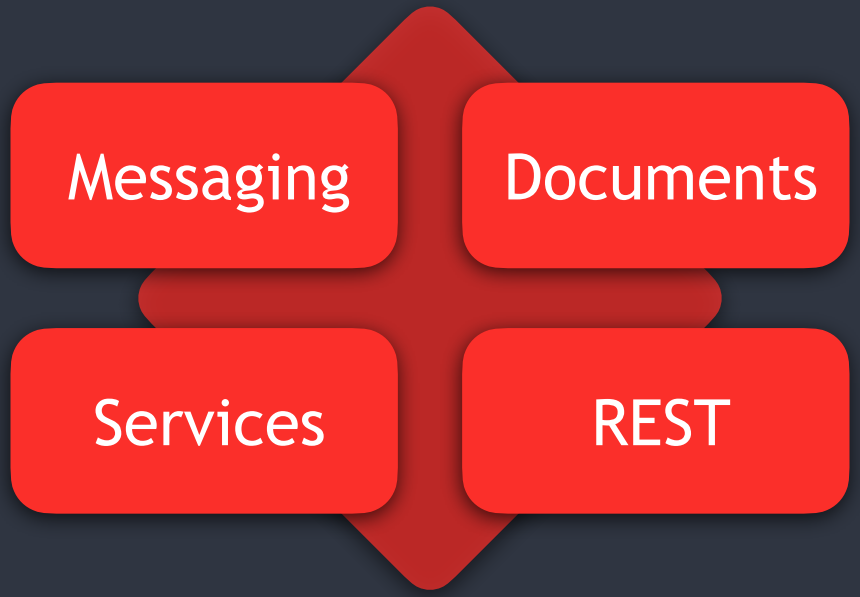
# Use Cases for HL7 FHIR ... and Other HL7 Standards

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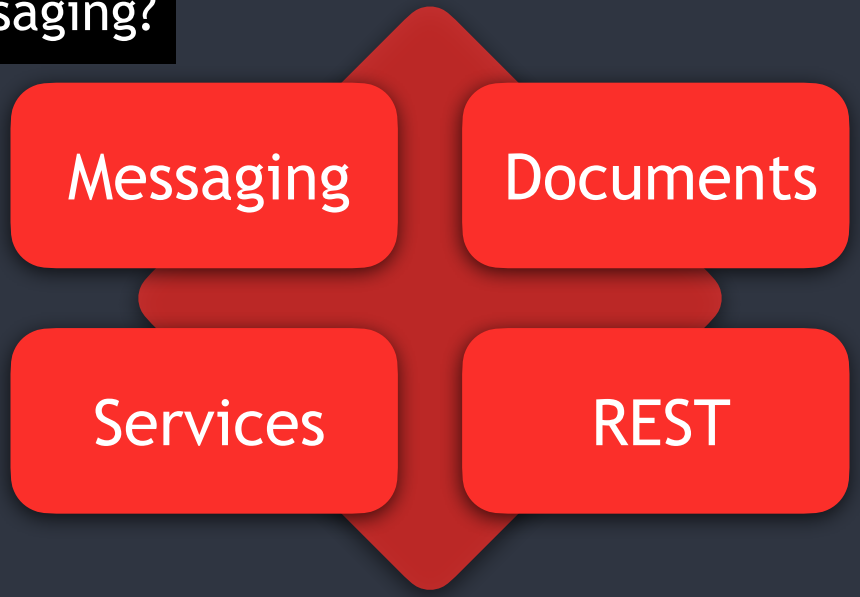
- Why would you replace HL7 v2 with something else for messaging?

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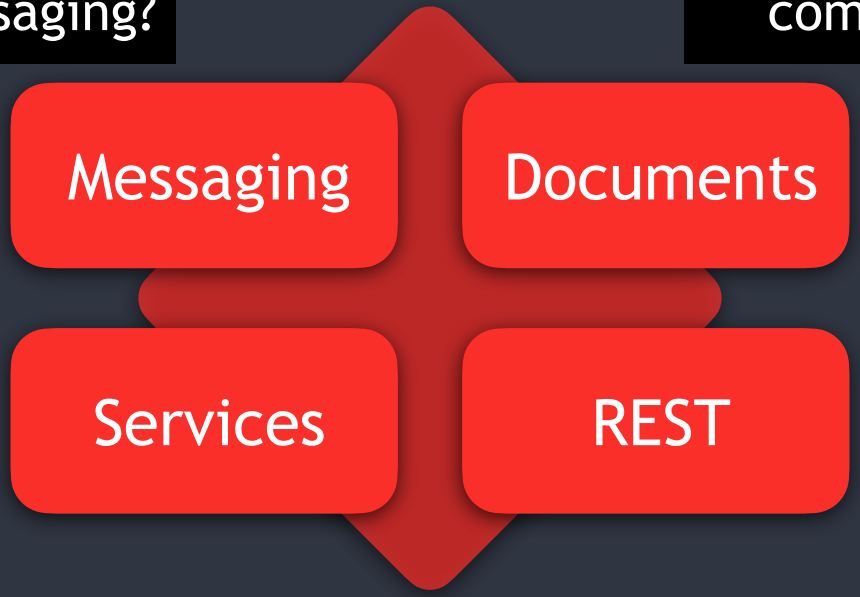
- HL7 v3 (in general) is perceived as complex ...

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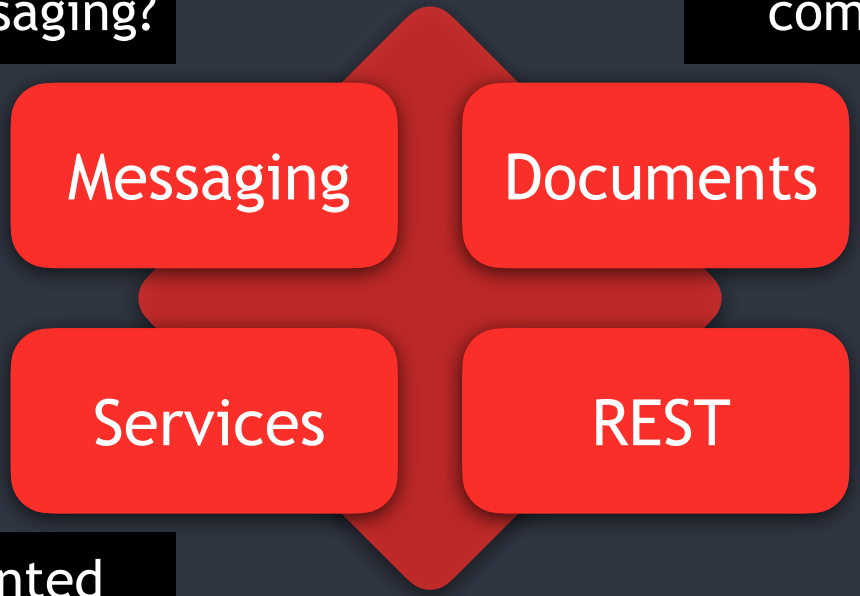


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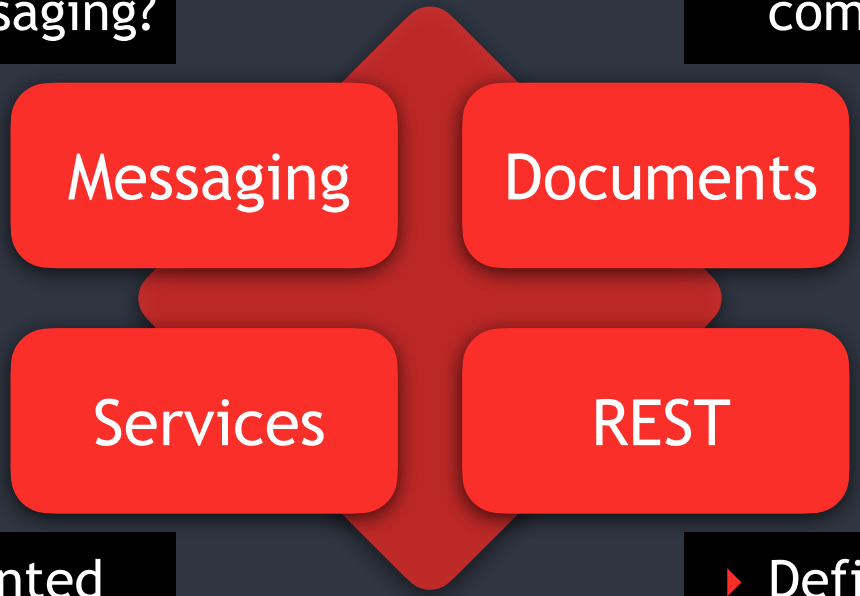


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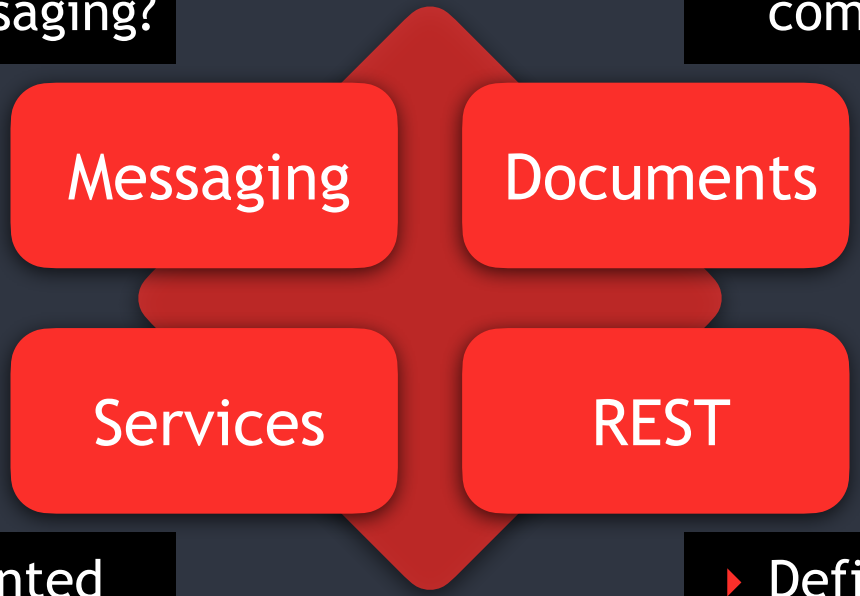


Persistent Storage (database)

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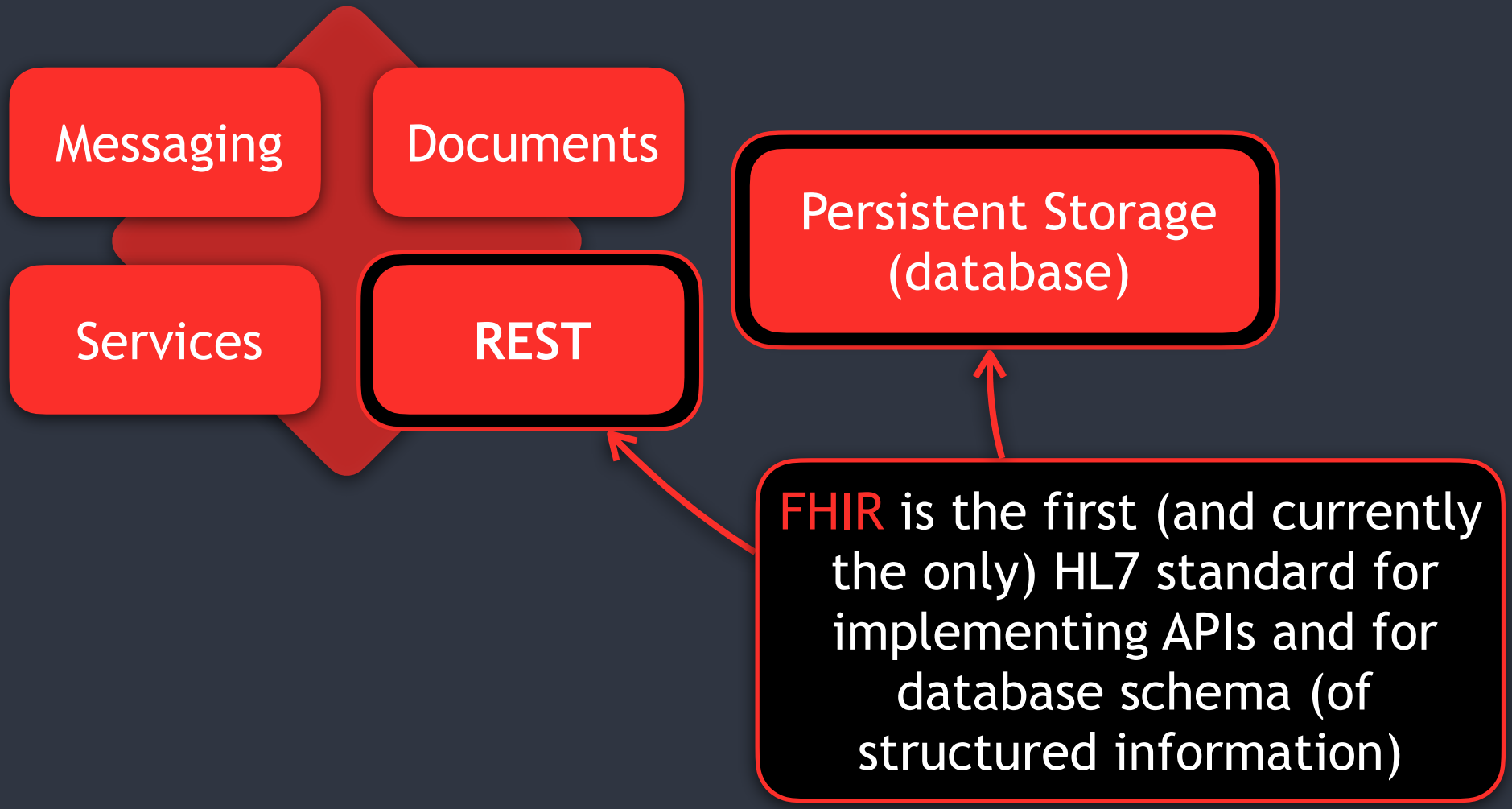
# HL7 FHIR ... and Other HL7 Standards - Summary



12 min.

# InterSystems Offering

and

# FHIR

 |  |

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Compared to HL7 v2 and v3
the count of vendors supporting HL7 FHIR has exploded

Also giants like Apple, Google and Microsoft support HL7 FHIR

 

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What is special about InterSystems as provider of FHIR capabilities?

 

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All the vendors concentrate on some specific role(s) regarding FHIR, e.g.:

- applications based on FHIR (SMART App Launch)
- "green field" FHIR Servers for collecting data in FHIR for e.g. analytics

 

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InterSystems is about:

1. Healthcare application backends: *Not just* new applications based *solely* on FHIR, but FHIR enabling existing application - both as servers and clients
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2. Integrating applications and data in general. Especially for operational use and in real time - both by patients and cohorts
3. Not just FHIR, but also other standards and capabilities needed by applications and integrations (of applications and data)

 |  |

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3.

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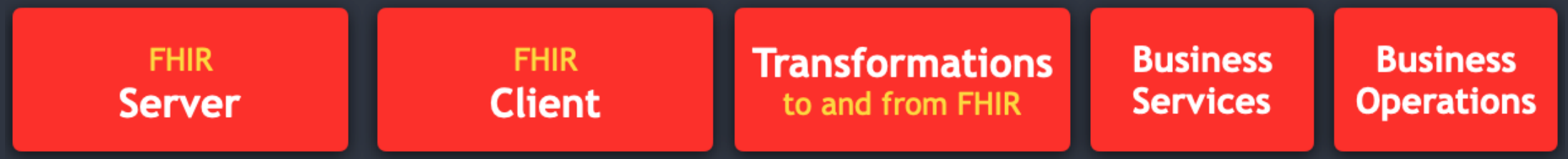
1. InterSystems has far the longest experience in using FHIR
2. InterSystems has far the biggest implementations so far using FHIR (both applications and HIEs)
3. InterSystems has the longest and deepest experience not only in using FHIR, but health care applications and interoperability in general

# InterSystems' FHIR Components

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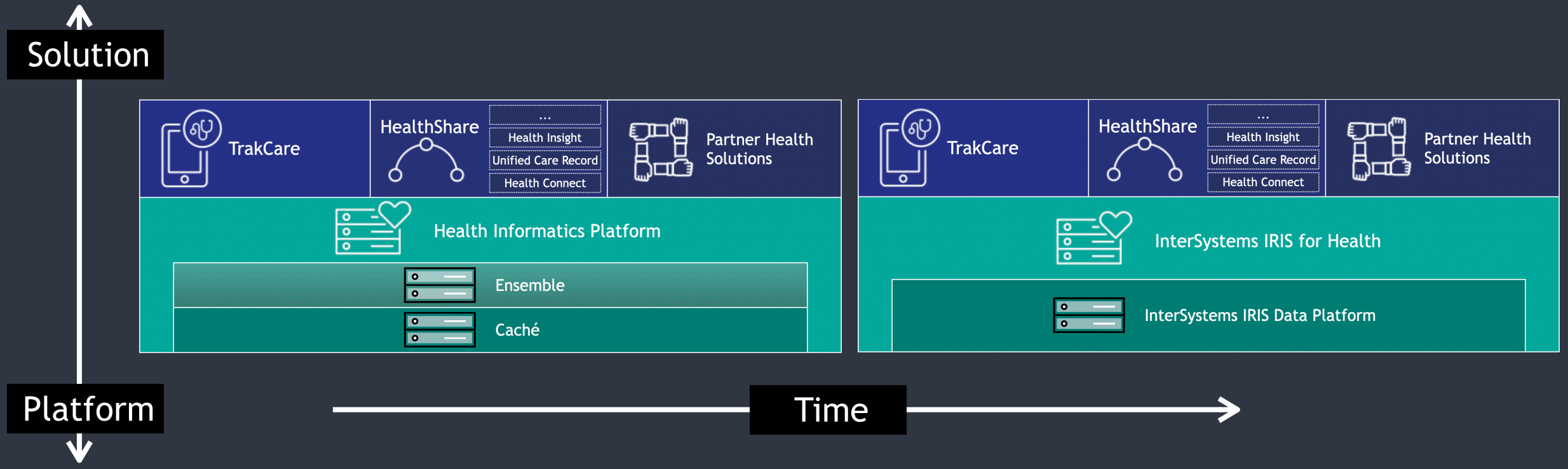
# Products of InterSystems

FHIR Server | FHIR Client | Transformations to and from FHIR | Business Services | Business Operations

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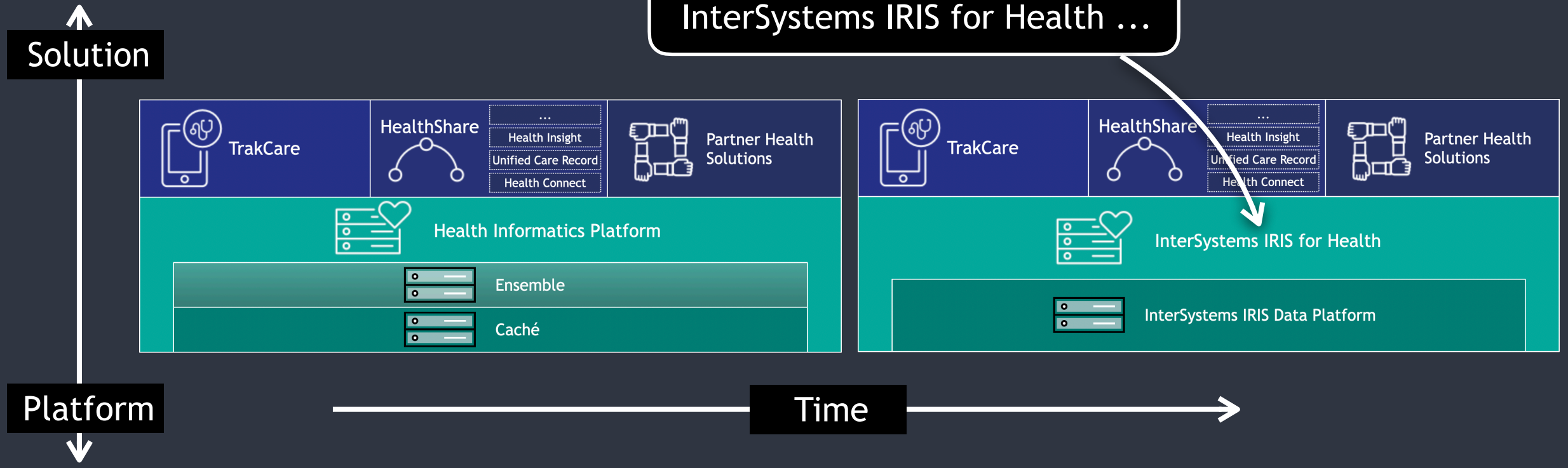
The newest FHIR capabilities are implemented in InterSystems IRIS for Health ...

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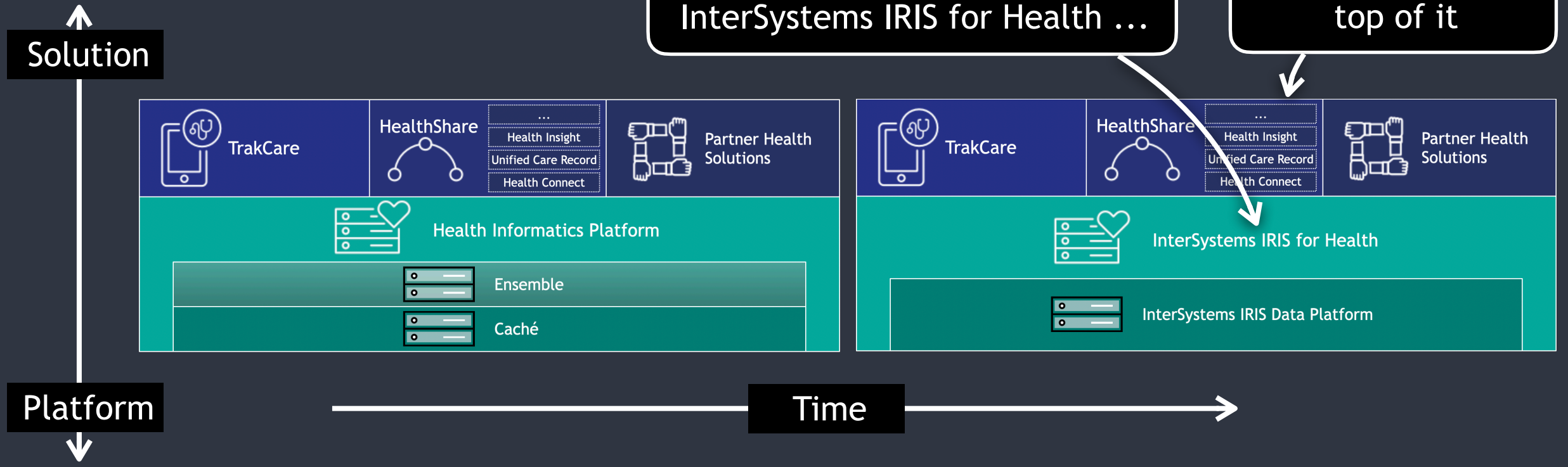


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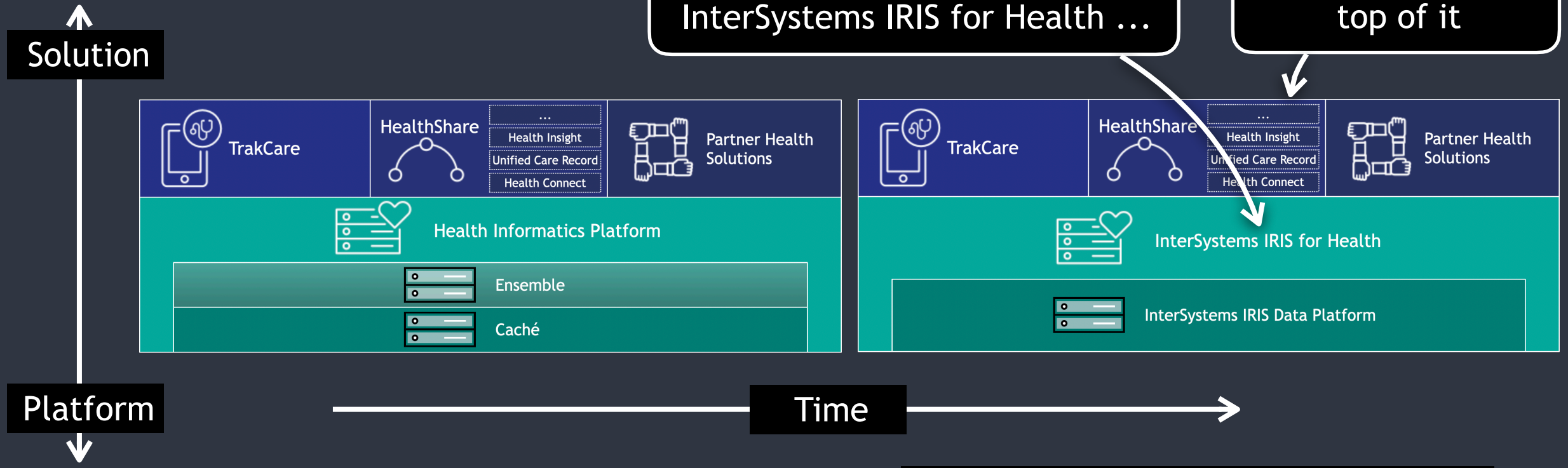


These are our products ...

 |  |

# FHIRaaS - InterSystems IRIS FHIR Accelerator Service


**FHIR server** as a turnkey solution: spin up in minutes and leave security, backups and management to InterSystems.

IRIS FHIR Accelerator Service provides:

- enterprise grade FHIR repository
- FHIR API developer portal

Aimed for innovative application developers building customer facing apps using FHIR, e.g.:

- patient-facing mobile apps,
- SMART on FHIR apps.

Available **initially** in the AWS Cloud

 |  |

# Products of InterSystems

FHIR Server | FHIR Client | Transformations to and from FHIR | Business Services | Business Operations

The newest FHIR capabilities are implemented in **InterSystems IRIS for Health** …

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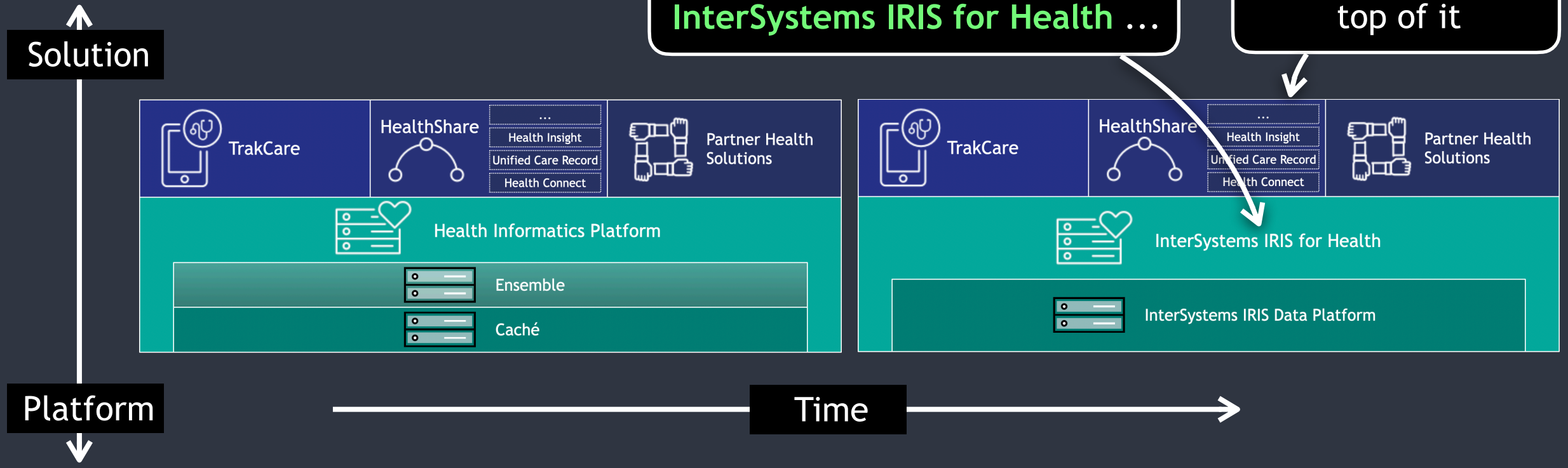


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# InterSystems IRIS for Health

Provides all FHIR capabilities:

- FHIR Server
- FHIR Client
- Transformations to and from FHIR
- Business Services
- Business Operations

May be deployed in:


- Virtualized Environments
- Containers
- Bare Metal

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# HealthShare Health Connect

... is based on IRIS for Health ...

 |  |

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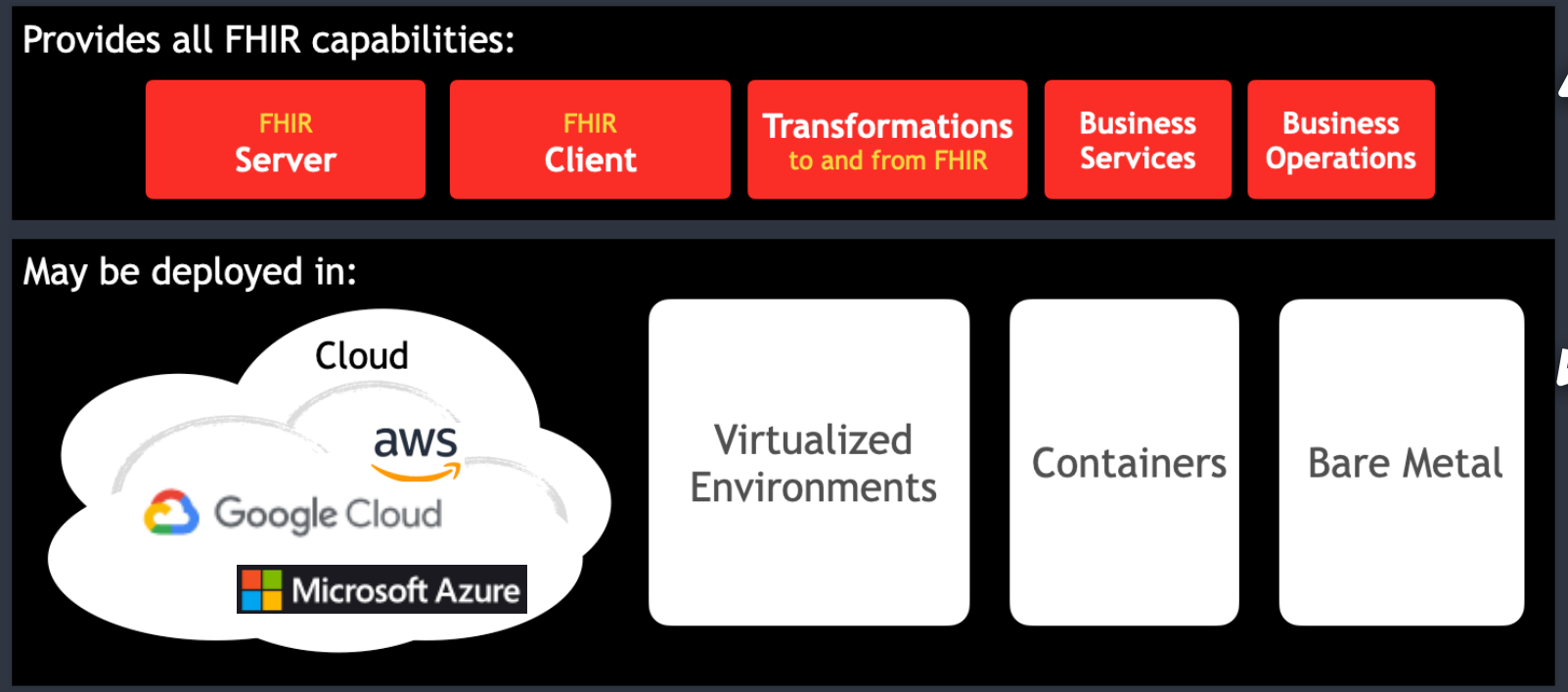
... is based on IRIS for Health ...

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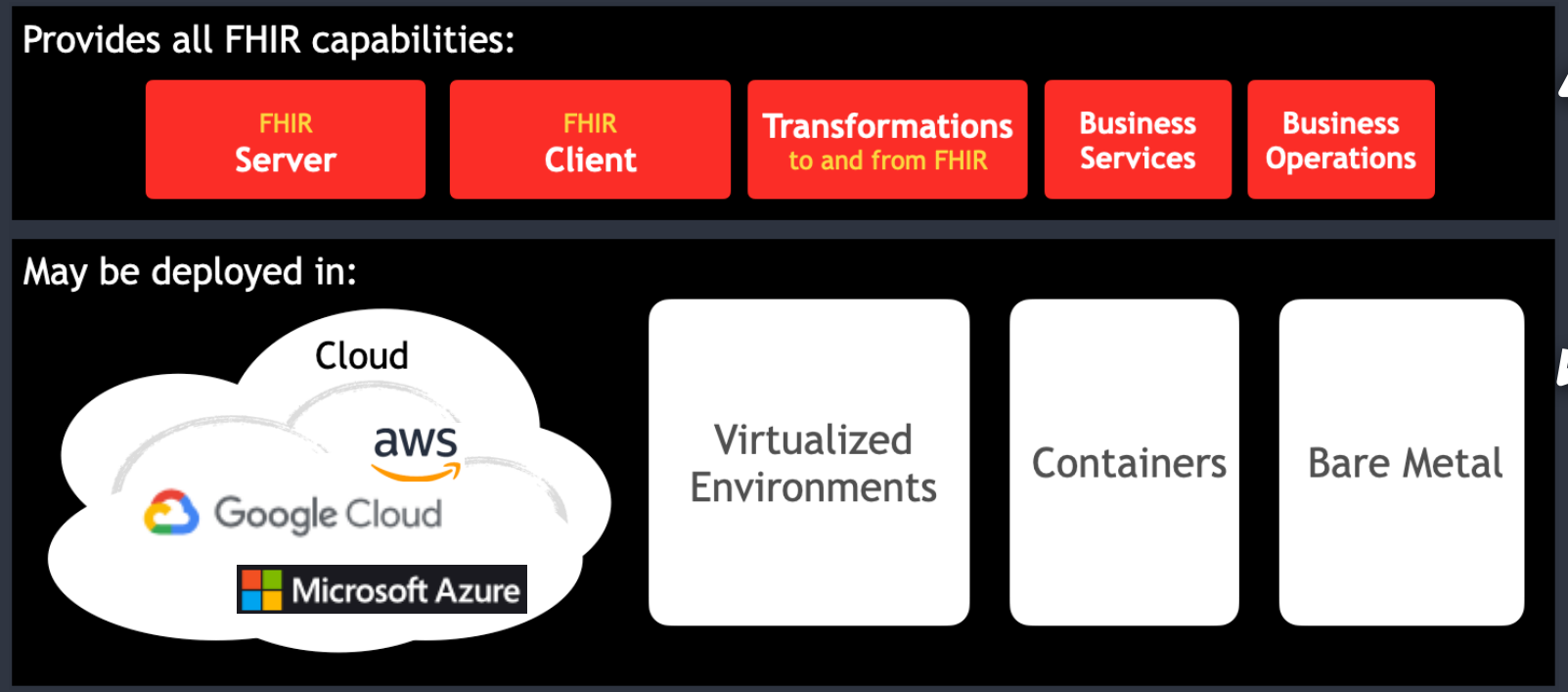


The use of HealthShare Health Connect is restricted to ***integration*** by licensing.

 |  |

# HealthShare Unified Care Record

... is based on IRIS for Health ...

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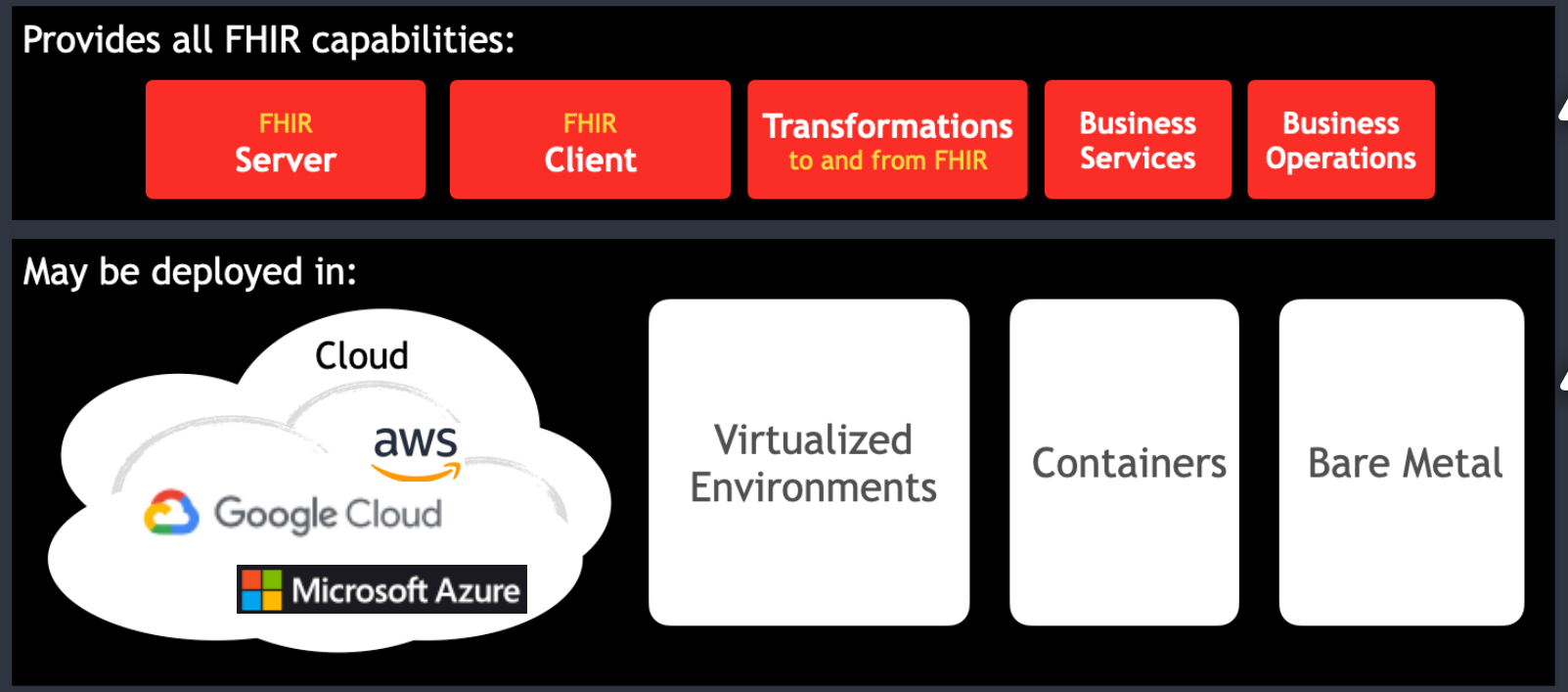



HealthShare Unified Care Record is a packaged solution - FHIR capabilities are there for this

 |  |

# Summary

FHIR Server | FHIR Client | Transformations to and from FHIR | Business Services | Business Operations

InterSystems IRIS
FHIR Accelerator Service

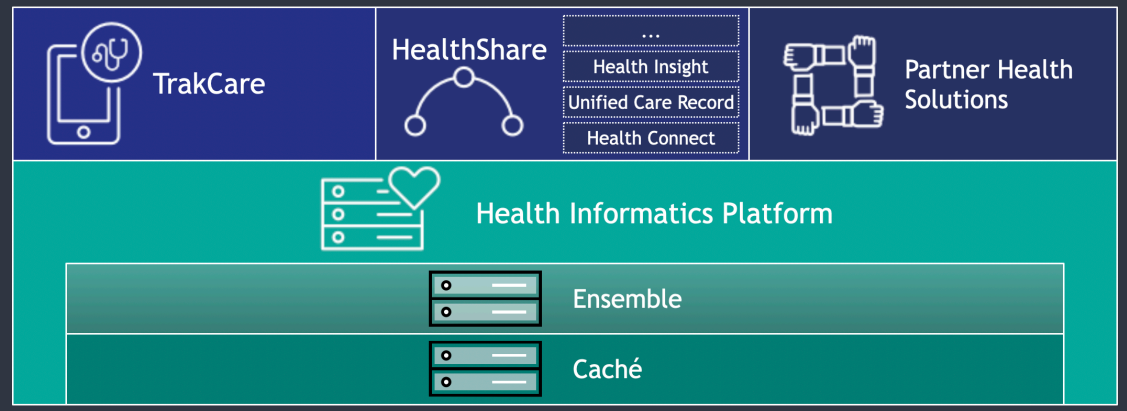
FHIR Server

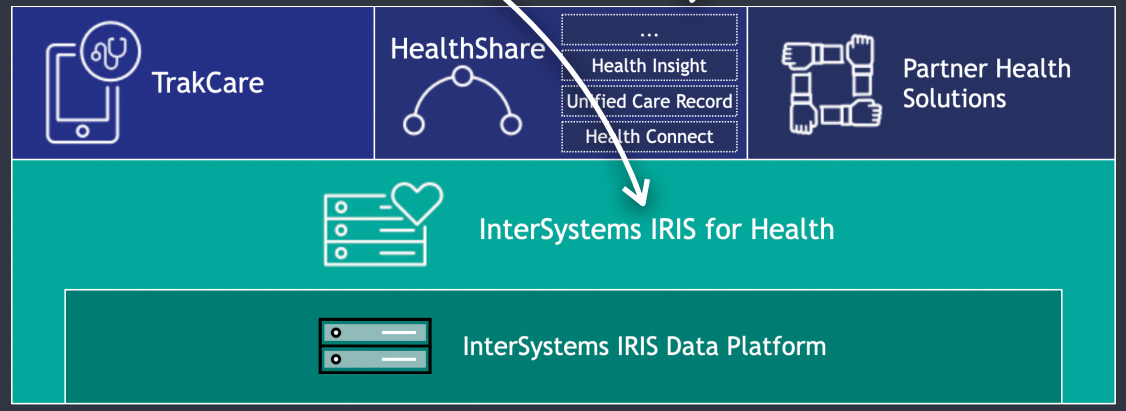
The newest FHIR capabilities are implemented in InterSystems IRIS for Health ...

... and used by the solutions built on top of it

Solution

Platform




Time

In each product, the FHIR capabilities are available for the scope of the product

 |  |

15 min.

# FHIRaaS

## InterSystems IRIS FHIR Accelerator Service

# FHIRaaS - InterSystems IRIS FHIR Accelerator Service

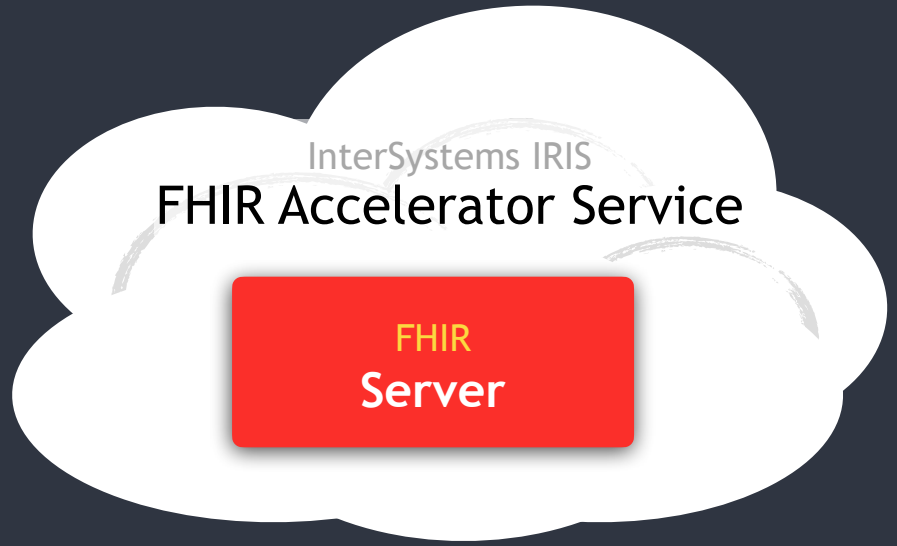

**FHIR server** as a reliable, secure, low maintenance solution that your healthcare application can use to store and retrieve FHIR® data

a turnkey solution: spin up in minutes and leave security, backups and management to InterSystems

Available **initially** in the AWS Cloud

# FHIRaaS - Production and Trial Deployments




**FHIRaaS** is available as
trial and production deployments

the screen captures on the following slides are from a trial deployment

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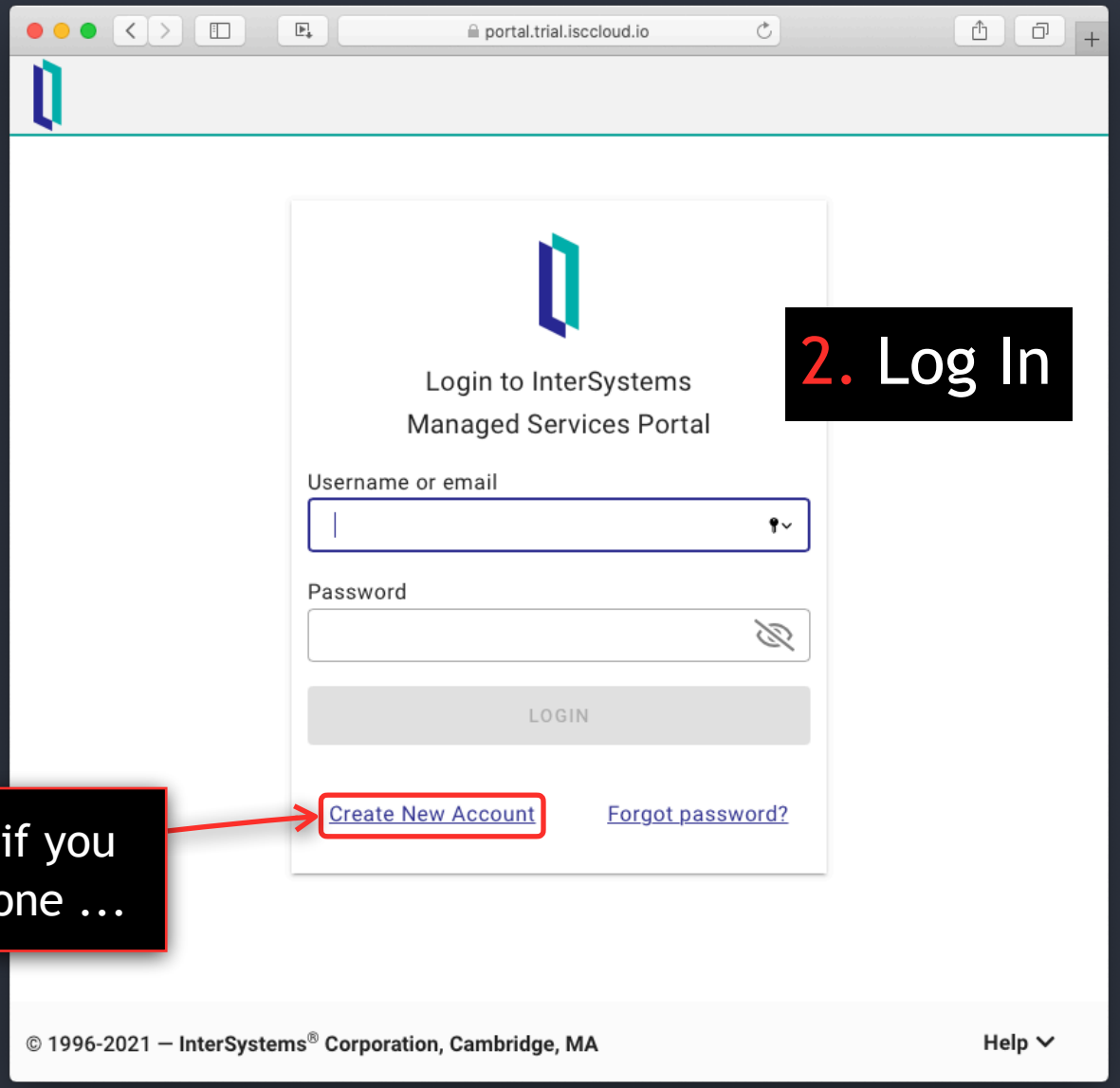
? min.

# Deploying a New Instance
of
# IRIS FHIR Accelerator Service

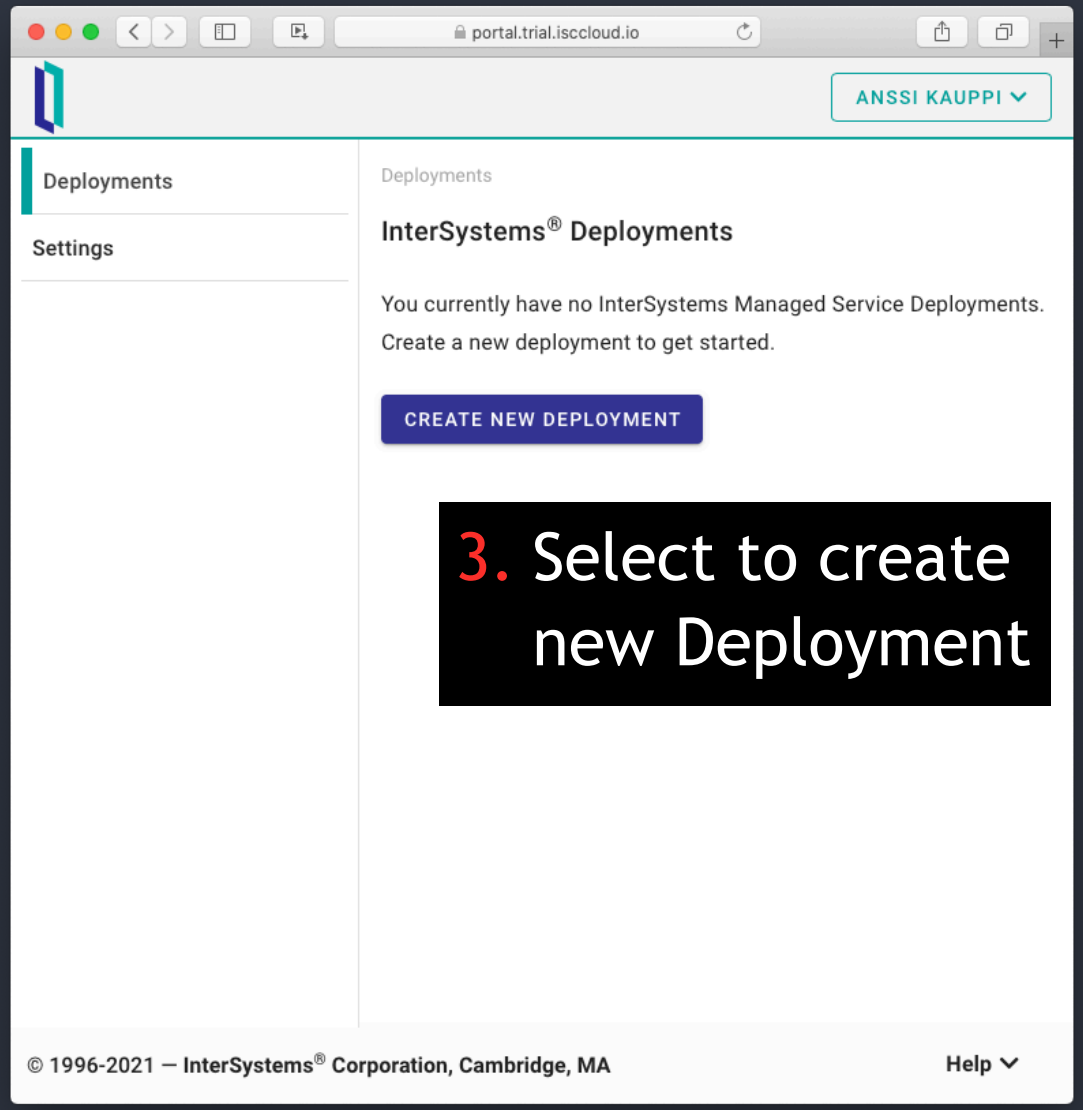
# 1. Go To: https://portal.trial.isccloud.io

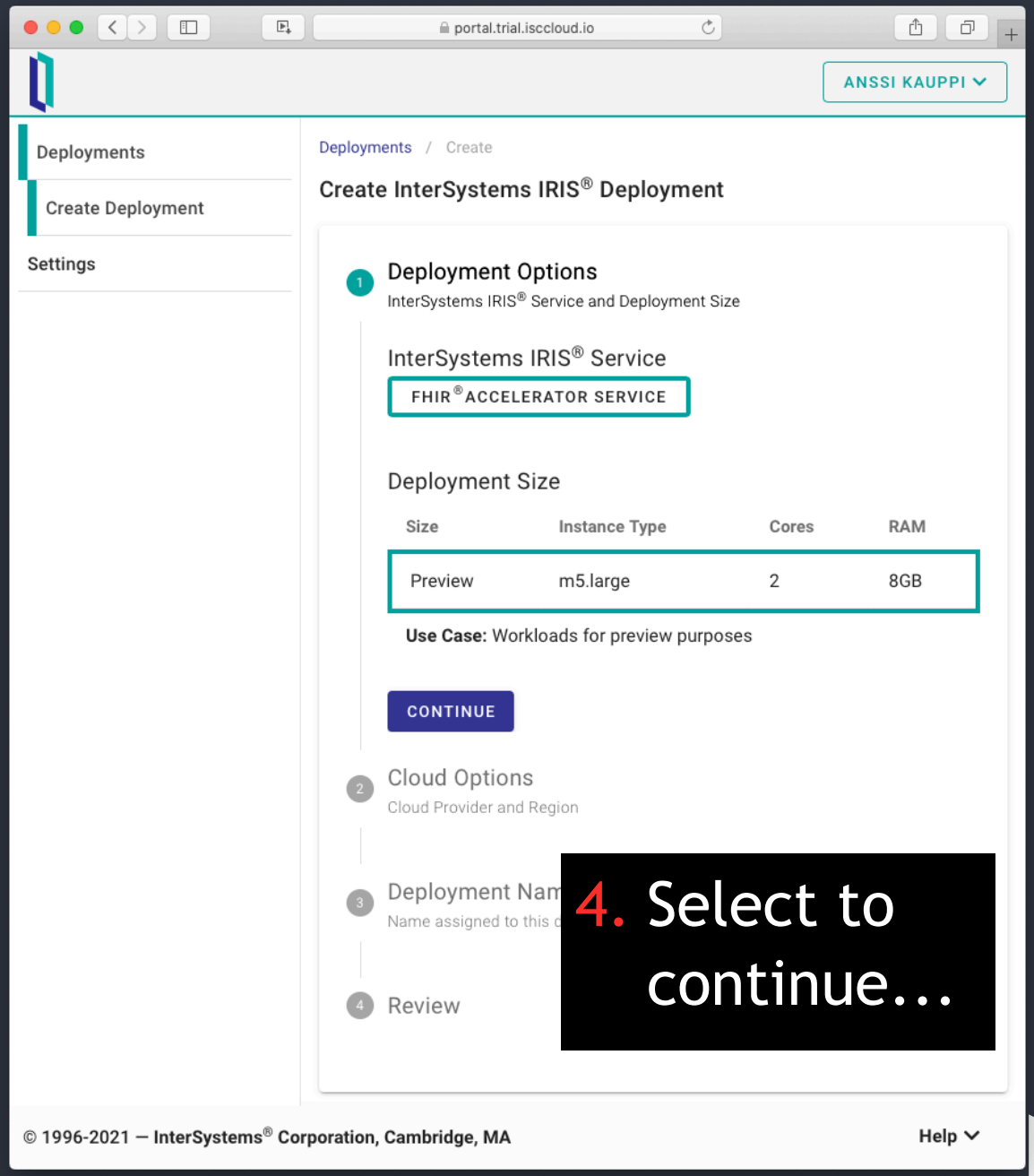



2. Log In

Create an account if you don't already have one ...


portal.trial.isccloud.io
ANSSI KAUPPI
Deployments
Settings
Deployments
InterSystems® Deployments
You currently have no InterSystems Managed Service Deployments.
Create a new deployment to get started.
CREATE NEW DEPLOYMENT
3. Select to create new Deployment
© 1996-2021 — InterSystems® Corporation, Cambridge, MA
Help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Deployments
Create Deployment
Settings
Deployments / Create
Create InterSystems IRIS® Deployment
1 Deployment Options
InterSystems IRIS® Service and Deployment Size
InterSystems IRIS® Service
FHIR® ACCELERATOR SERVICE
Deployment Size
Size
Instance Type
Cores
RAM
Preview
m5.large
2
8GB
Use Case: Workloads for preview purposes
CONTINUE
2 Cloud Options
Cloud Provider and Region
3 Deployment Nam
Name assigned to this
4 Review
4. Select to continue...
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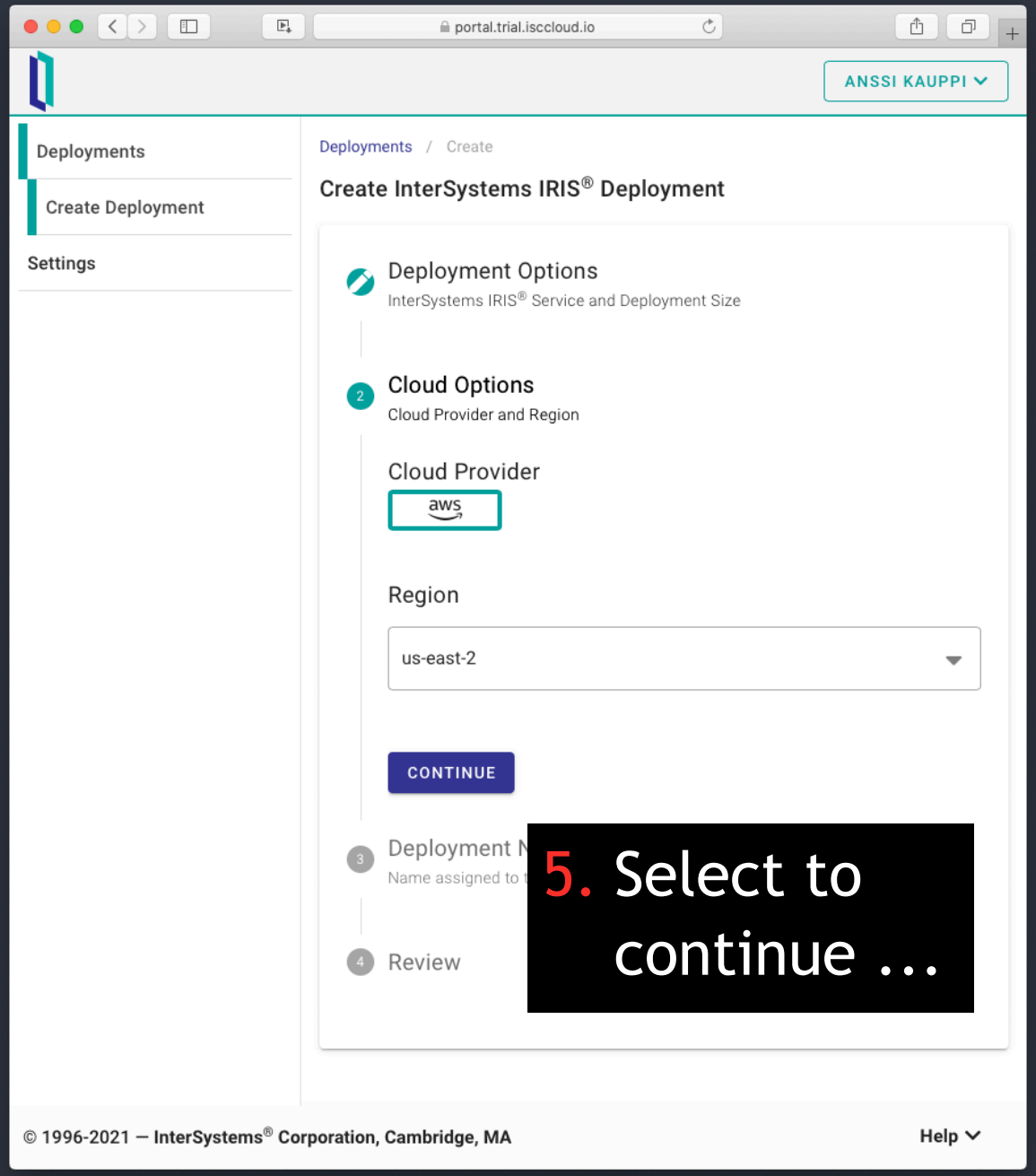
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Deployments
Create Deployment
Settings
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Create InterSystems IRIS® Deployment
Deployment Options
InterSystems IRIS® Service and Deployment Size
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Cloud Options
Cloud Provider and Region
Cloud Provider
aws
Region
us-east-2
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Review
5. Select to continue ...
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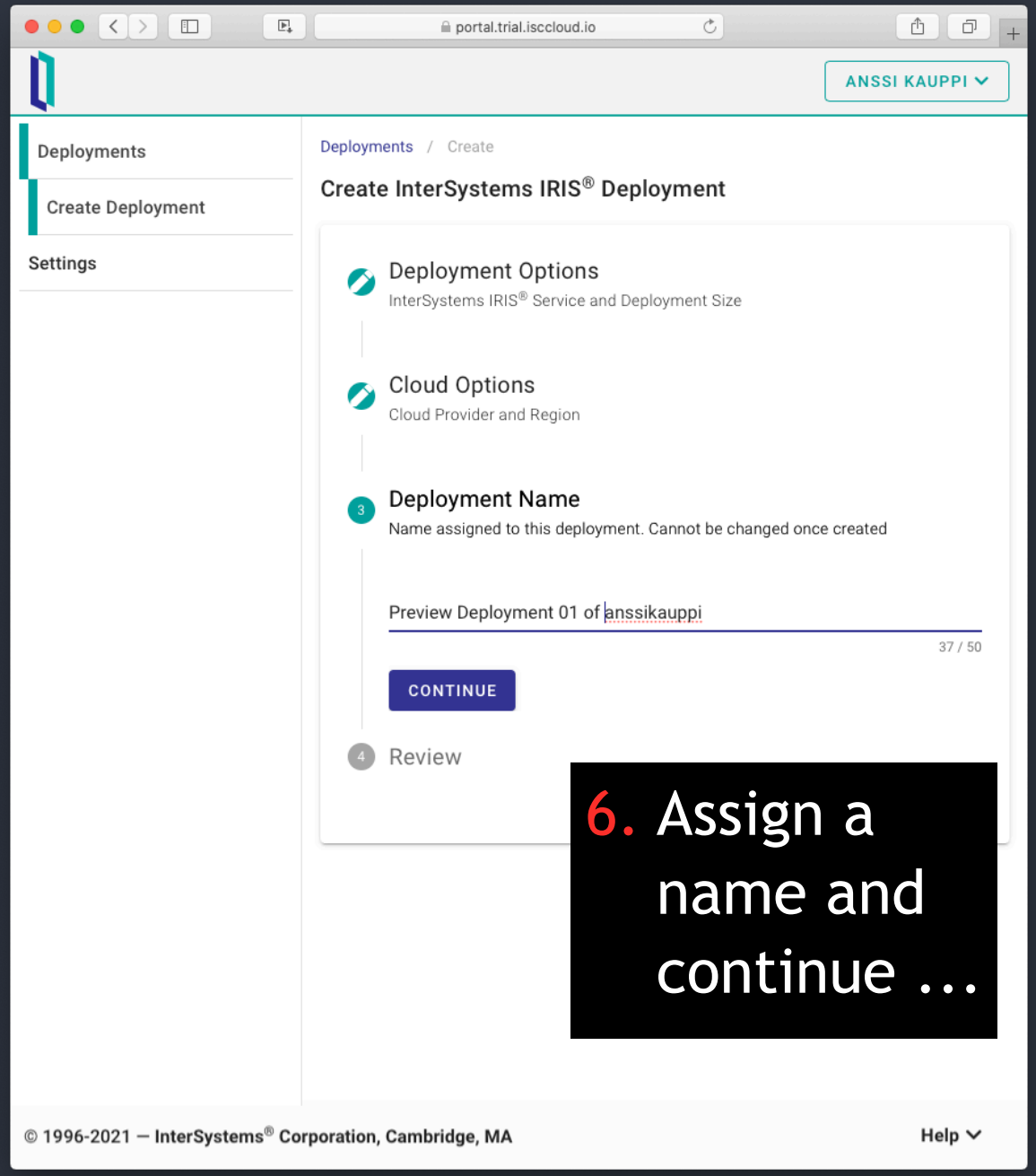
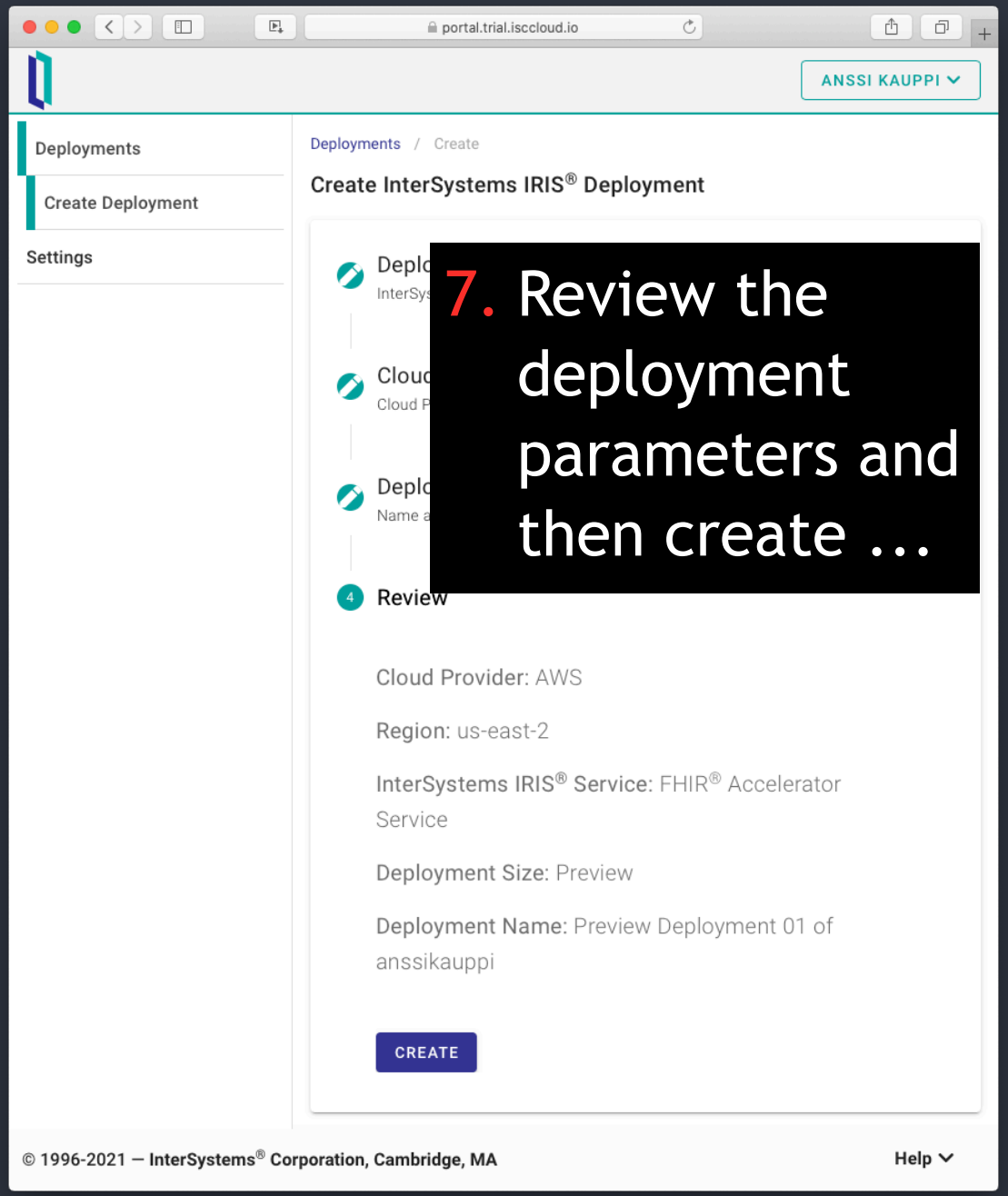
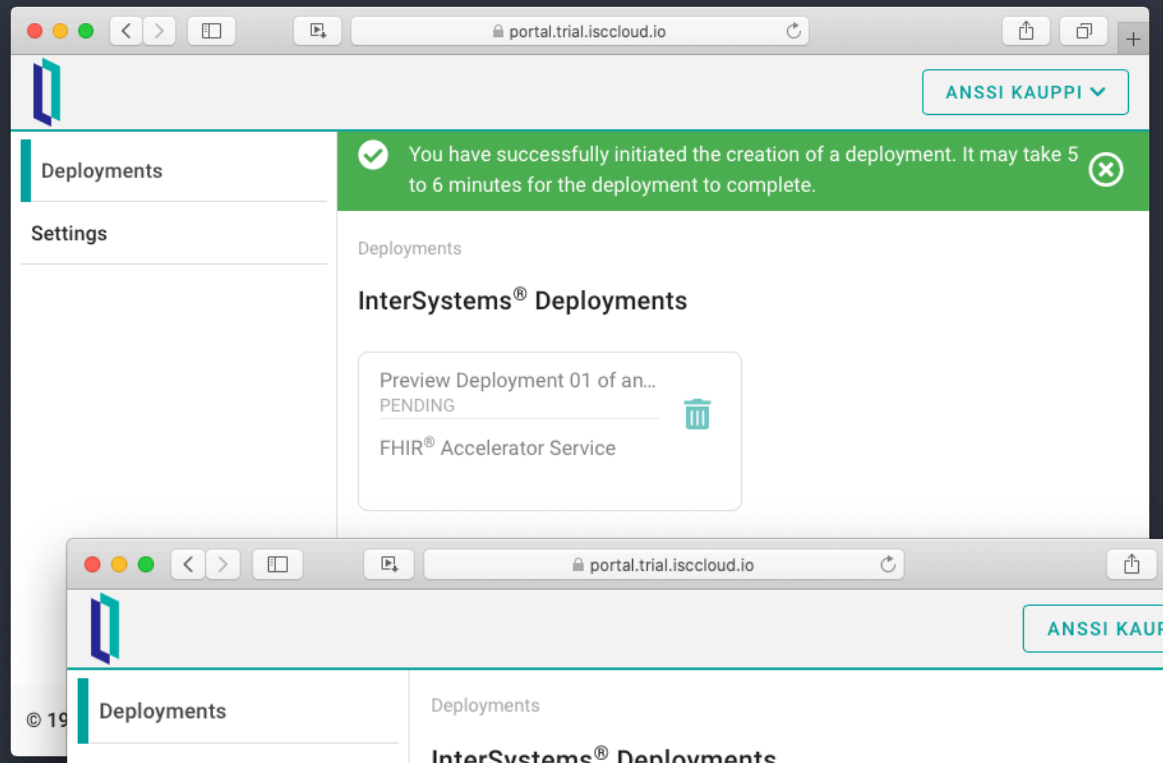
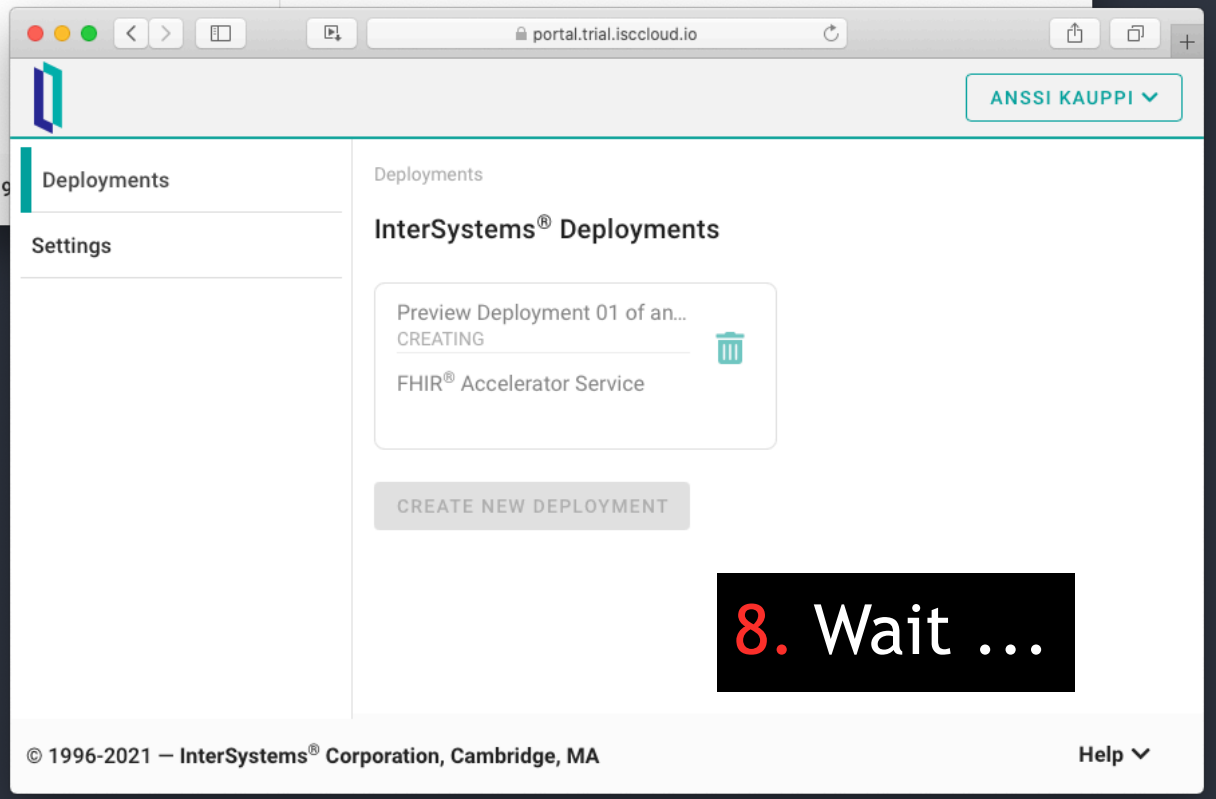

portal.trial.isccloud.io
ANSSI KAUPPI
Deployments
Create Deployment
Settings
Deployments / Create
Create InterSystems IRIS® Deployment
Deployment Options
InterSystems IRIS® Service and Deployment Size
Cloud Options
Cloud Provider and Region
3
Deployment Name
Name assigned to this deployment. Cannot be changed once created
Preview Deployment 01 of anssikauppi
37 / 50
CONTINUE
4
Review
6. Assign a name and continue ...
© 1996-2021 — InterSystems® Corporation, Cambridge, MA
Help



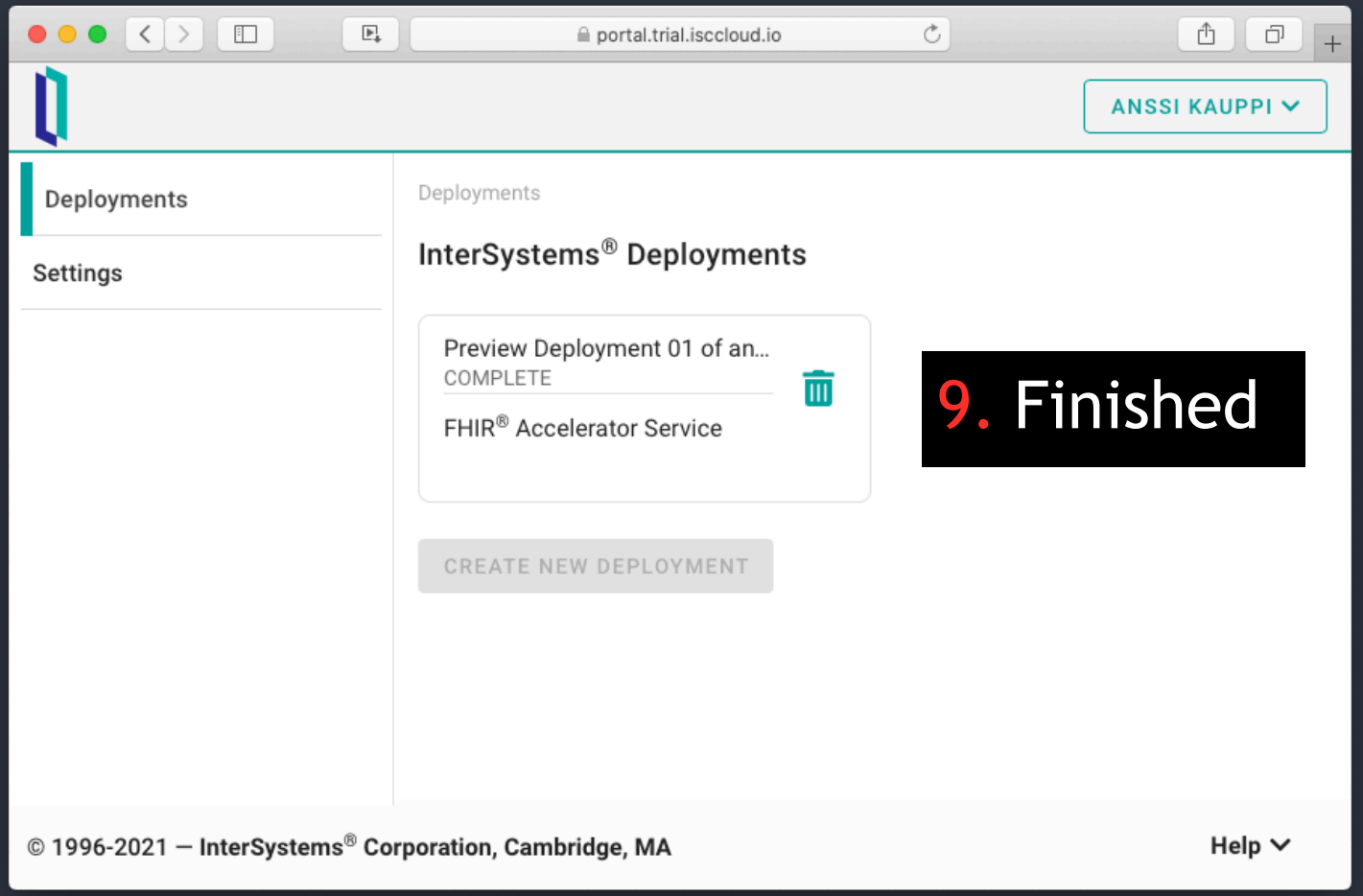

7. Review the deployment parameters and then create ...




8. Wait ...

# Creating a Trial Deployment of FHIRaaS

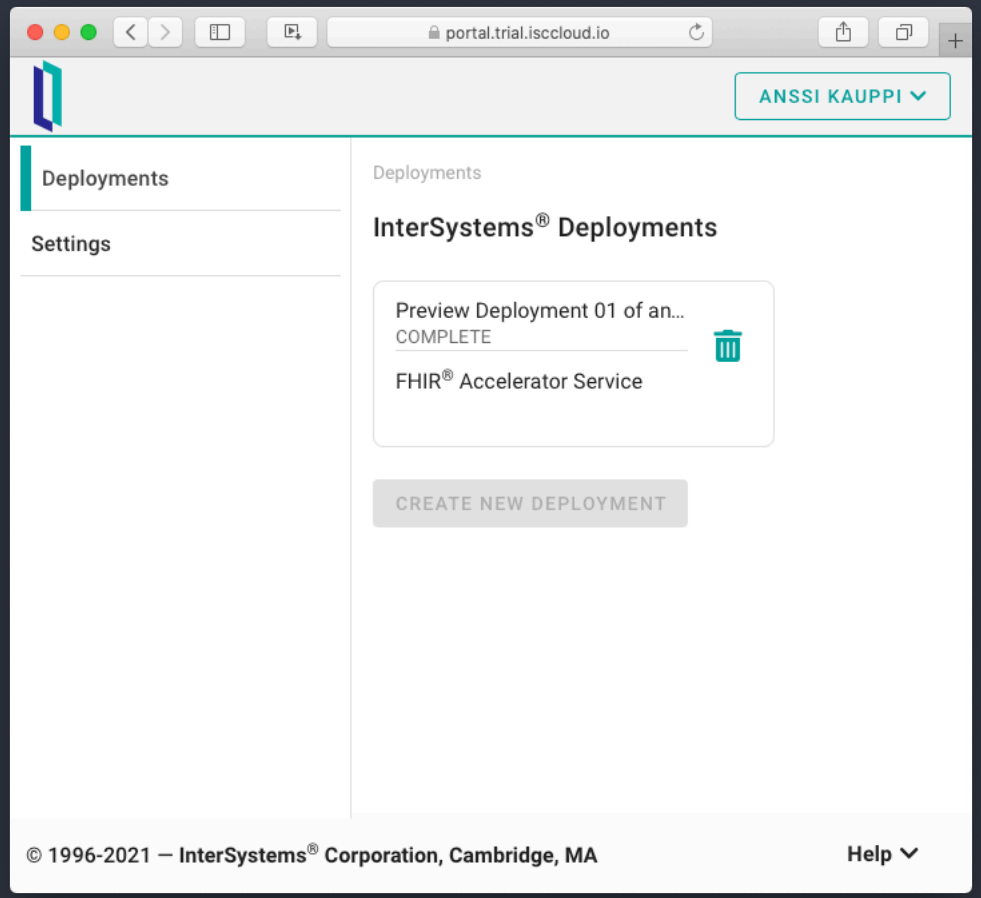


? min.

# Features
of
# IRIS FHIR Accelerator Service

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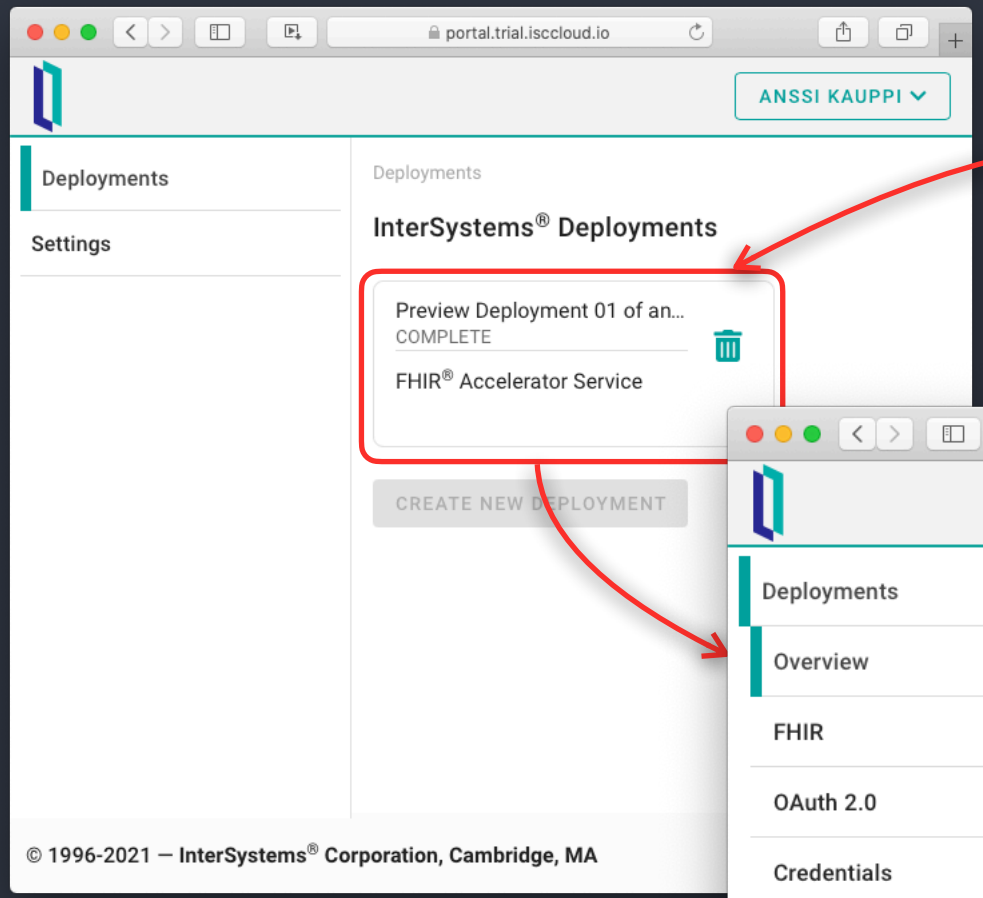
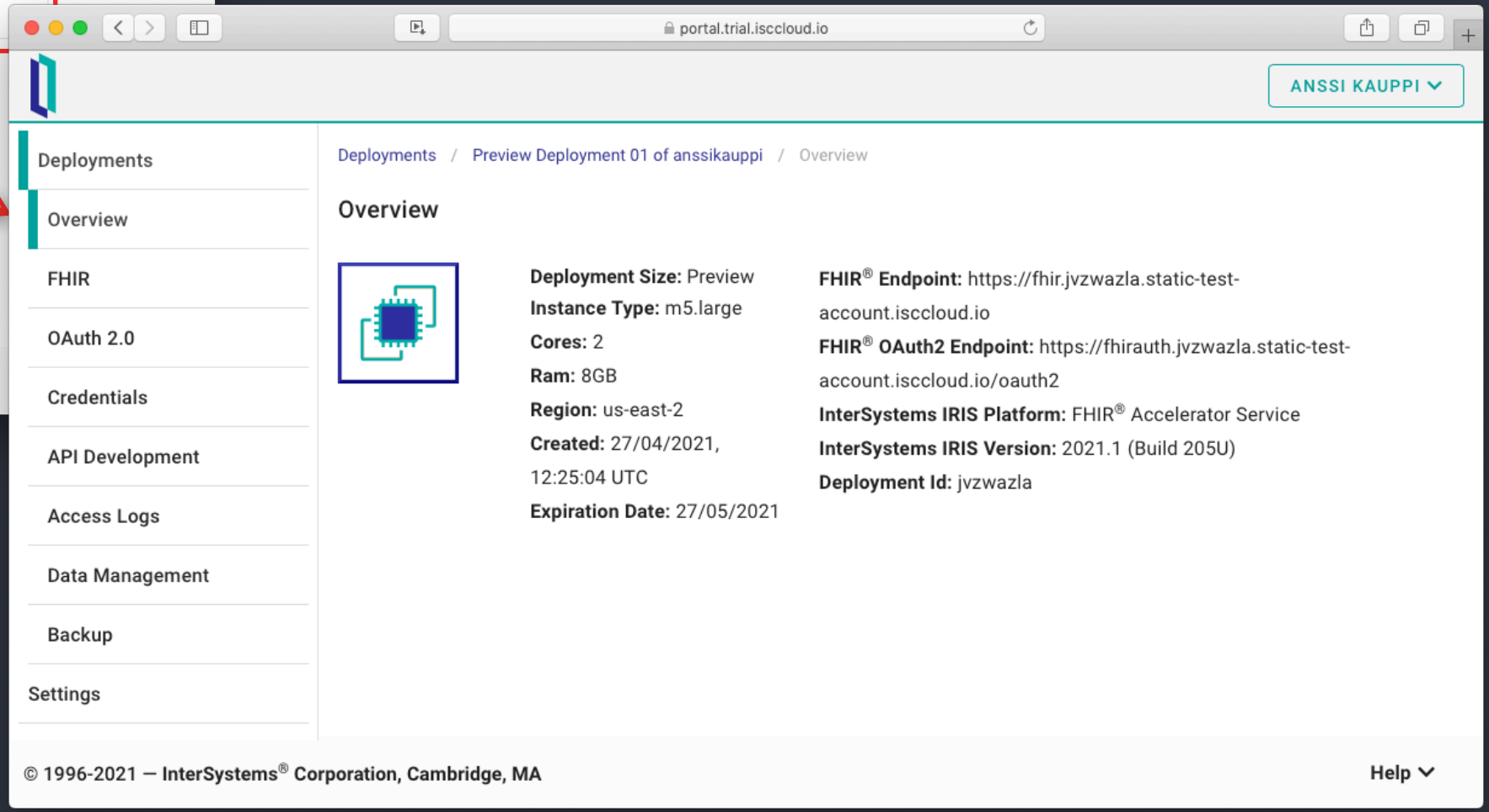
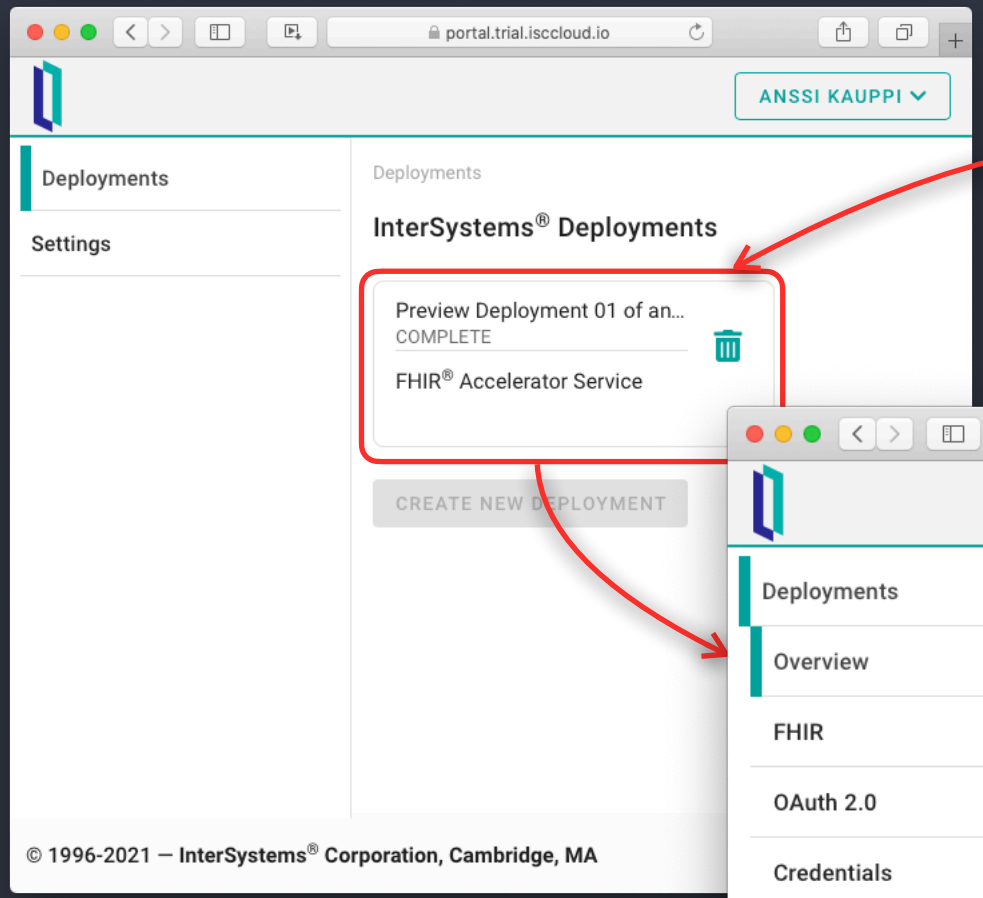


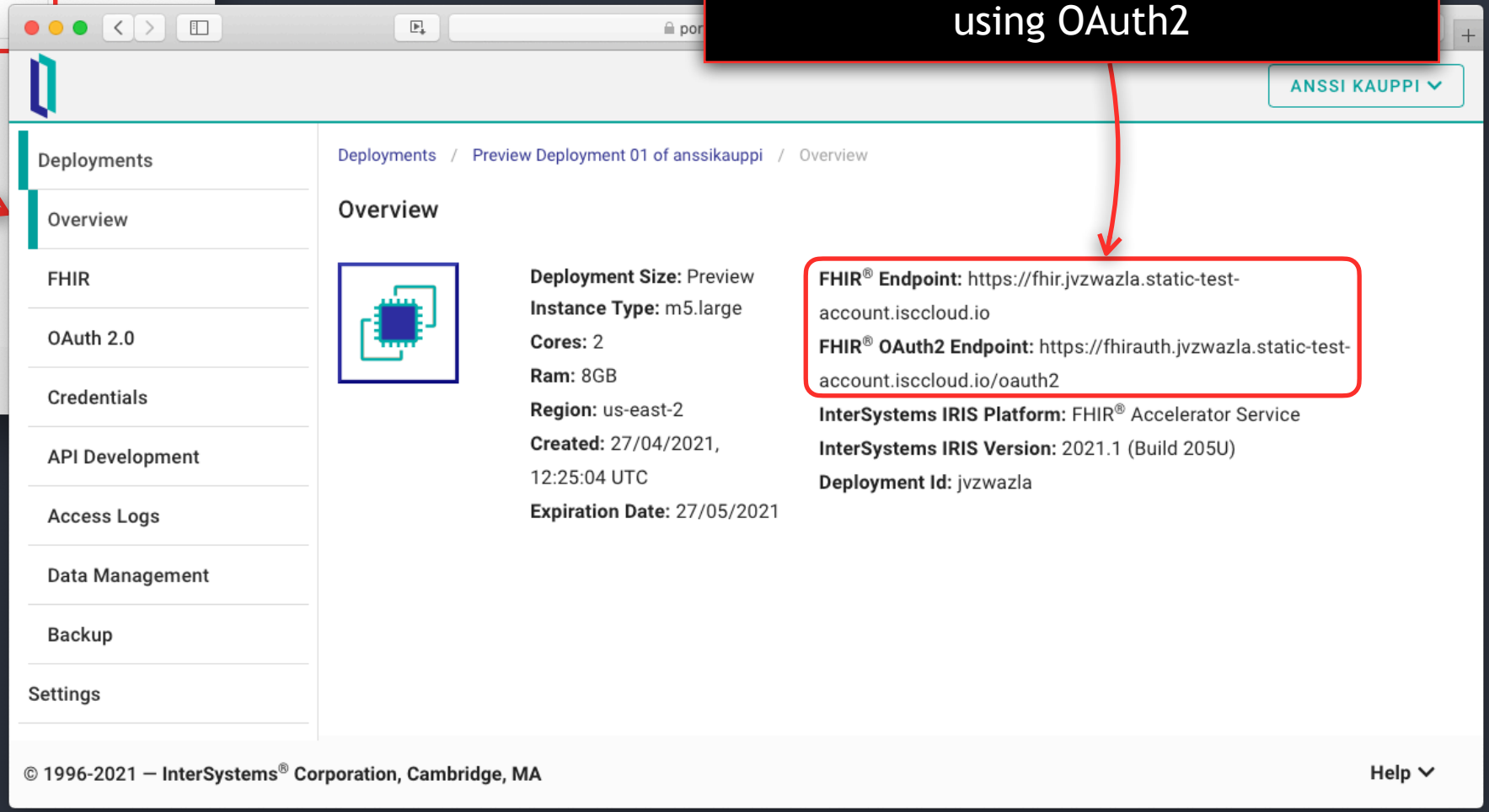

Select the deployment






Select the deployment

Here are the addresses of the end points for invoking FHIR interactions and for authentication/authorisation using OAuth2

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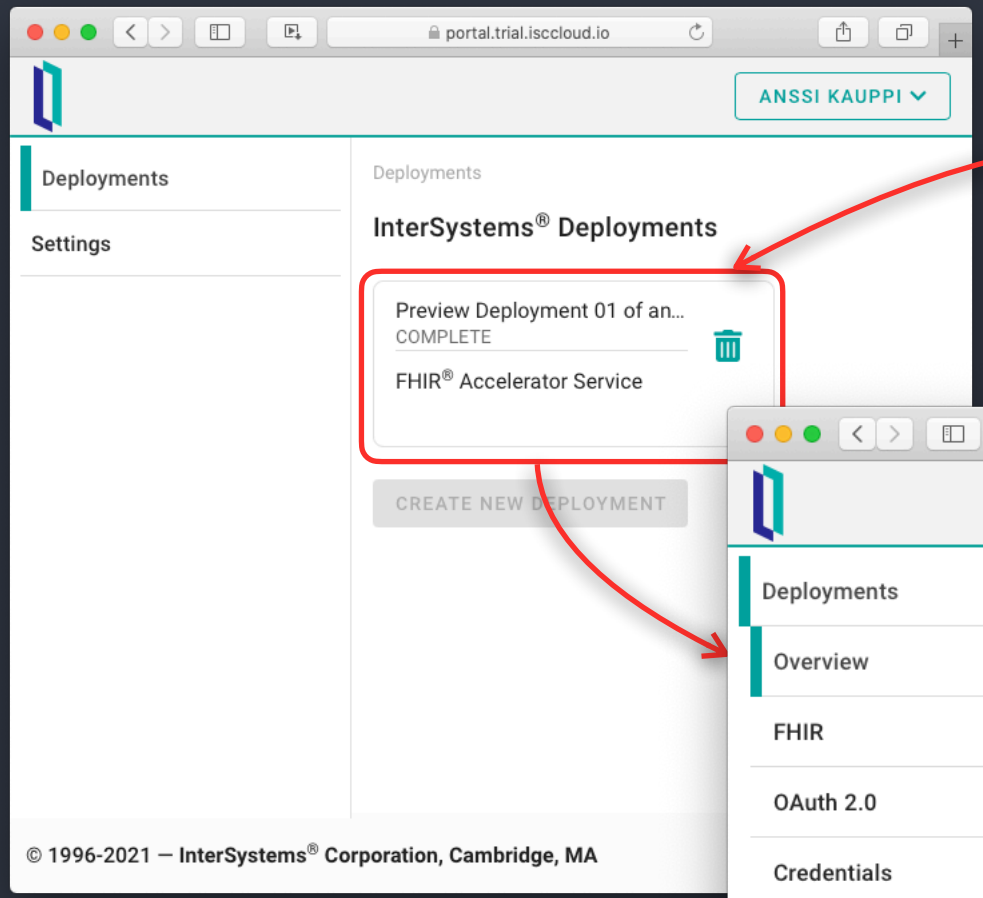


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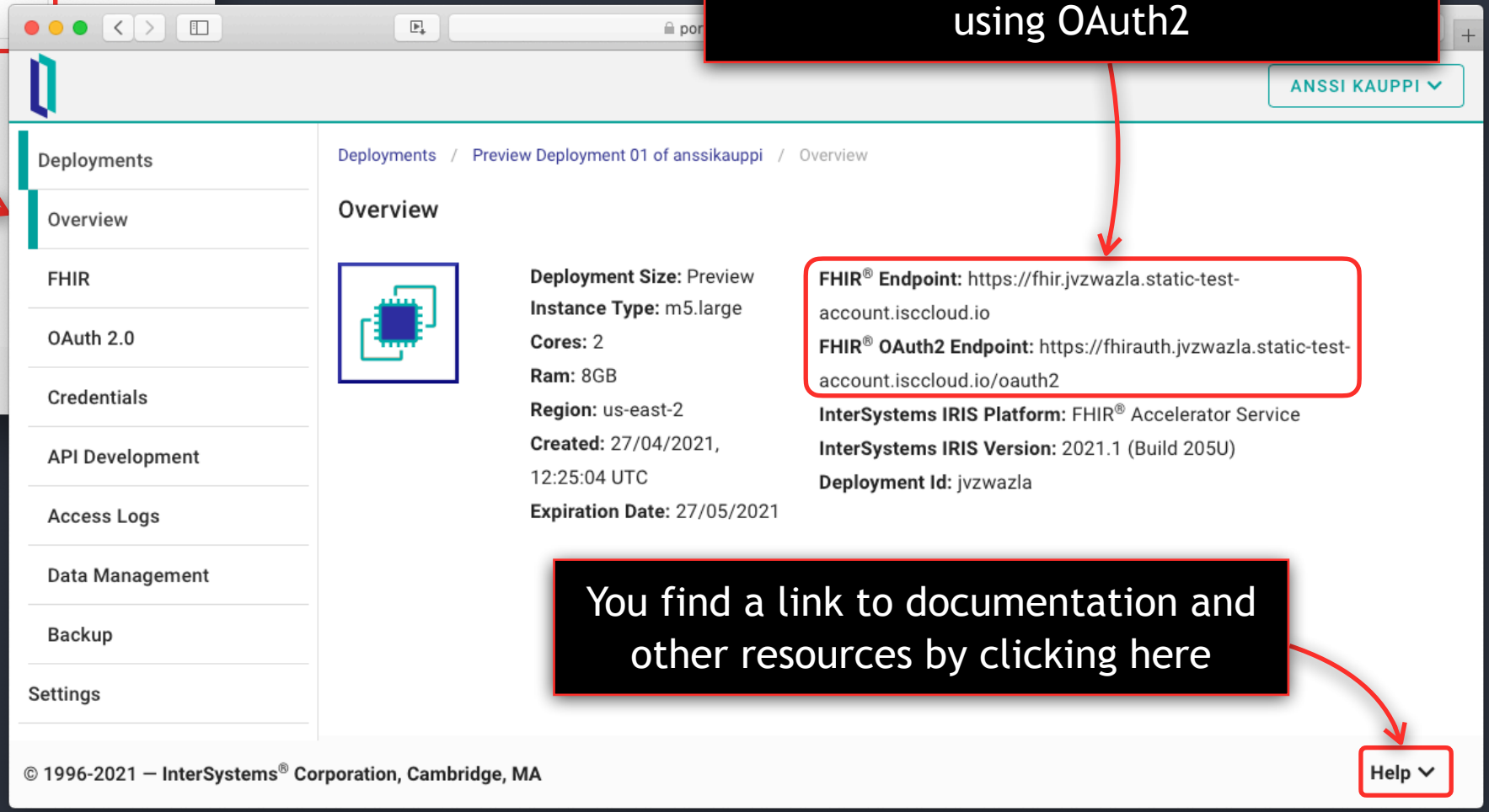
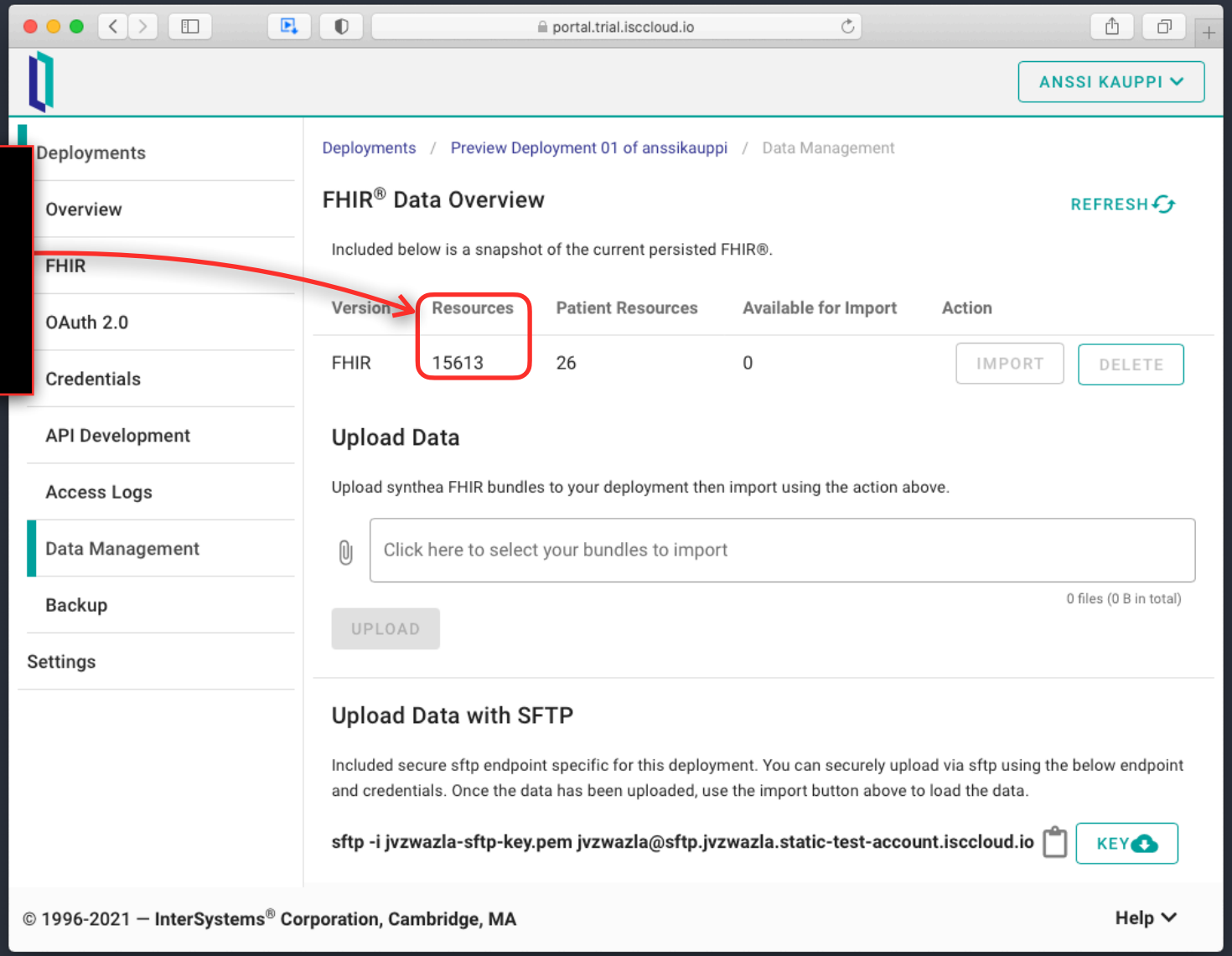



You find a link to documentation and other resources by clicking here

# The Service is Preloaded with Test Data

You have thousands of resources preloaded to start experimenting with

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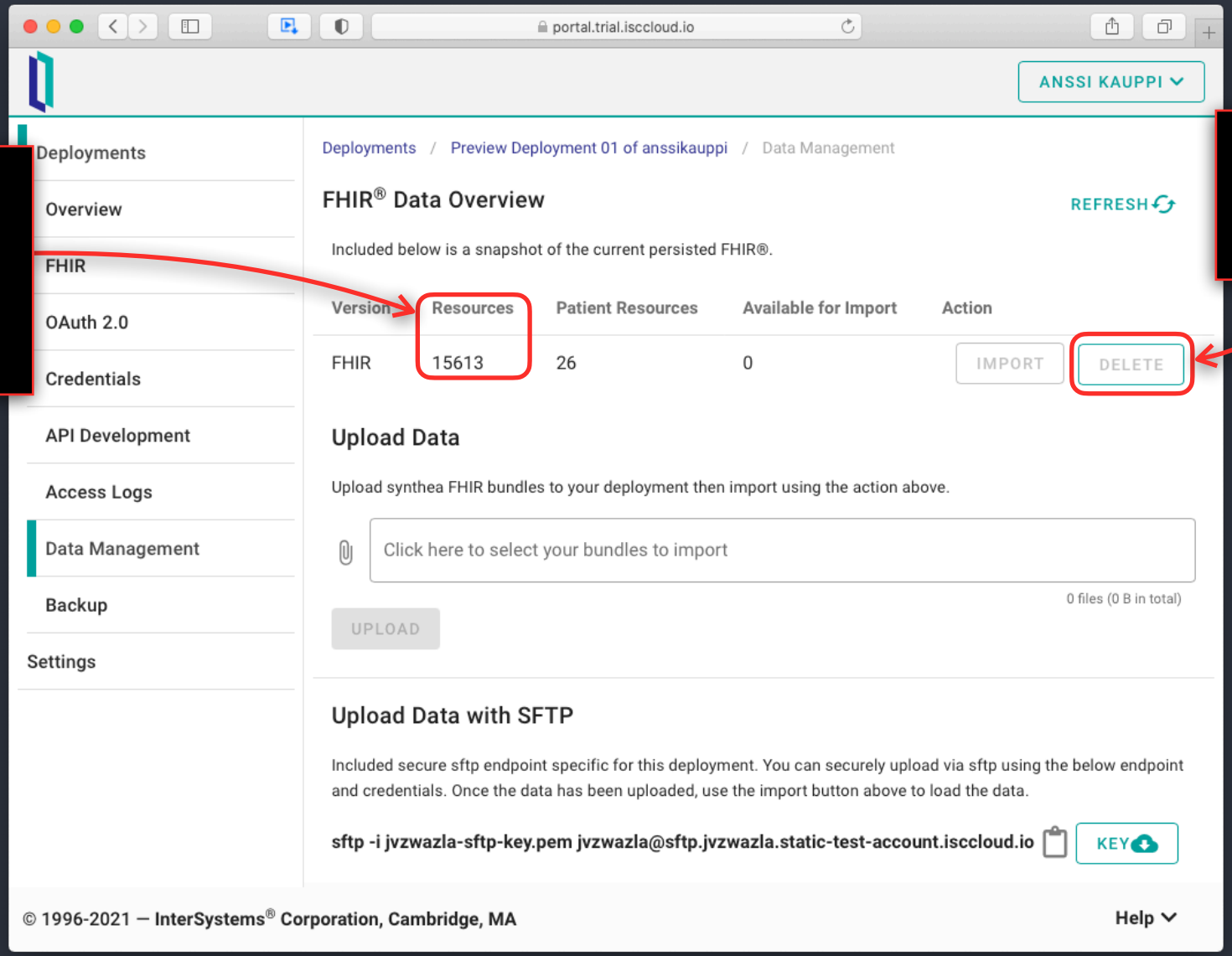


You can delete them all at once if/when you wish

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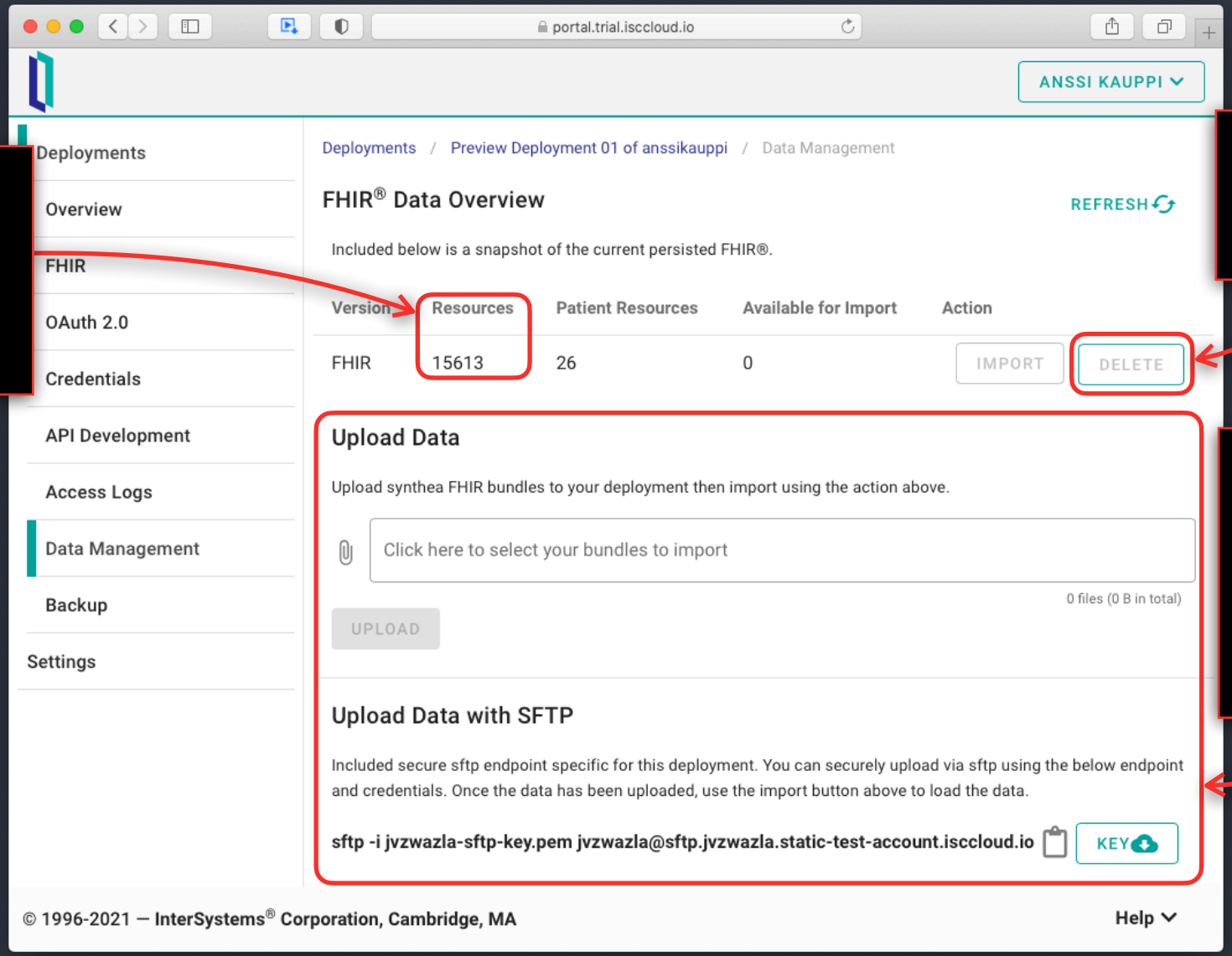


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There are several ways to upload new test data as FHIR bundles using SFTP and FTP

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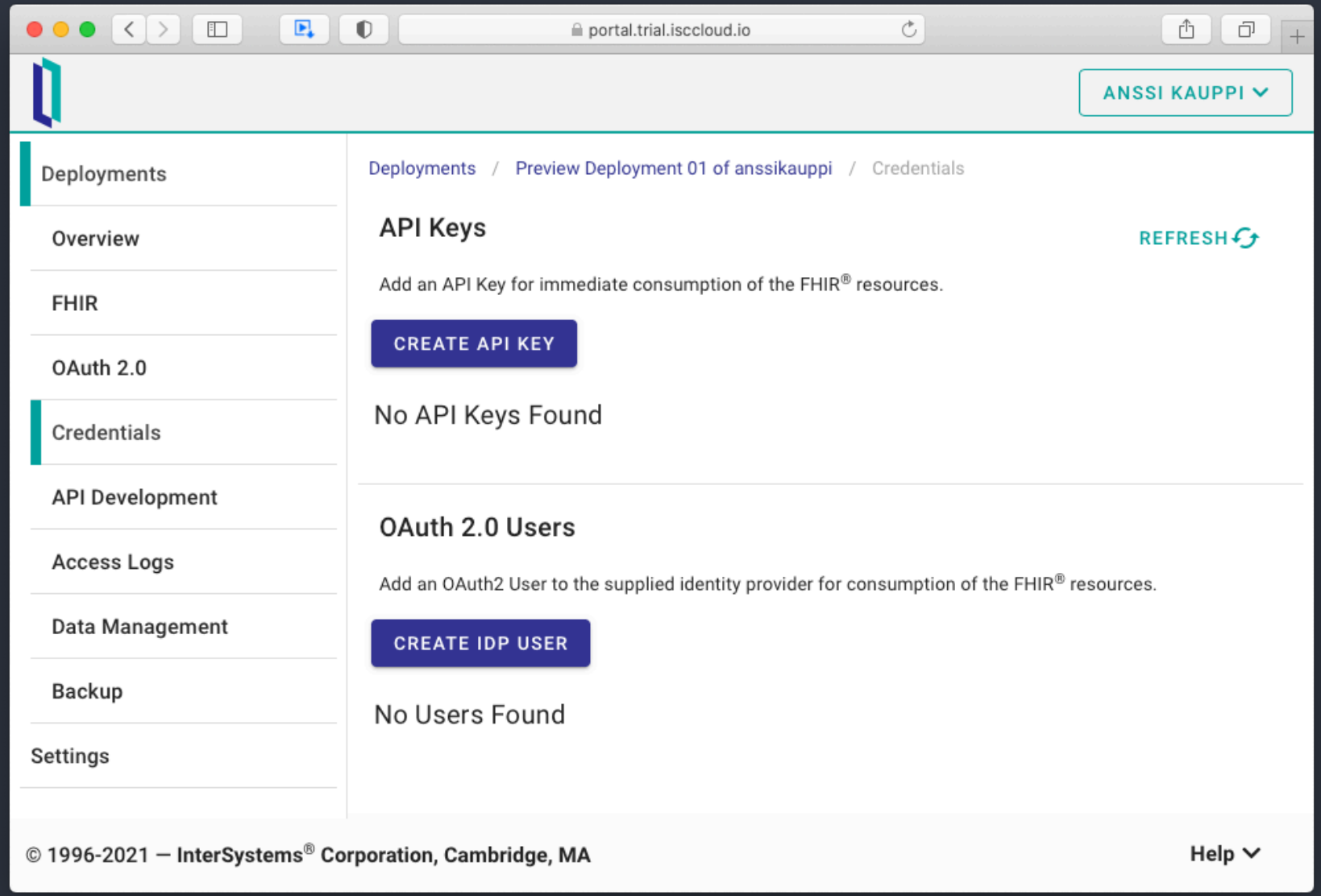
# Access Controls

You need to set up an access control mechanism to govern how users and applications can access the service

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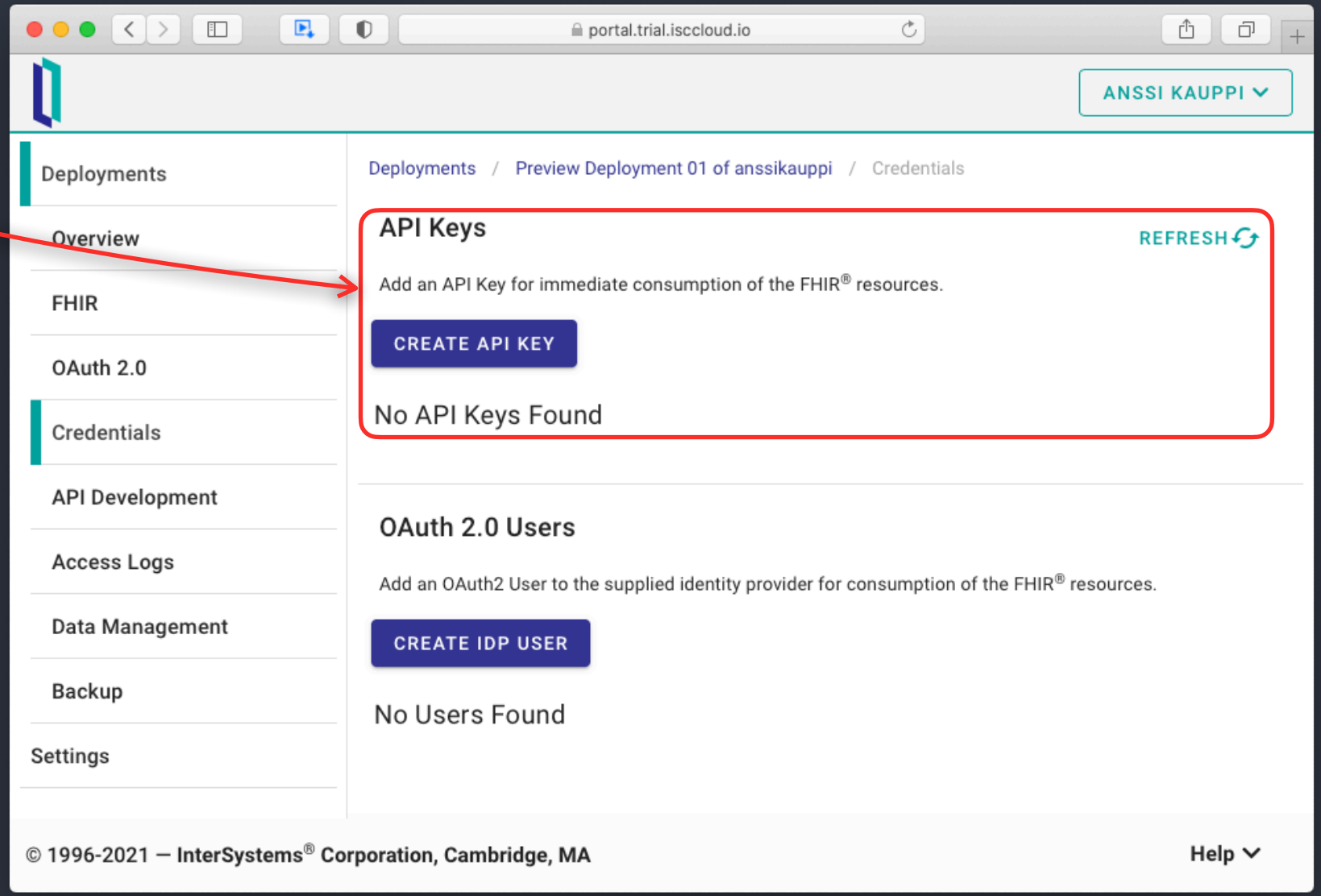
You can use **API keys**: Each user is assigned a unique API key that is sent in the header of the request to allow access to the service.

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# Access Controls

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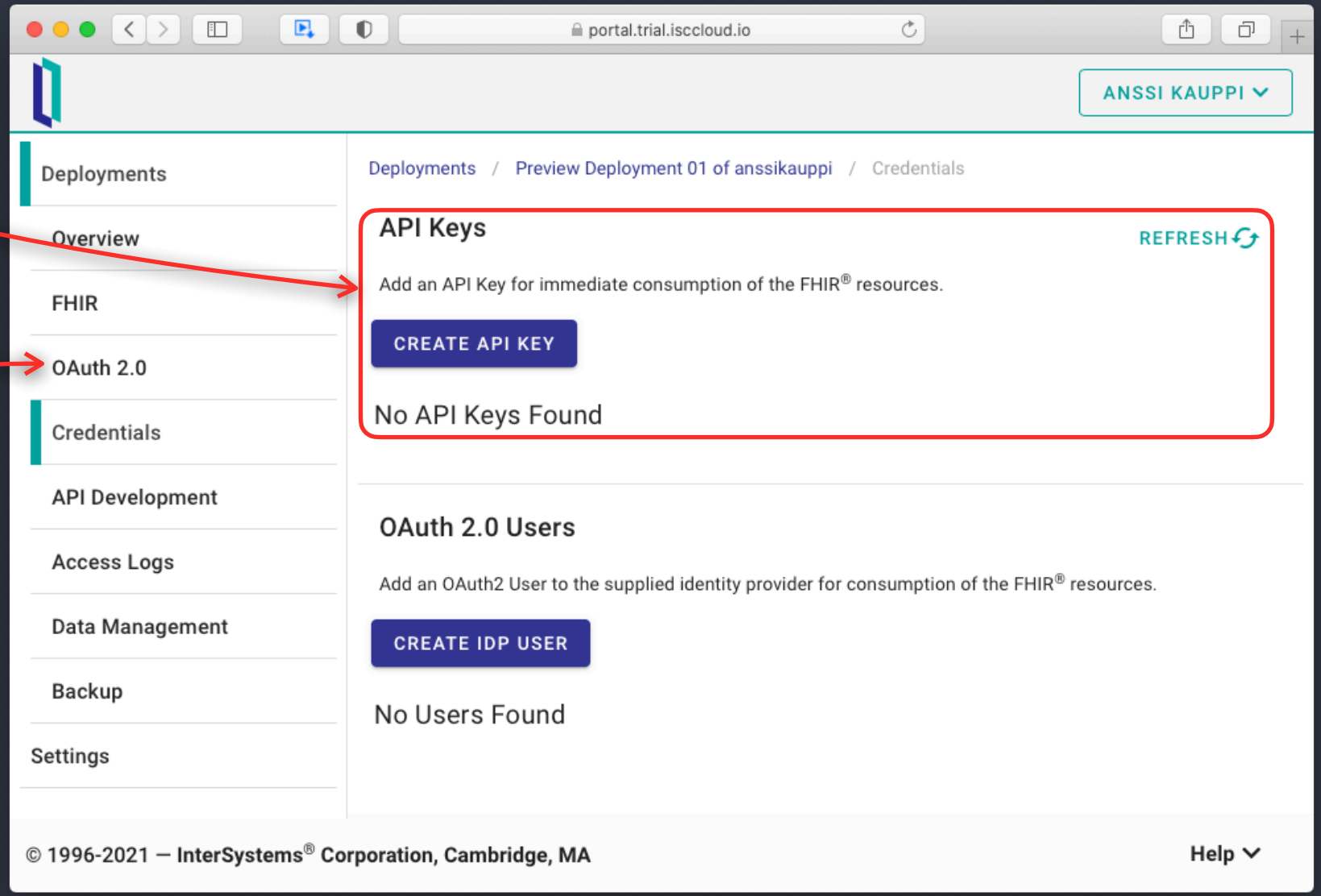
You can use **API keys**: Each user is assigned a unique API key that is sent in the header of the request to allow access to the service.

You can use **OAuth2**: Each user is given a token by an idP that grants access to FHIRaaS, however the access is limited by the scopes associated with the OAuth Strategy

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# Access Controls

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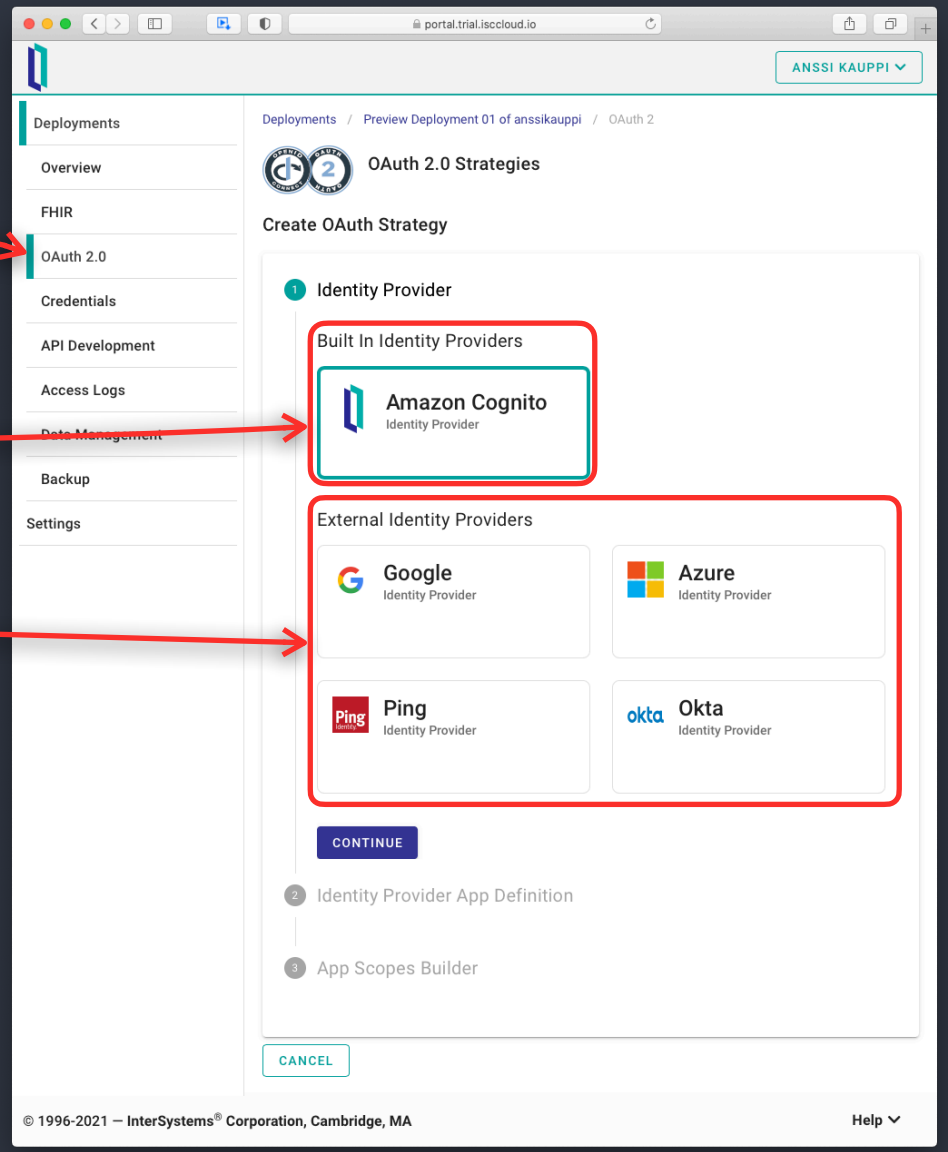
**OAuth**: associate an identity provider (an IdP), which manages users, with a set of scopes, which define the actions a user or application can perform using the service

You can use either the built-in identity provider...

... or an external identity provider (your organization's existing identity provider)

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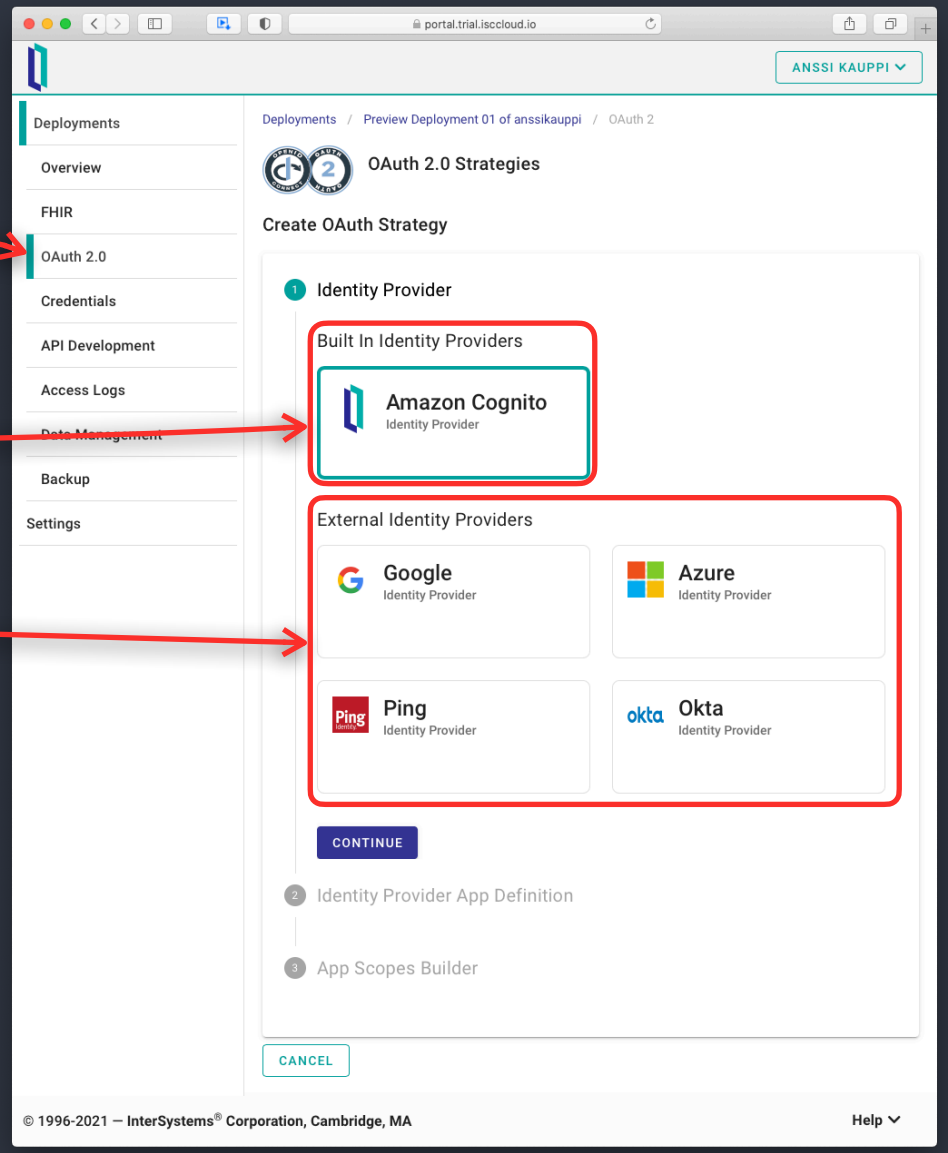
If you are using an external identity provider, it manages users who need access to FHIRaaS

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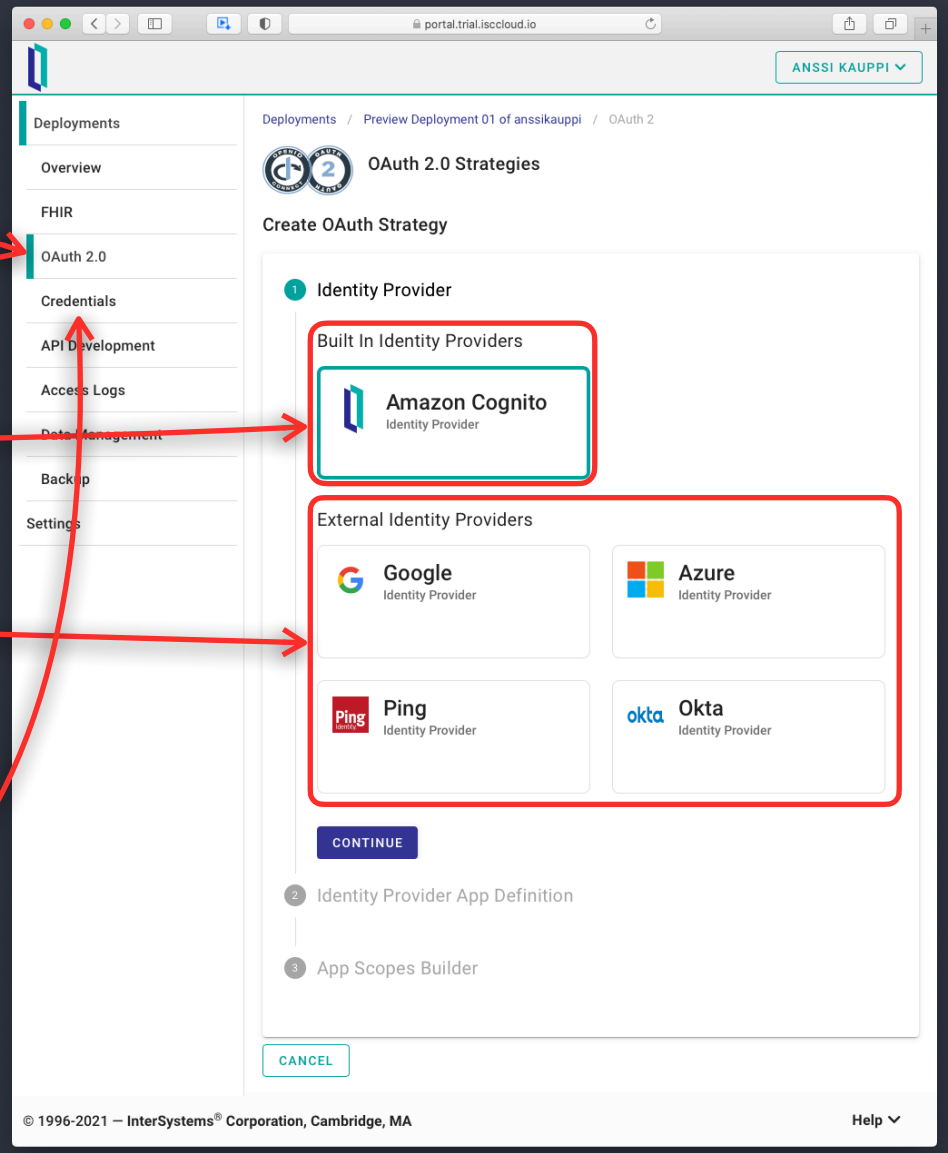
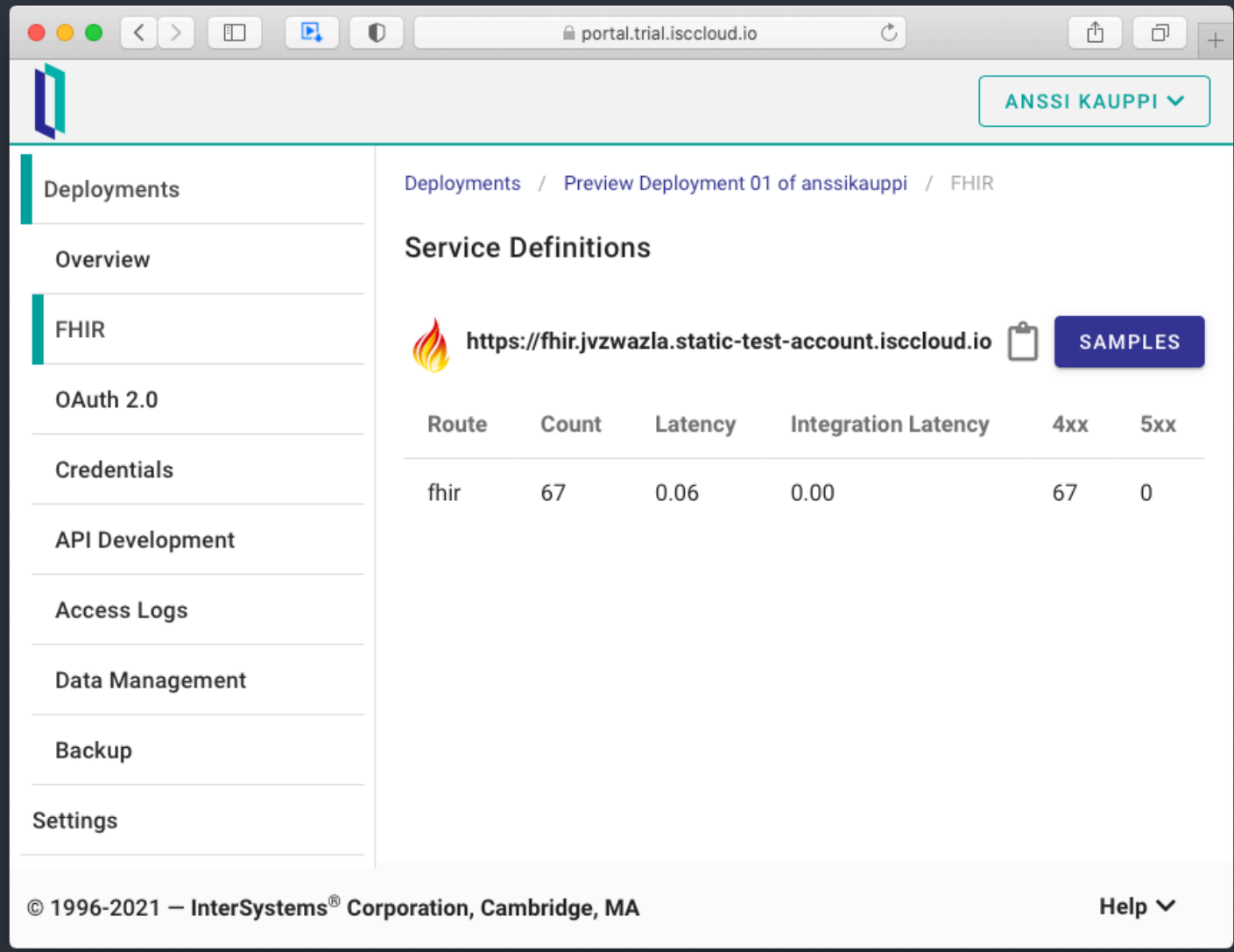
If you are using the built-in identity provider, you must create users



# Start Using the Server through the FHIR RESTful API

Once you have set up an access control mechanism you are all set to use the FHIR service through its RESTful API as described by HL7 (https://www.hl7.org/fhir/http.html)

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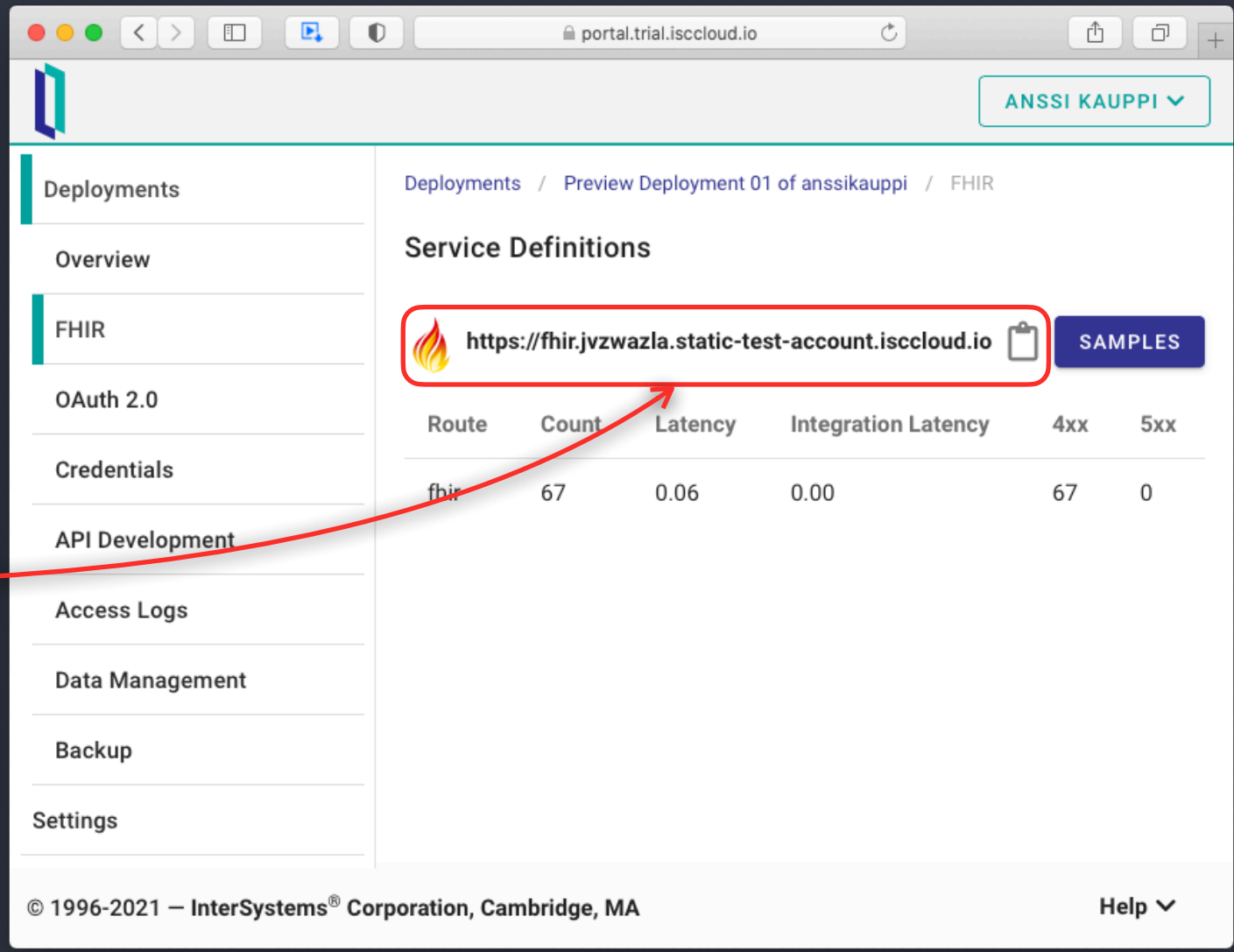
# Start Using the Server through the FHIR RESTful API

Once you have set up an access control mechanism you are all set to use the FHIR service through its RESTful API as described by HL7 (https://www.hl7.org/fhir/http.html)

You can copy the service base URL here ...

... then use curl, ARC, Postman, ..., or your application(s) to invoke FHIR interactions

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# Demo

Check before you start:

- You have an Internet connection
- You have ARC installed
- You have a FHIRaaS service deployed
- You do not have any patients with any of the criteria:
  identifier=010101-123N&given=Pentti

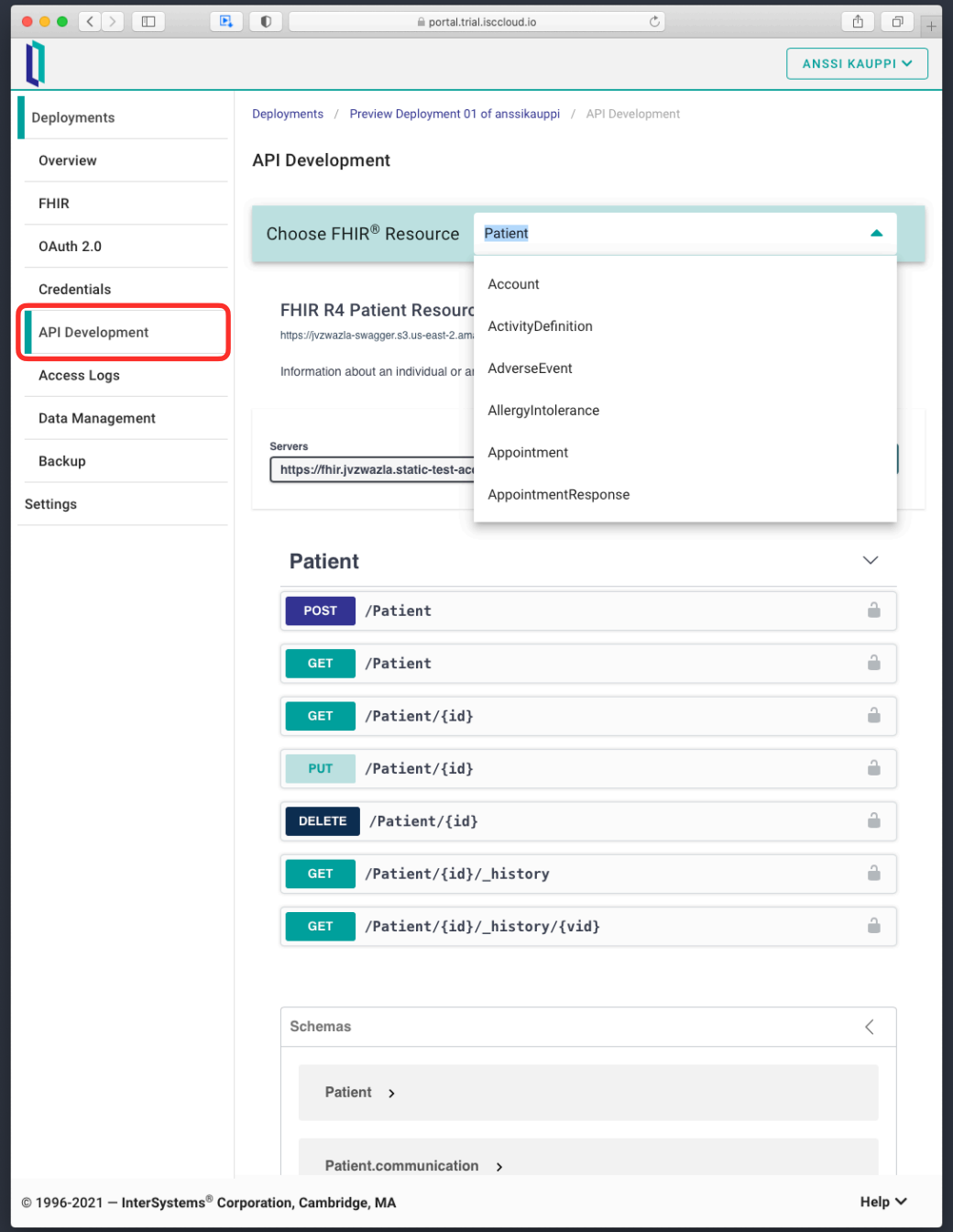
Demo:

1. Show FHIRaaS and copy base URL
2. Using ARC Search all patients - note count resources returned
3. Create a new patient resource, use localised (extended) example from https://simplifier.net/FinnishAppointment instead of a standard one from https://www.hl7.org/fhir
4. Using ARC Search all patients - note count resources returned
5. Search by SSN
6. Show API Development of FHIRaaS: search using name (Pentti Potilas) and language (FI)
7. Show API Development of FHIRaaS: delete the resource

# Developer Portal ...

The Developer Portal is a great way to familiarise yourself with FHIR resources and make basic API requests that store and retrieve these resources from FHIRaaS

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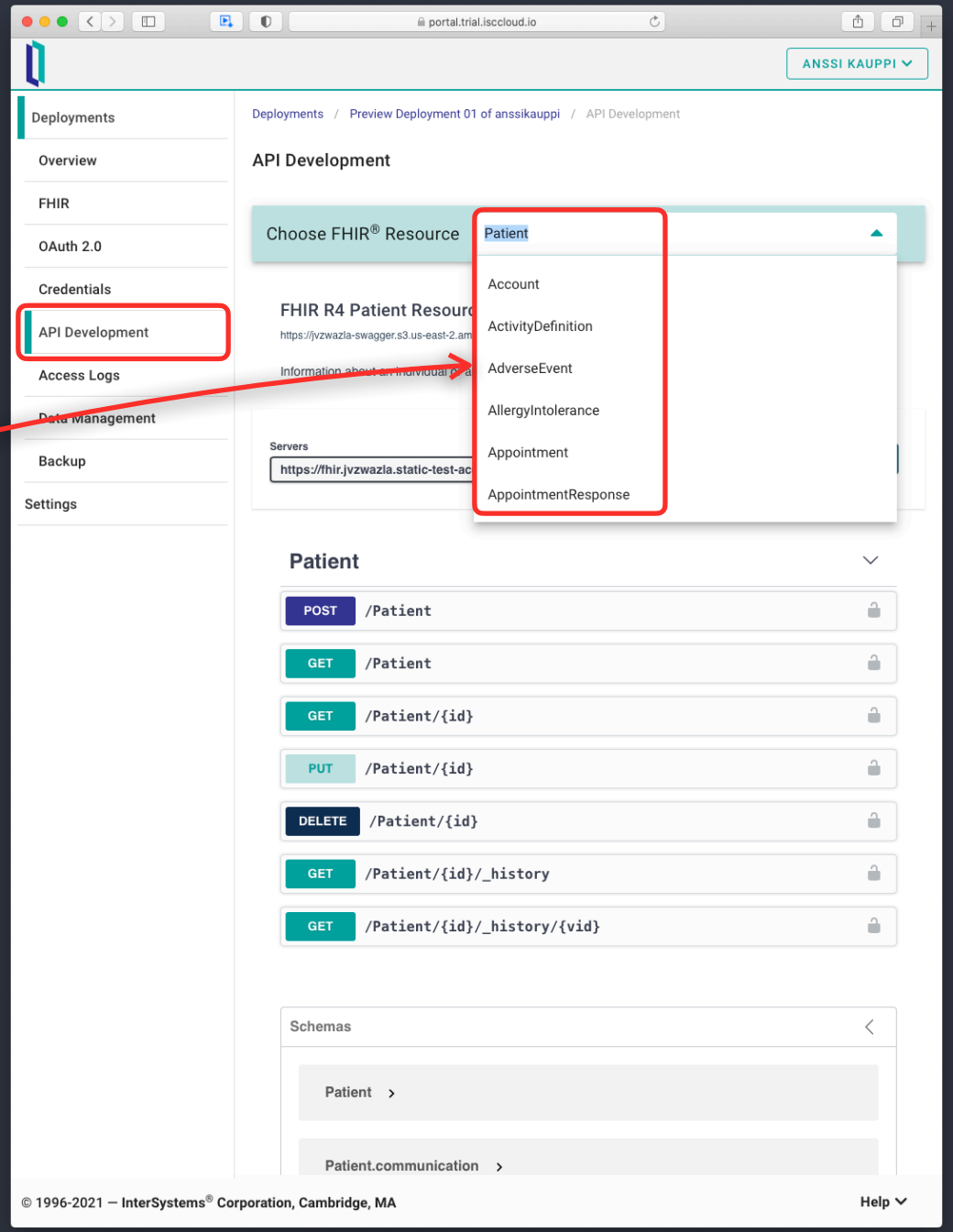


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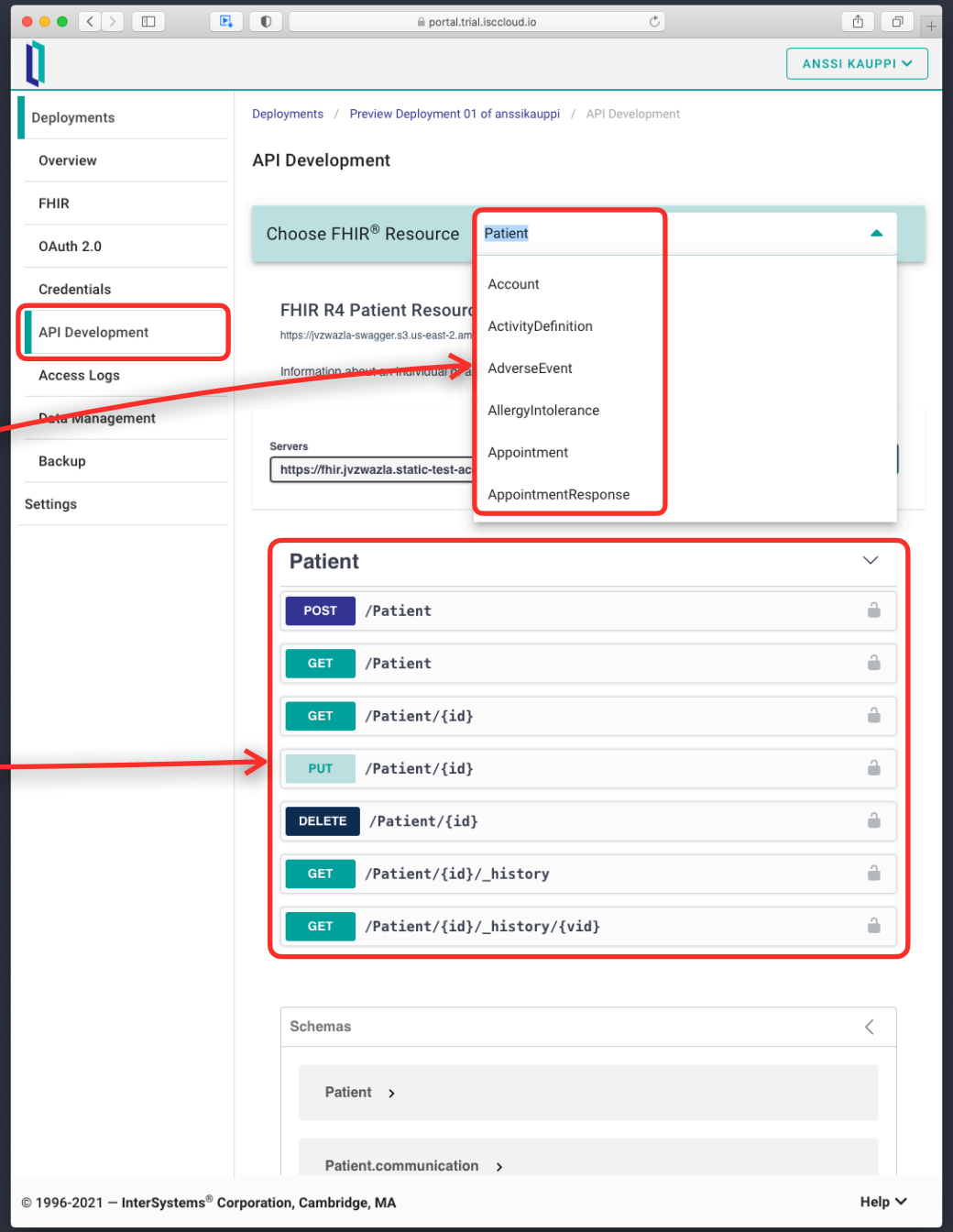


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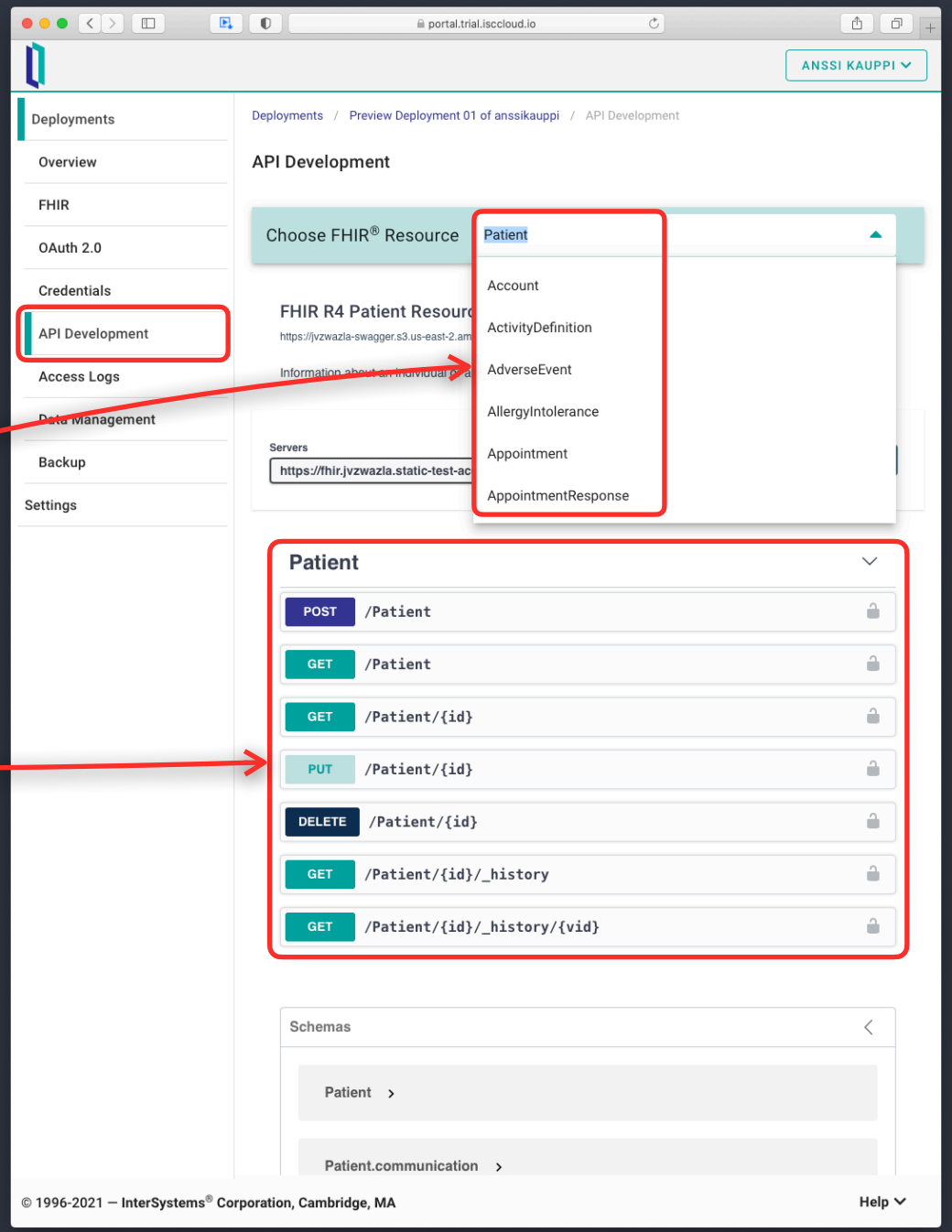
The Developer Portal is a great way to familiarise yourself with FHIR resources and make basic API requests that store and retrieve these resources from FHIRaaS

Select the type of resource you want to work with ...

... then select an interaction ...

then fill in the fields for each URL parameter / portion of URL in the form opened (not shown in the pic.) ...

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# Developer Portal ...

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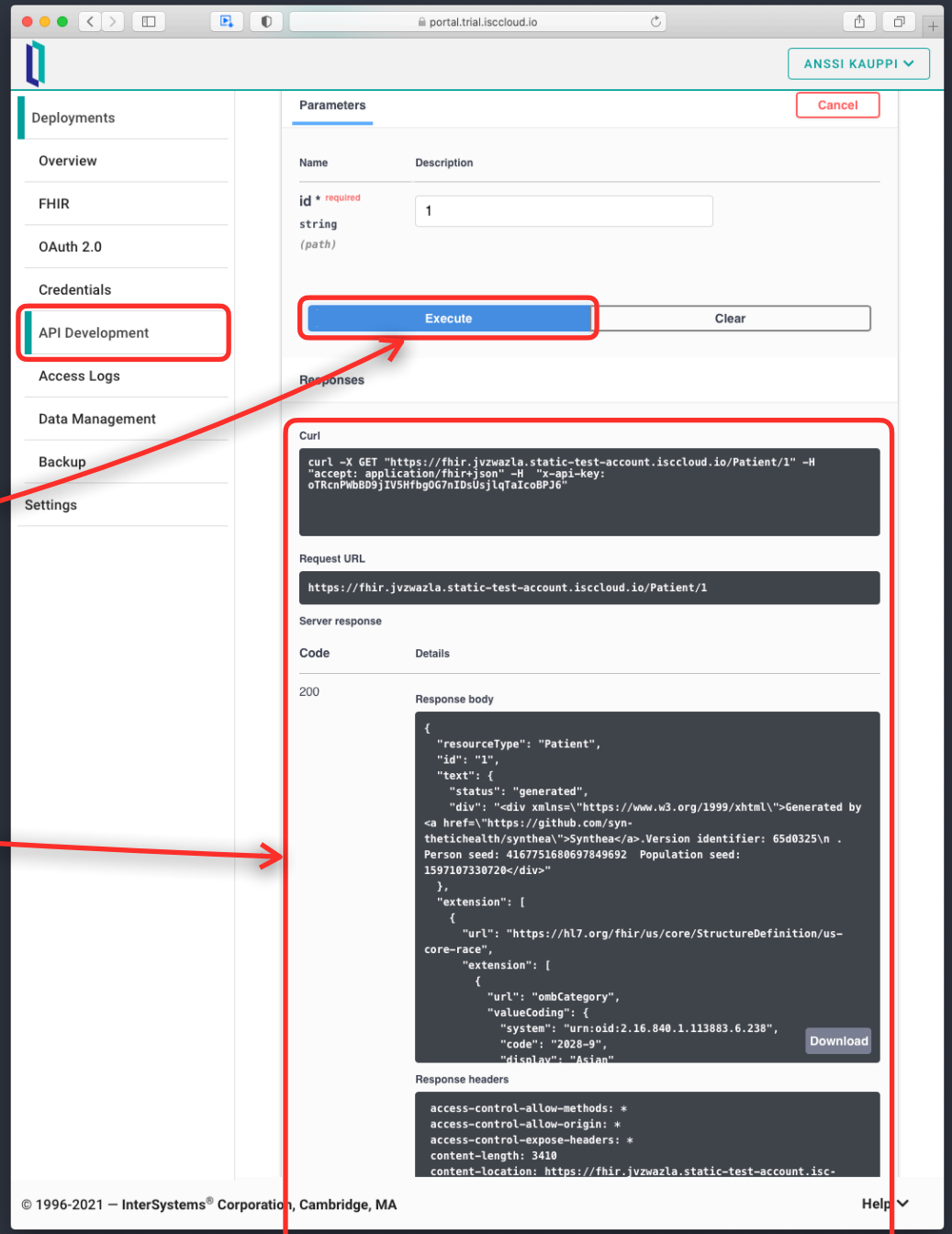
After filling in the fields, and selecting to Execute ...

You see both the FHIR request done and the response returned here

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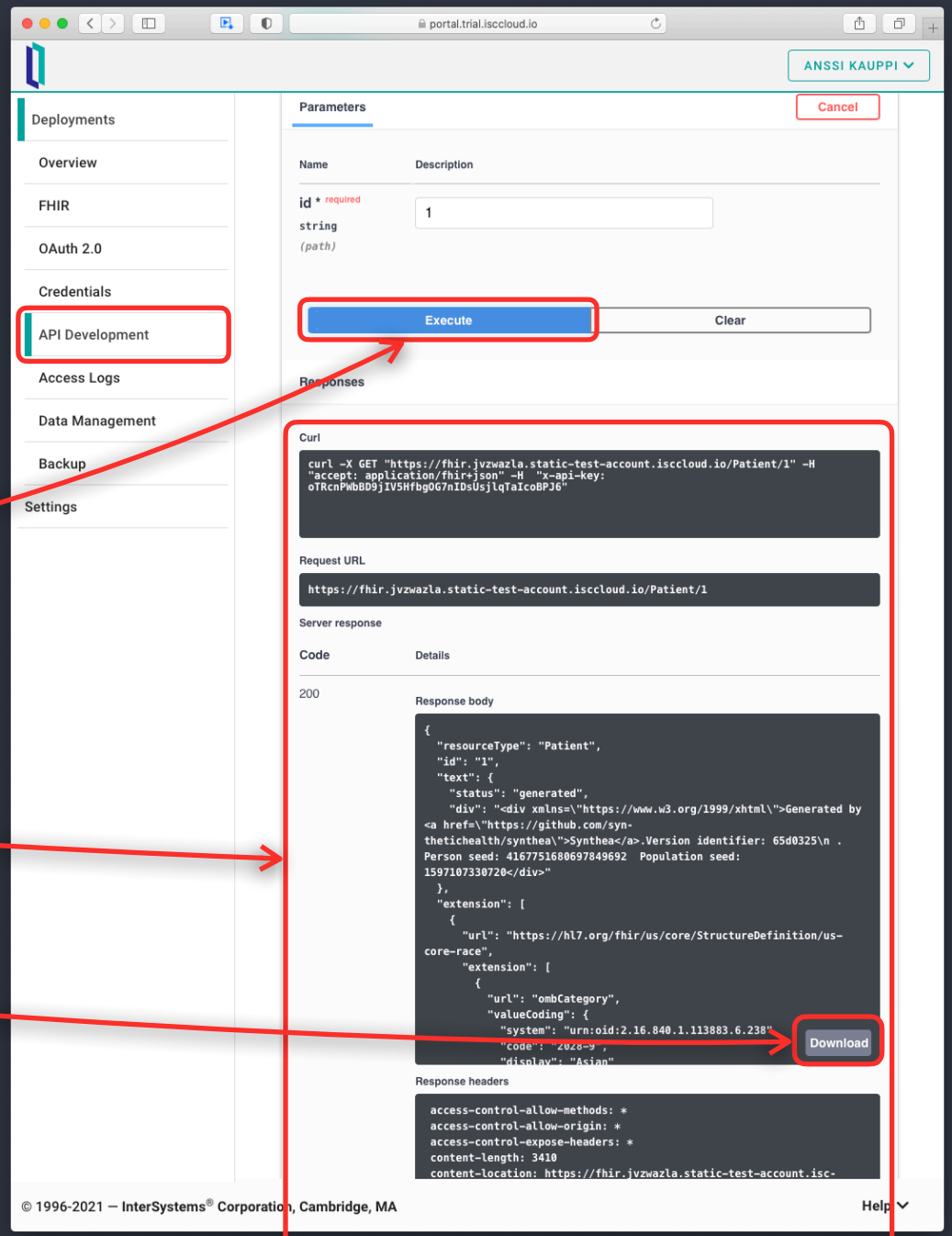
You can download the response body ...

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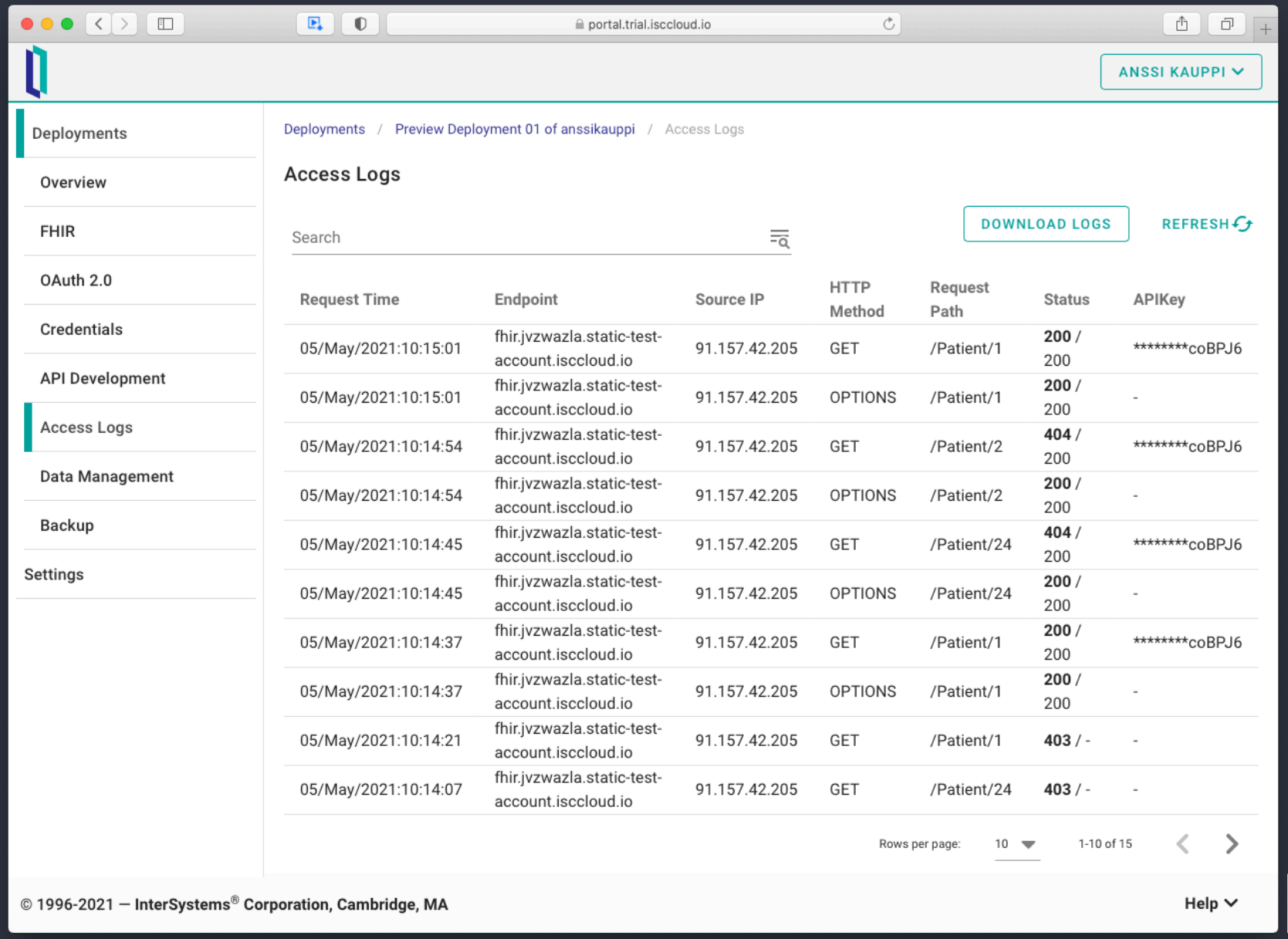
# Access Logs

who is using the service and what FHIR requests they are making

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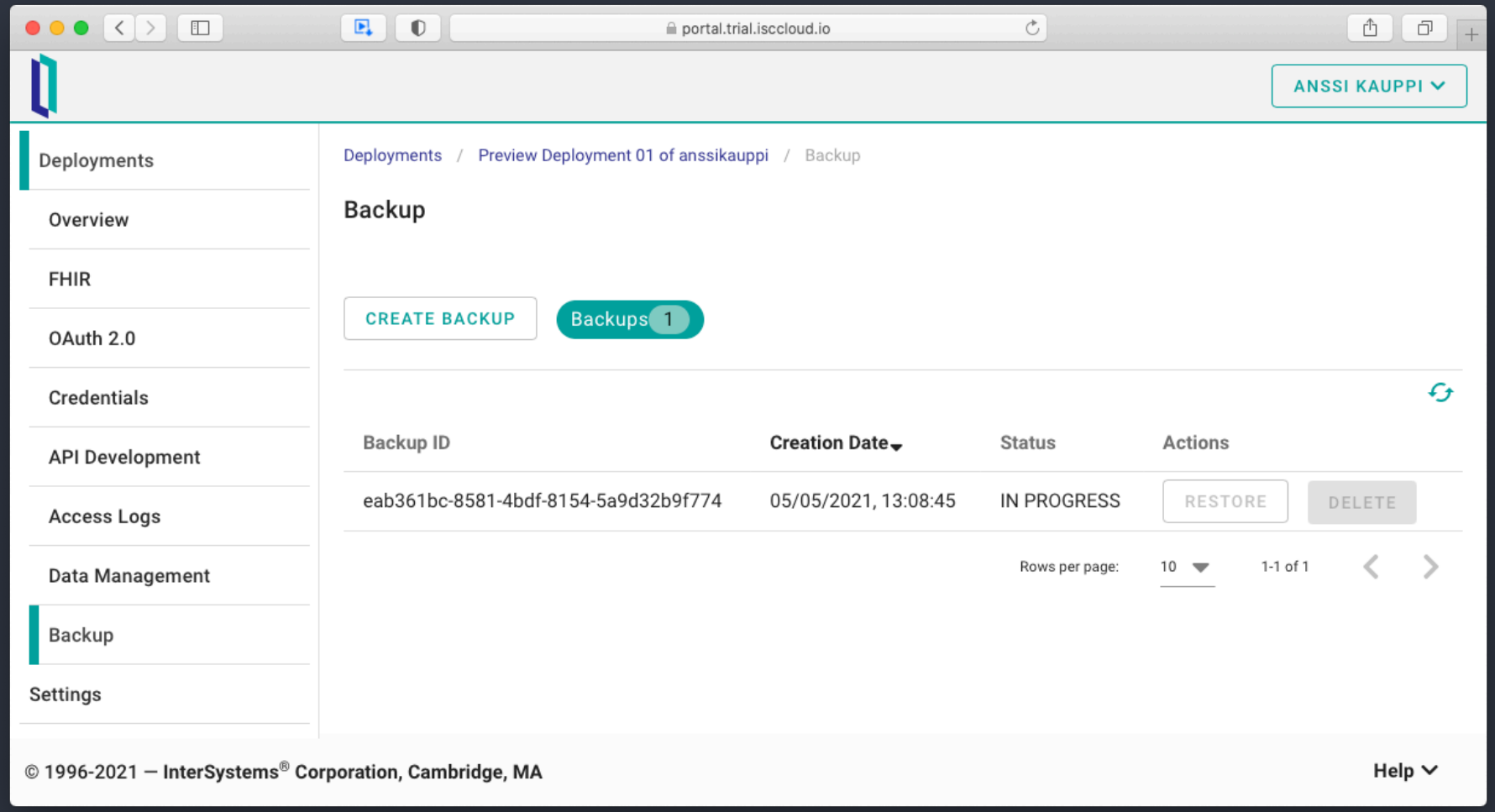
# Backups

Create and restore backups



# FHIRaaS - InterSystems IRIS FHIR Accelerator Service


**FHIR server** as a reliable, secure, low maintenance solution that your healthcare application can use to store and retrieve FHIR® data

a turnkey solution: spin up in minutes and leave security, backups and management to InterSystems

Available **initially** in the AWS Cloud

4 min.

InterSystems

# IRIS for Health

and

# FHIR Components

 |  |

# InterSystems IRIS for Health

Provides all FHIR capabilities:

- FHIR Server
- FHIR Client
- Transformations to and from FHIR
- Business Services
- Business Operations

May be deployed in:


- Virtualized Environments
- Containers
- Bare Metal

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# InterSystems FHIR Components are Modular


Each of these components is modular:
consists of multiple components
that can be assembled and configured
according to the specific needs

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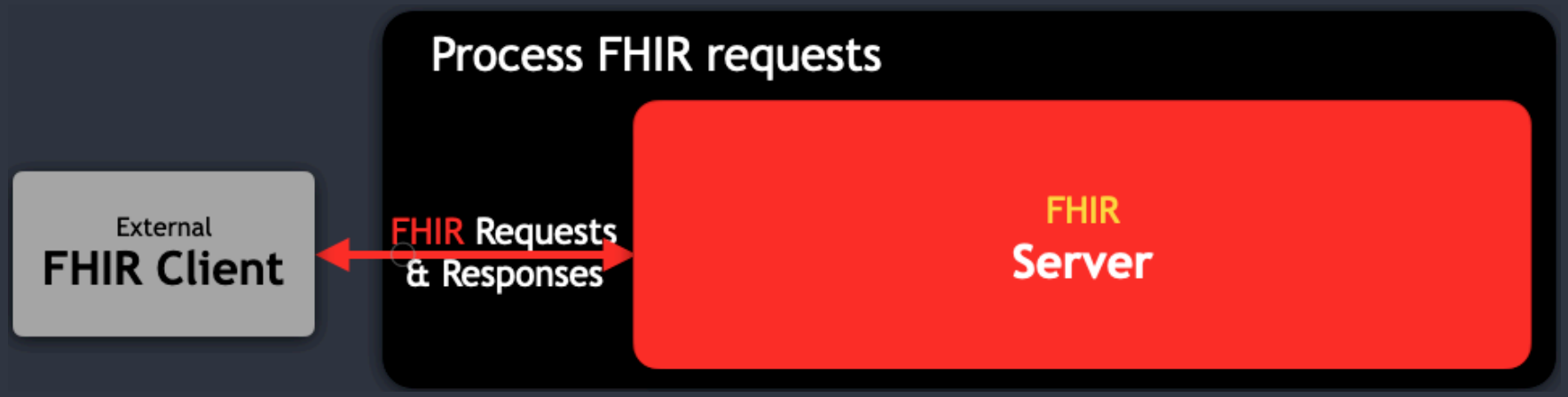
# Components of FHIR Server ...

FHIR Server | FHIR Client | Transformations to and from FHIR | Business Services | Business Operations

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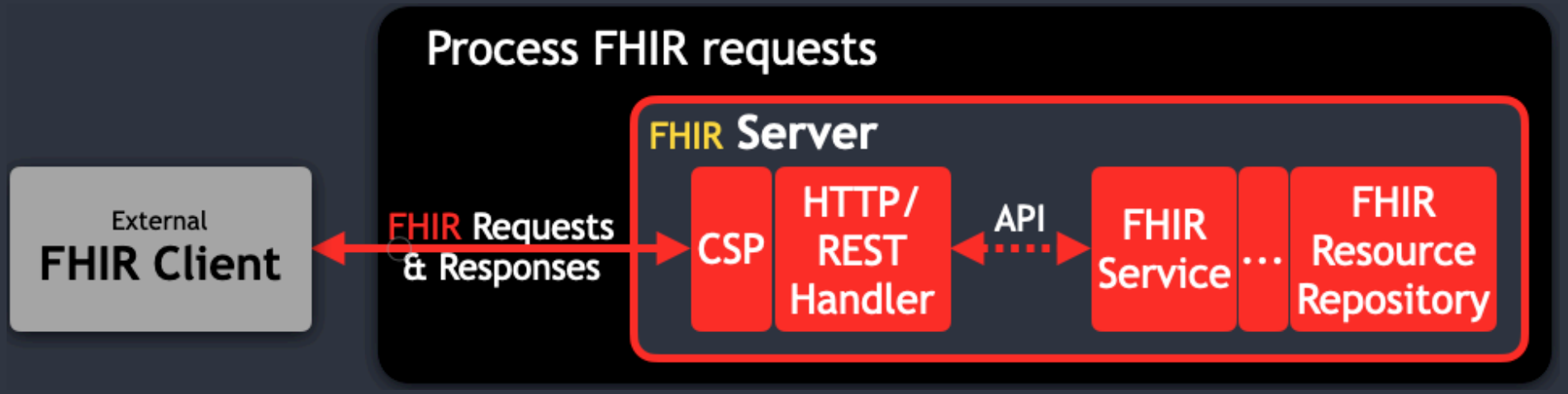
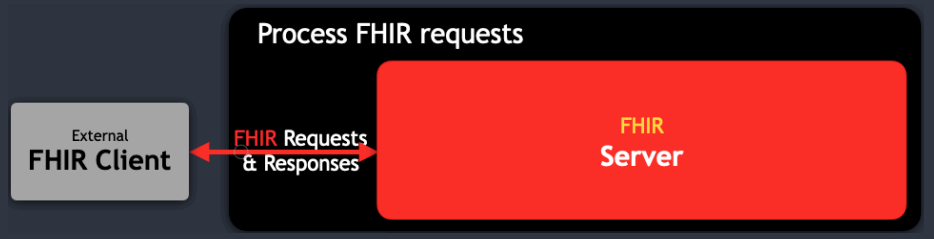
# Components of FHIR Server

FHIR Server | FHIR Client | Transformations to and from FHIR | Business Services | Business Operations

... somewhat granular level:

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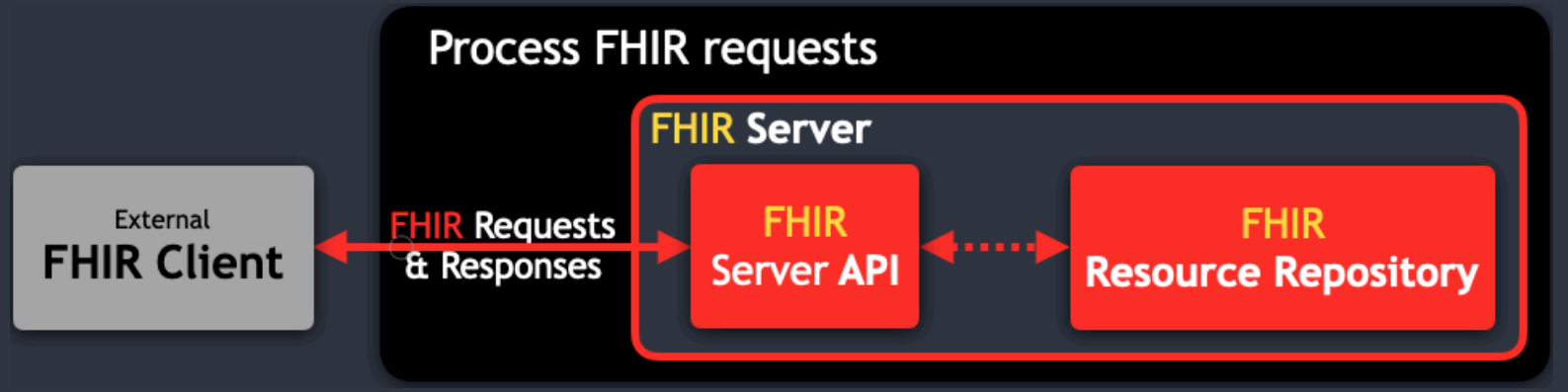
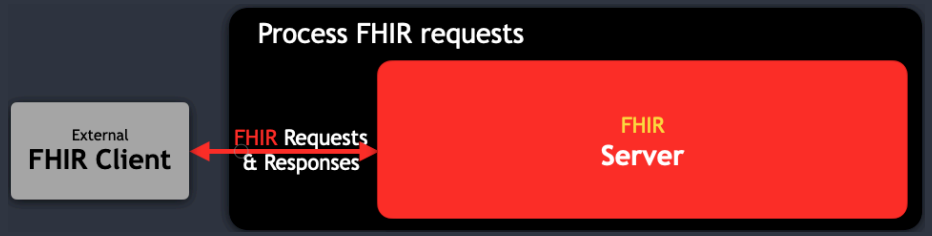
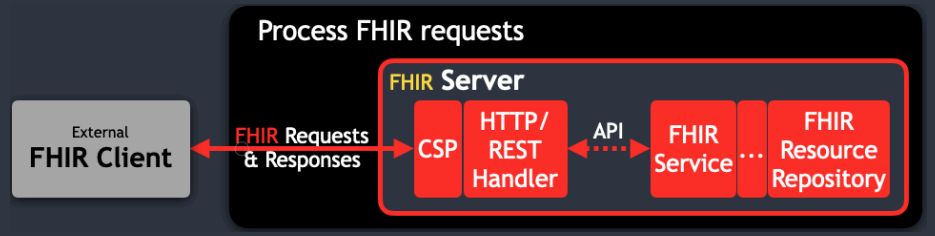
# Components of FHIR Server

FHIR Server | FHIR Client | Transformations to and from FHIR | Business Services | Business Operations

... less granular level:

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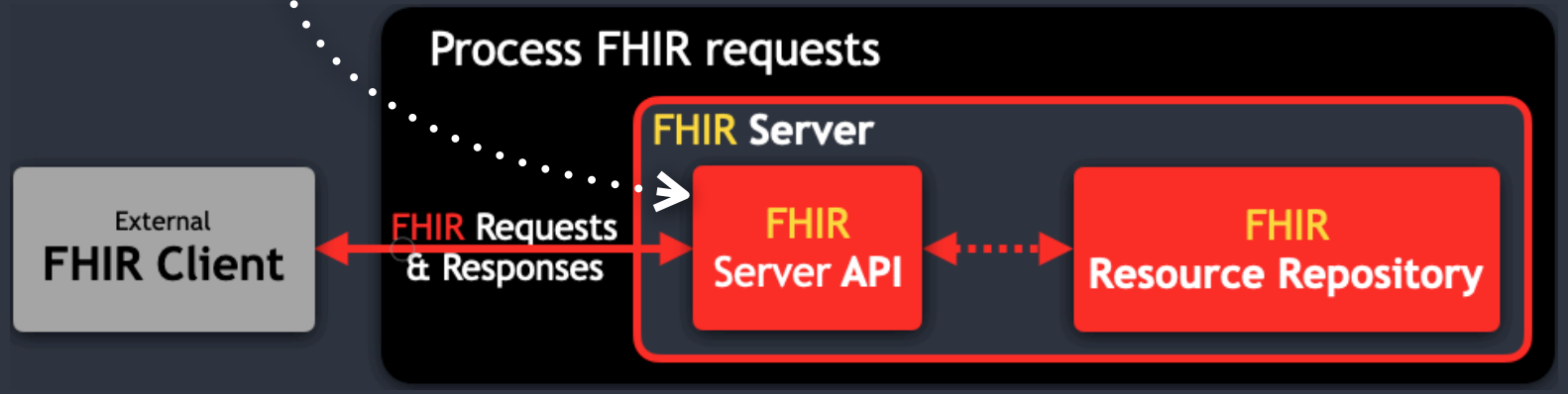
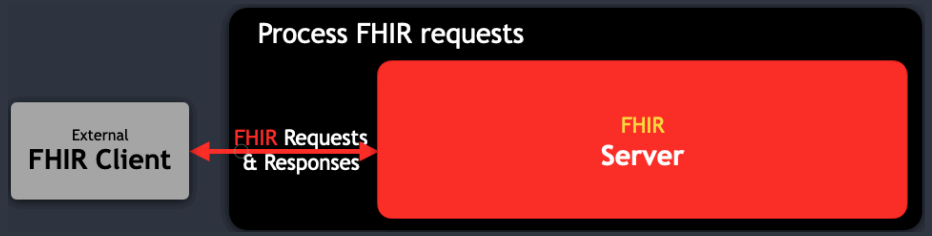
# Components of FHIR Server

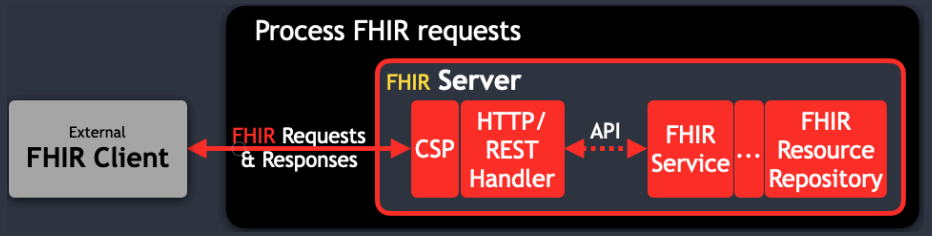


... less granular level:

**FHIR Server API** implements the FHIR RESTful API as described in https://www.hl7.org/fhir/http.html

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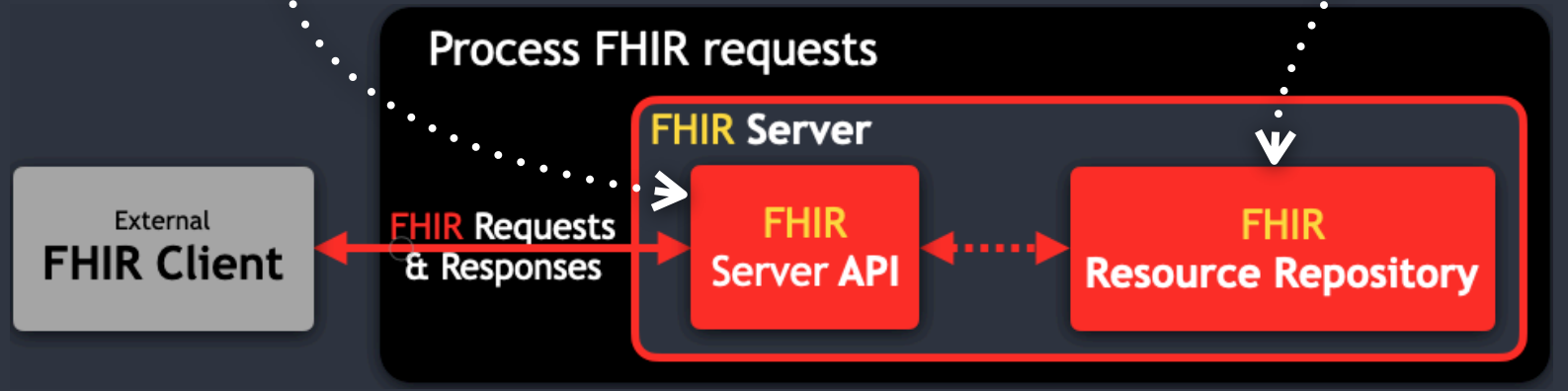
# Components of FHIR Server

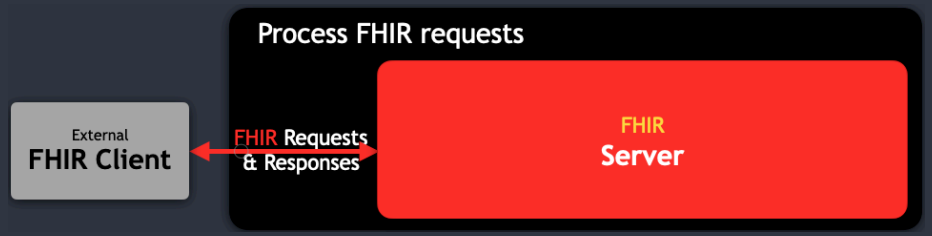
FHIR Server | FHIR Client | Transformations to and from FHIR | Business Services | Business Operations

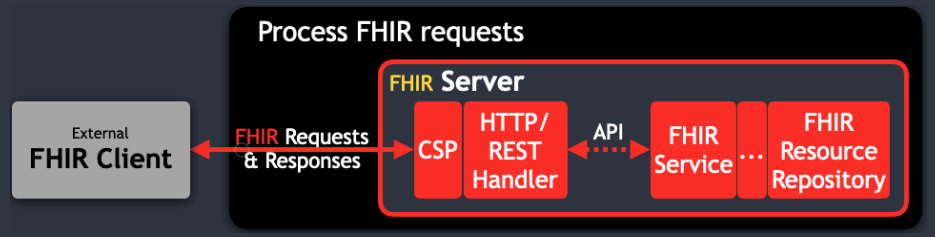
... less granular level:

**FHIR Server API** implements the FHIR RESTful API as described in https://www.hl7.org/fhir/http.html

**FHIR Resource Repository** is a database capable of serving any FHIR interaction

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# Components for ... anything ...

FHIR Server | FHIR Client | Transformations to and from FHIR | Business Services | Business Operations

The next slides are about some basic use case patterns

 

# Map FHIR Server to clients using other protocols


 |  |

# Map FHIR Server to clients using other protocols


 |  |

# Map FHIR Client(s) to services using other protocols

(a very simple case)


 |  |

# Map FHIR Client(s) to services using other protocols

(a very simple case)


 

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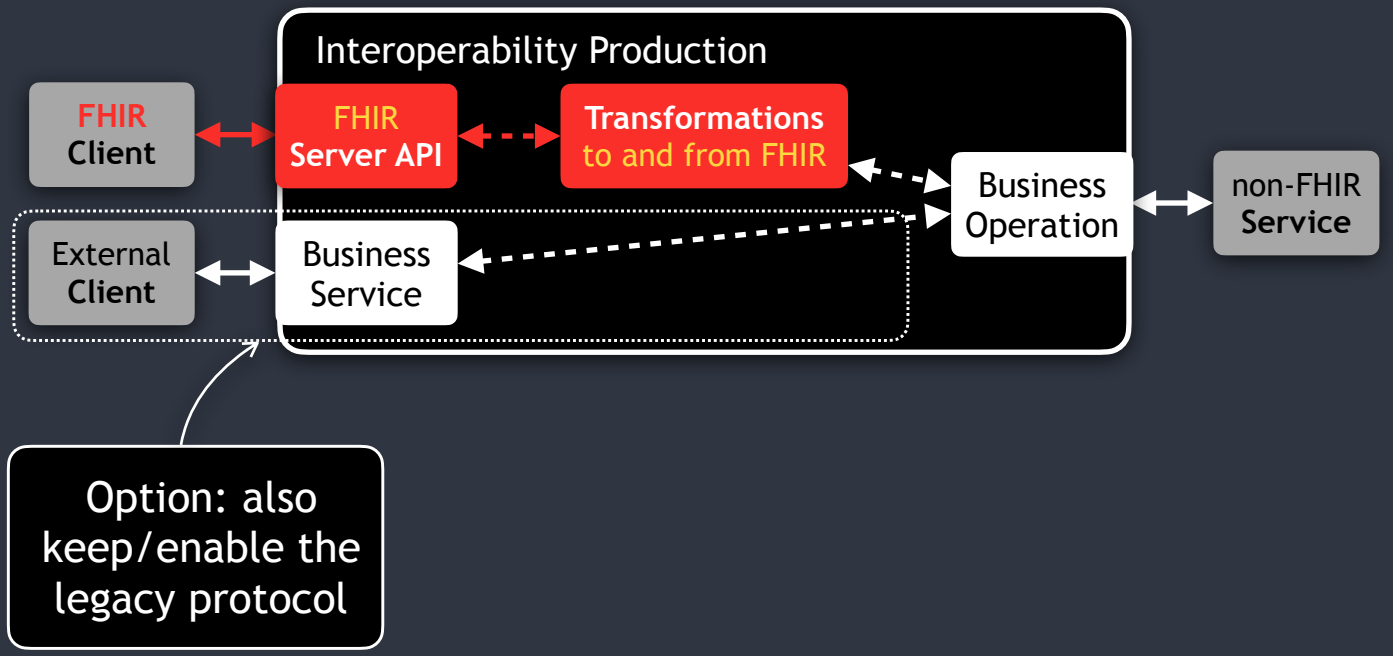
(a very simple case)

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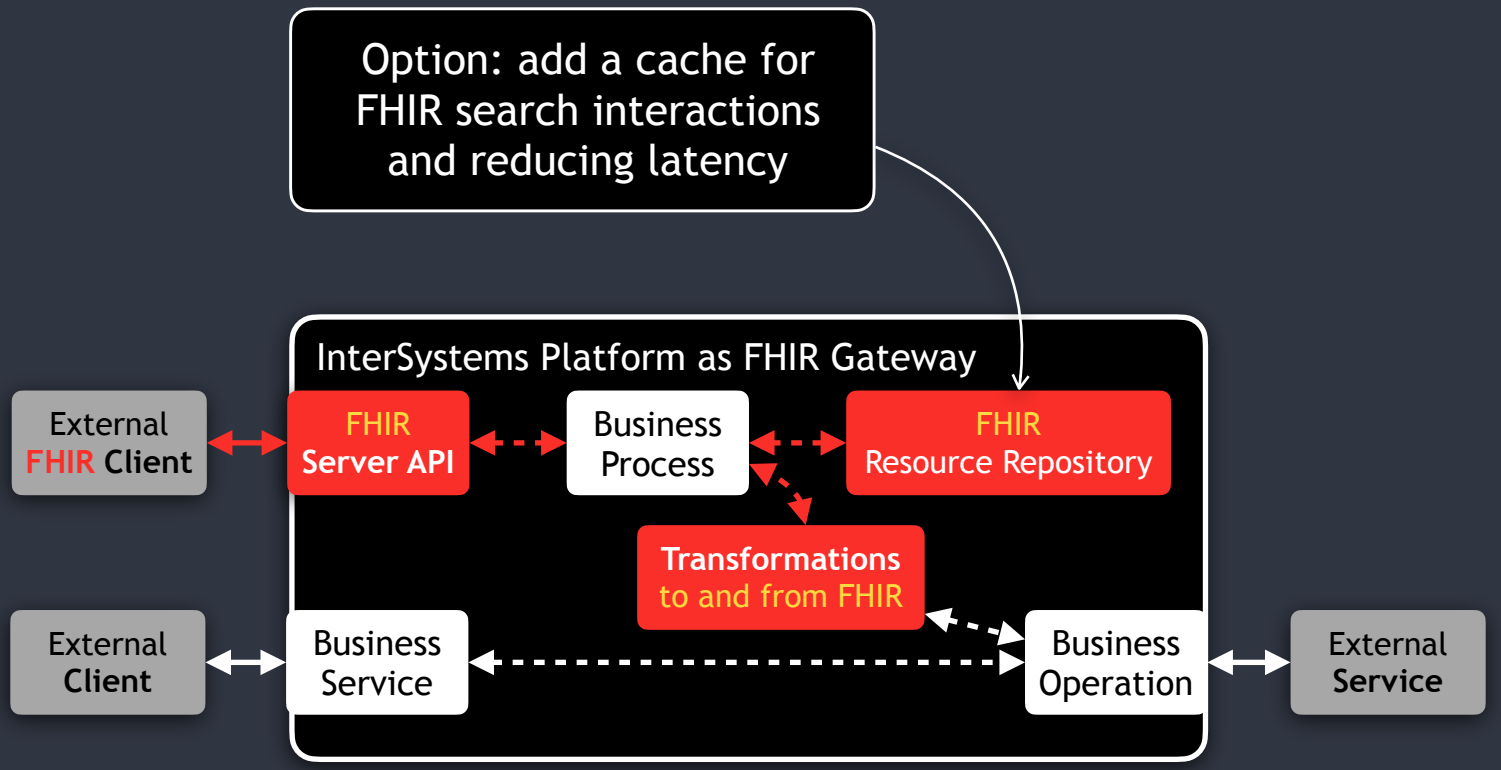
# FHIR Gateways: Read Interactions and Responsiveness

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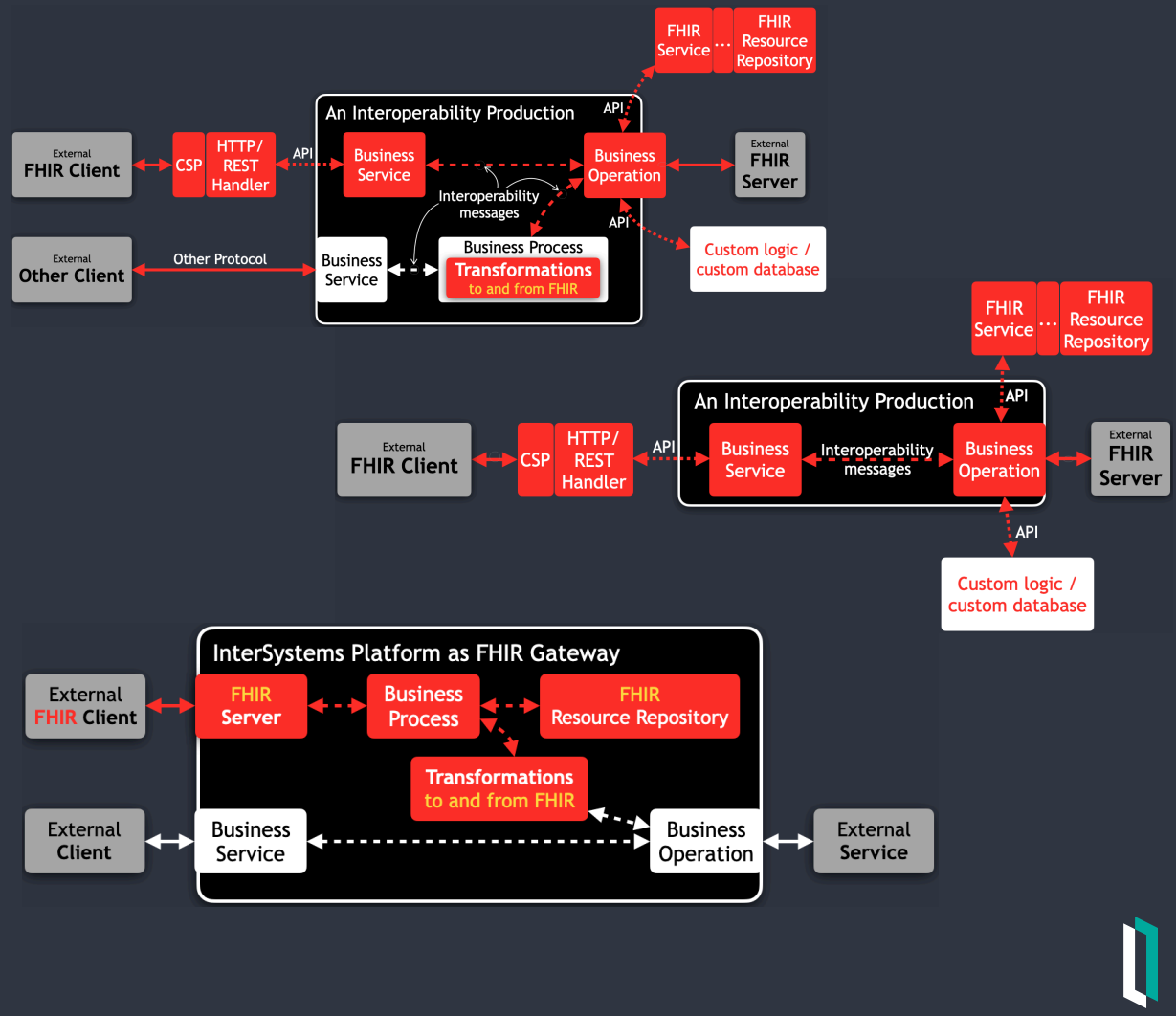
# Summary:
# Modular components for about anything

FHIR Server | FHIR Client | Transformations to and from FHIR | Business Services | Business Operations

1. Implement a FHIR server using a FHIR resource repository or a custom backend
2. FHIR enable a legacy application with an optional FHIR cache
3. implement a legacy API for a FHIR API
4. Any combinations of above ...

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15 min.

Case & Demo

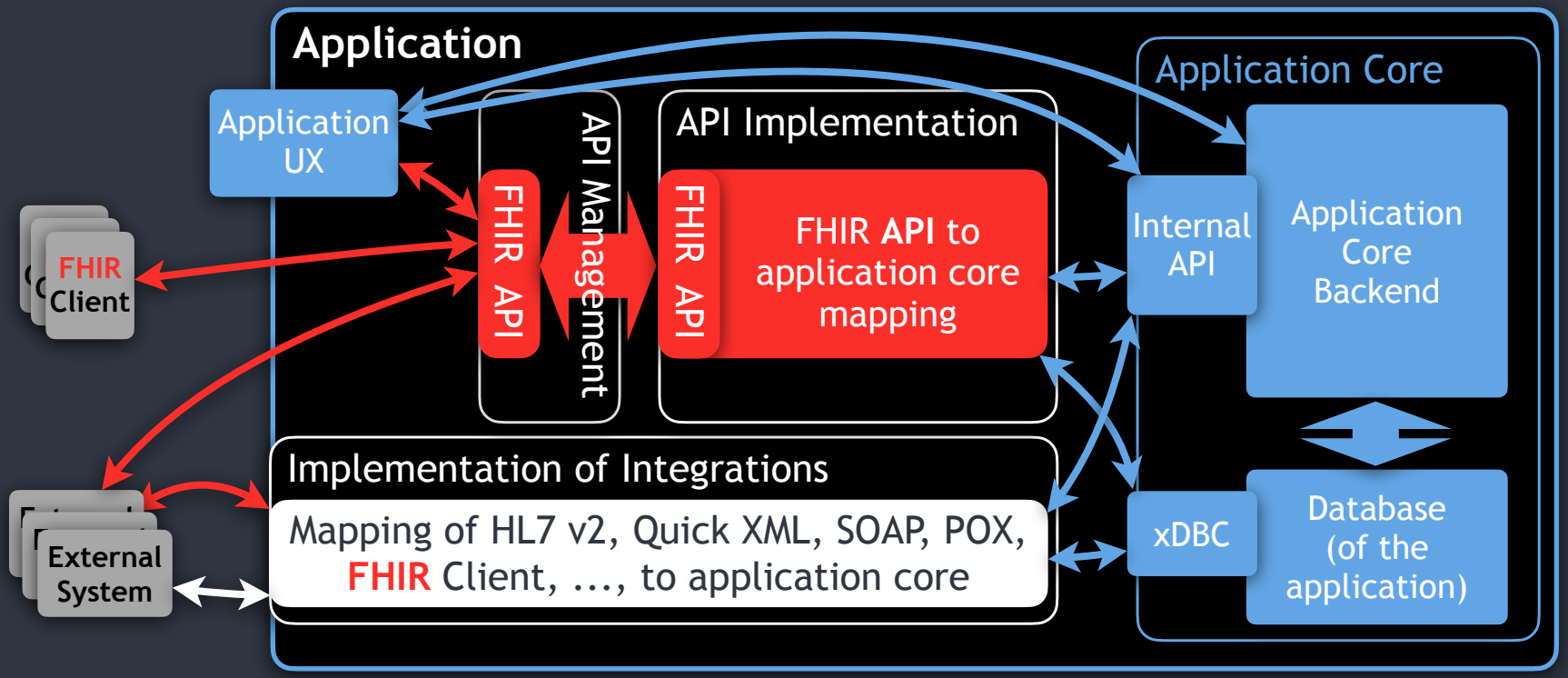
# FHIR Enabling an EHR

and

# Profiling

# Task: Implement FHIR RESTful API on top of an internal API

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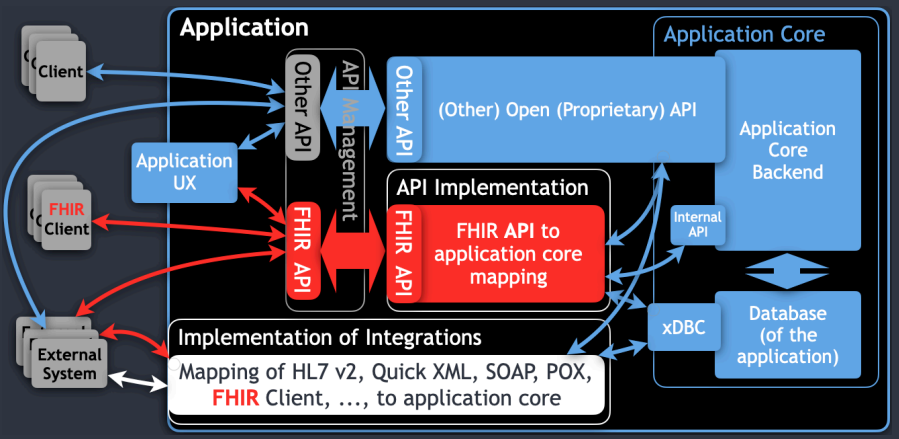
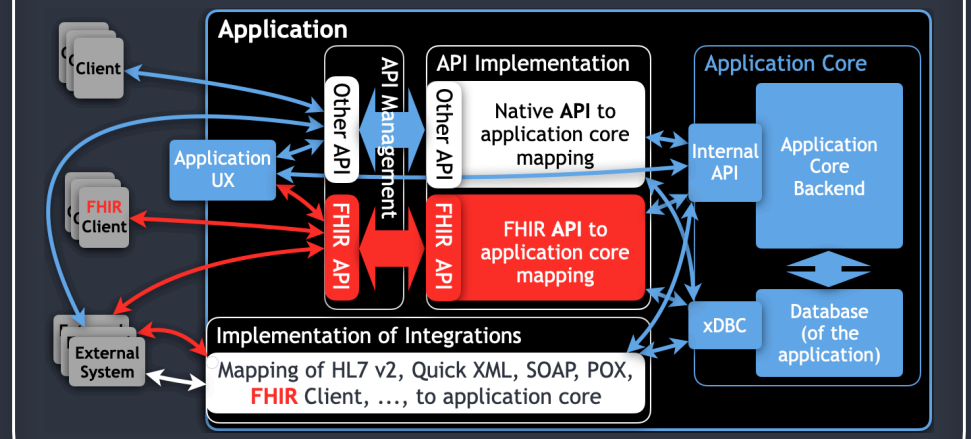
# Task ... at least 4 Different Scenarios to consider ...

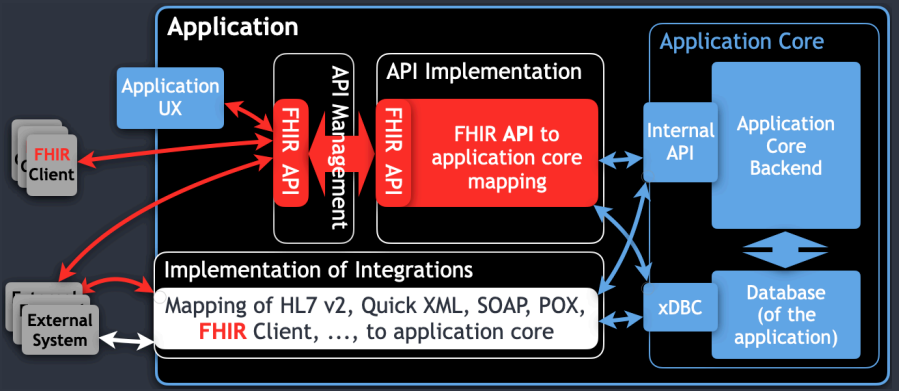
## (Proprietary) API first design (two open APIs)



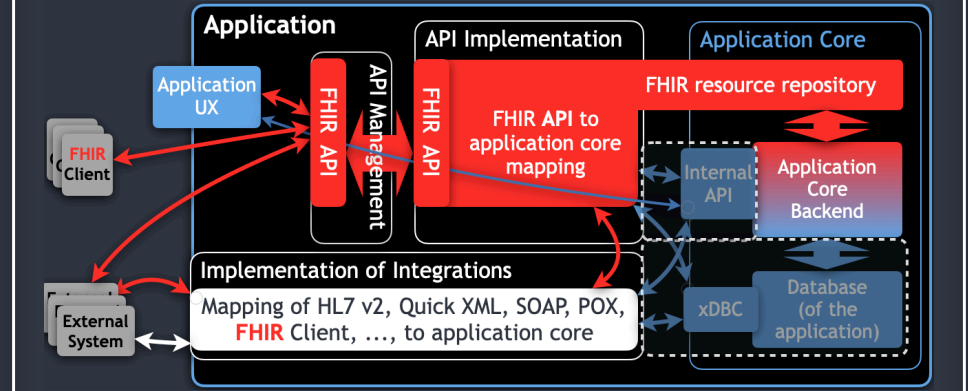

## Two open APIs on top of internal API




## FHIR API on top of internal API

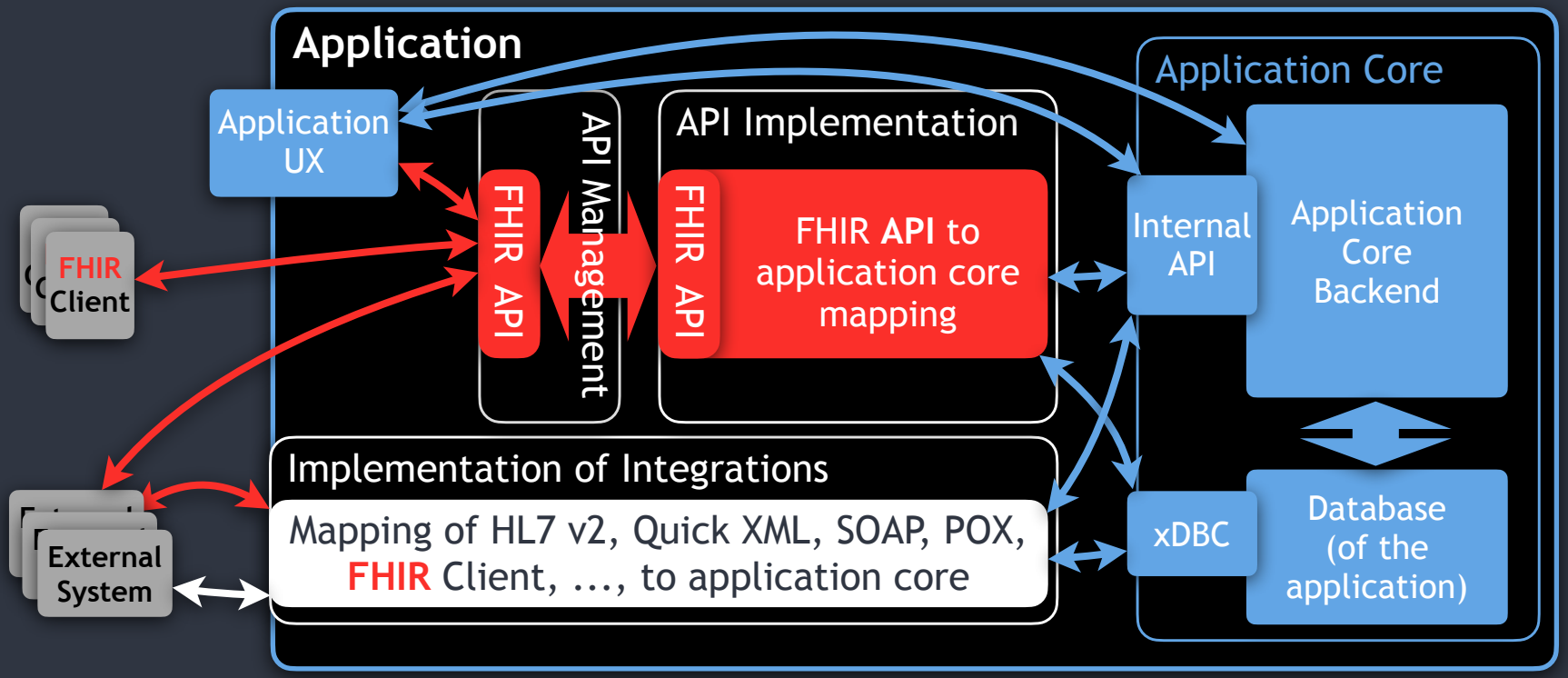



## (FHIR) API first design




 |  |

# Task: Implement FHIR RESTful API on top of an internal API

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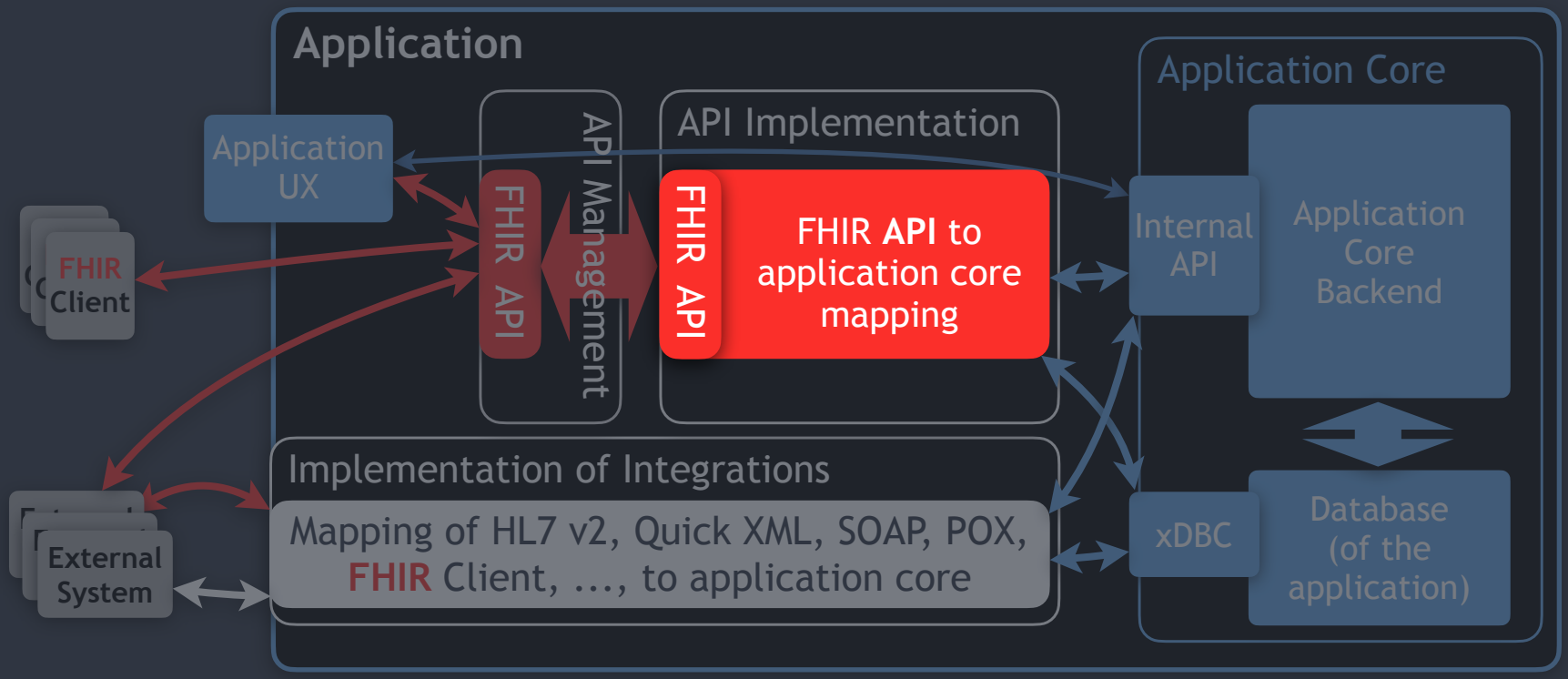
# Task: Implement FHIR RESTful API on top of an internal API

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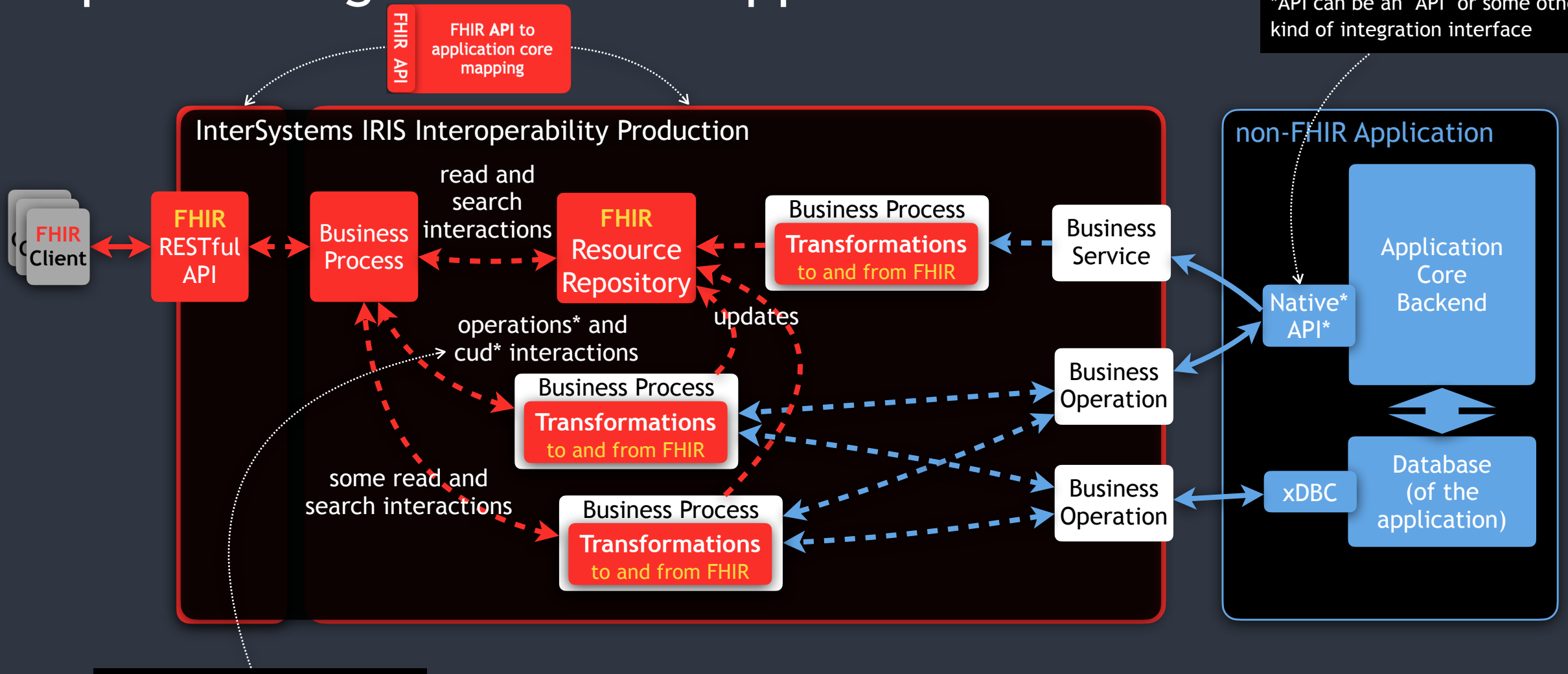
# Implementing FHIR API for application/service

*Native may be strictly internal but also for external use

*API can be an "API" or some other kind of integration interface




*operation = execute interaction

*cud = create, update, delete

Legend: Interoperability message, FHIR interaction

Interoperability message, application data model

 |  |

# Demo

Check before you start:

- You have an Internet connection
- You have ARC installed
- You have a production for FHIR enabling an EHR deployed
- You do have several (more than 5) patients with the criteria: family=potilas&given=pentti
- You do not have any patients with the criteria: homeMunicipalityName=Oulu

Demo:

1. Show the production configuration (Management Portal)
2. ... the flow of messages starting from BS From_FHIR_API
3. Using ARC Search all patients
4. Show (and explain) the message trace (including the bundle returned)
5. Create a new patient resource, use localised (extended) example from https://simplifier.net/FinnishAppointment instead of a standard one from https://www.hl7.org/fhir
6. Show (and explain) the message trace
7. Explain the personal difficulty of remembering SSN of children ...
8. Search by just name (family=potilas&given=pentti) --> You get too many results
9. --> you need to add home municipality ...
10. Take a look at the search parameters of Patient resource (no home municipality (extension))
11. Show conformance resources: structure definition for Patient and search parameter
12. Search using: family=potilas&given=pentti&homeMunicipalityName=Oulu

# Corollary

Having just **FHIR Server** may be enough for some green field projects and restricted use cases ...

... but is not enough for most real world use cases.

 |  |

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Most real world use cases that really matters, like FHIR enabling an existing EHR, requires a rich set of FHIR capabilities:

**FHIR Server** | **FHIR Client** | **Transformations** to and from FHIR | **Business Services** | **Business Operations**

 |  |

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Most real world use cases that really matters, like FHIR enabling an existing EHR, requires a rich set of FHIR capabilities:

**FHIR Server** | **FHIR Client** | **Transformations to and from FHIR** | **Business Services** | **Business Operations**

... combined with other capabilities needed to connect to non-standard world and to orchestrate flow of information and processes:

Business Service | Business Operation | Business Process | Business Rules | Transformations | ...

# Corollary

strong support for localised FHIR profiles is also needed - including additional search parameters etc.

10 min.

Demo

# Apple Health App

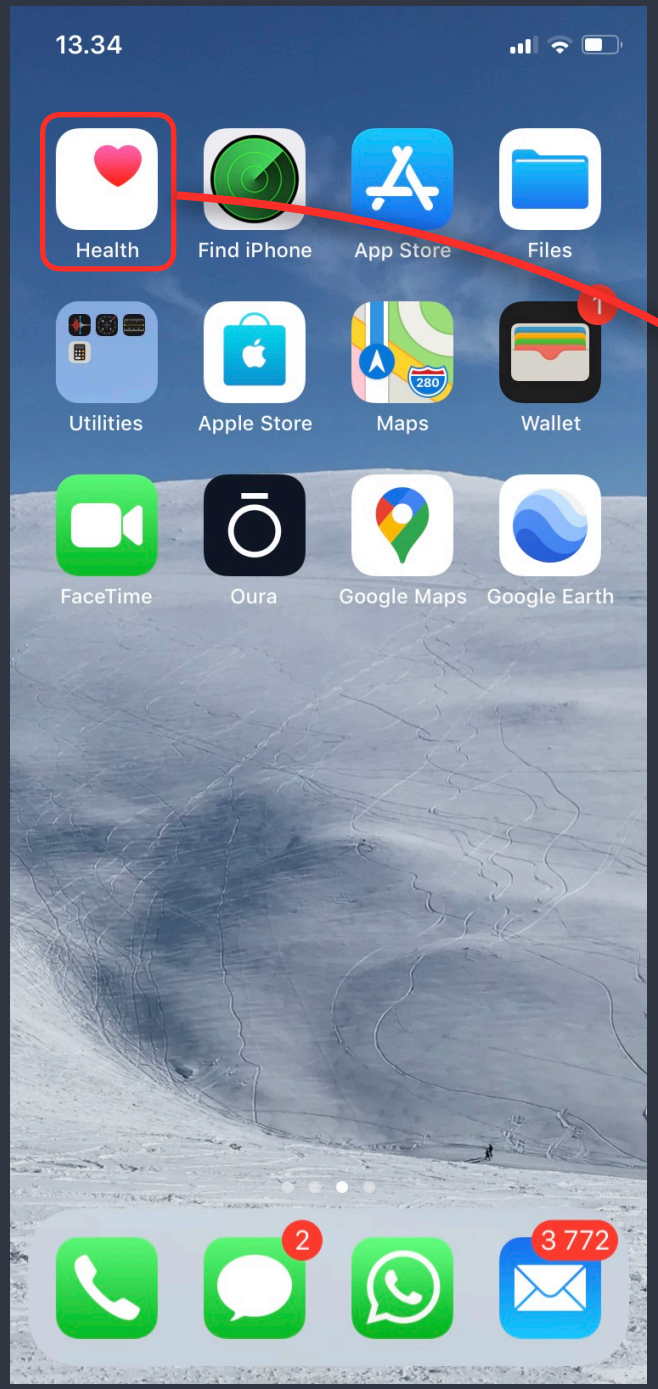
 |  |

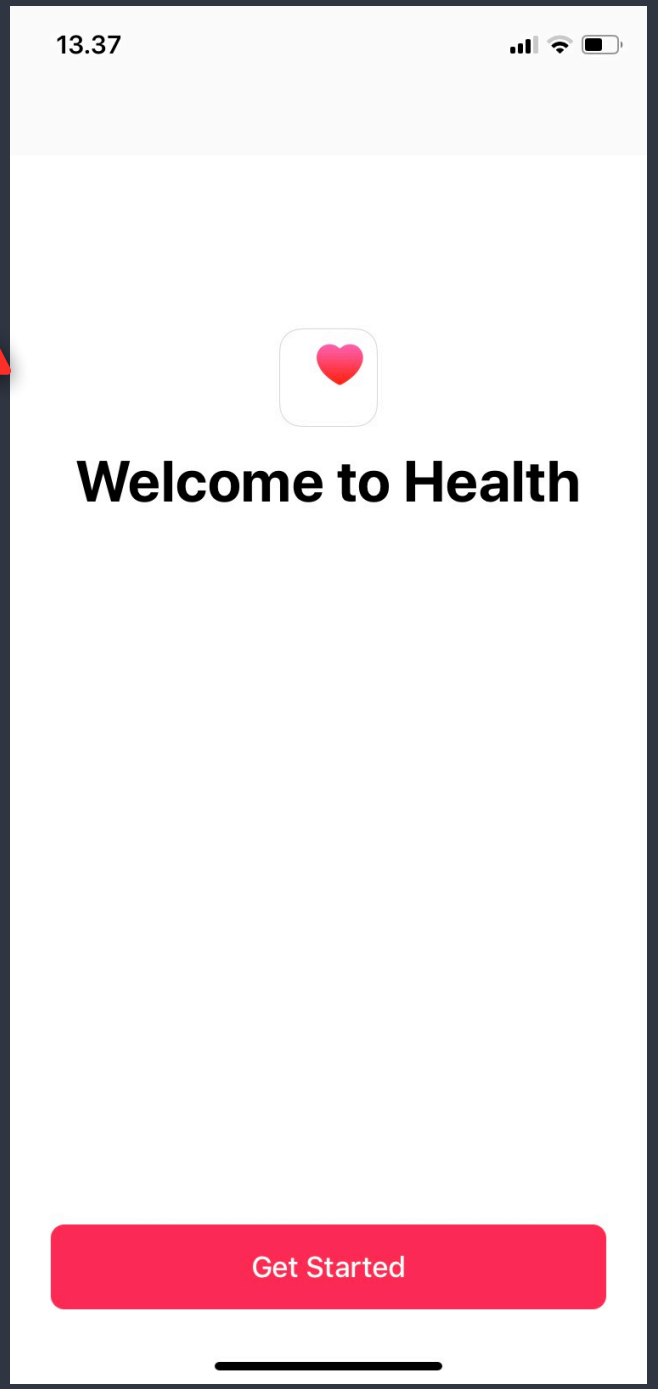
? min.

# Connecting to
and
# Authorising an EHR

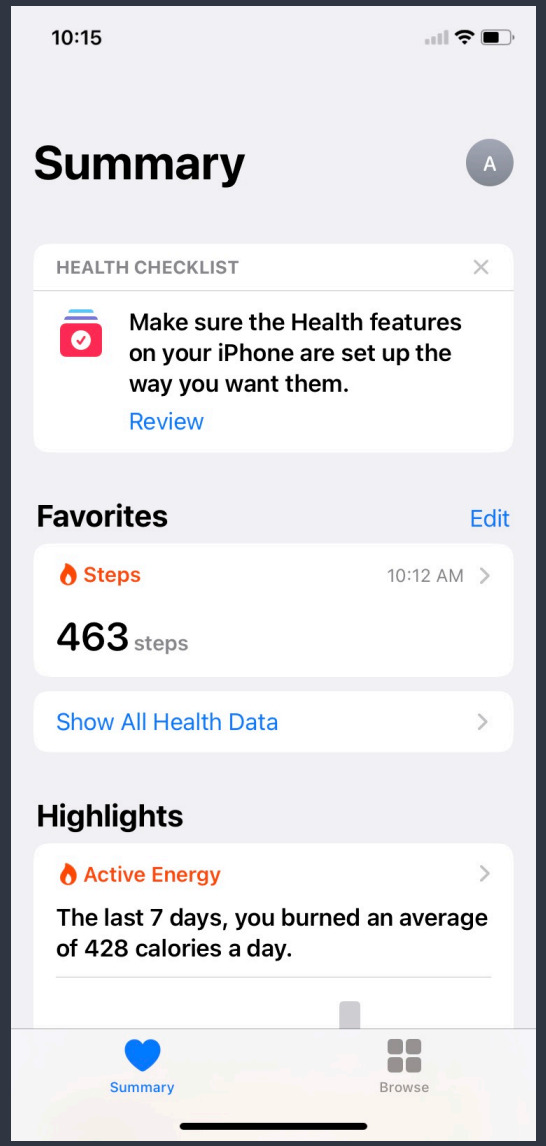
# Apple Health App is Preinstalled on Every iPhone ...




 |  |

# Search for Providers

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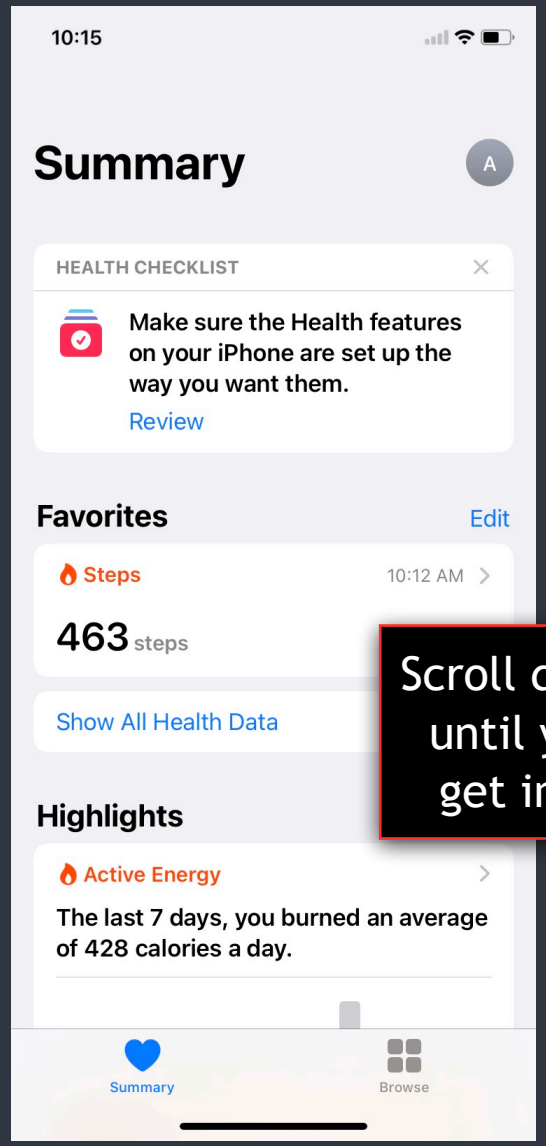
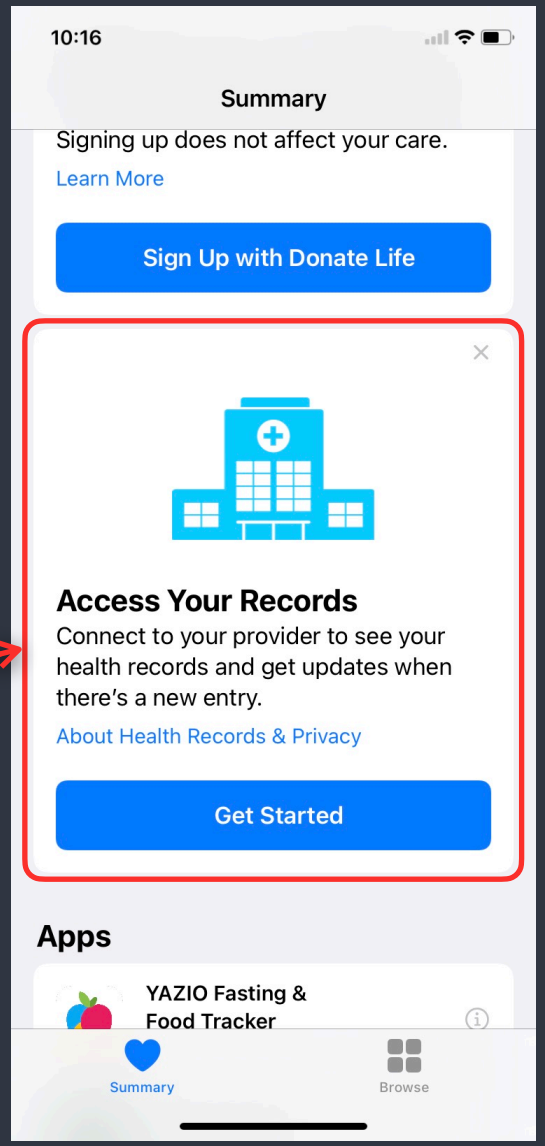
# Search for Providers




Scroll down until you get into

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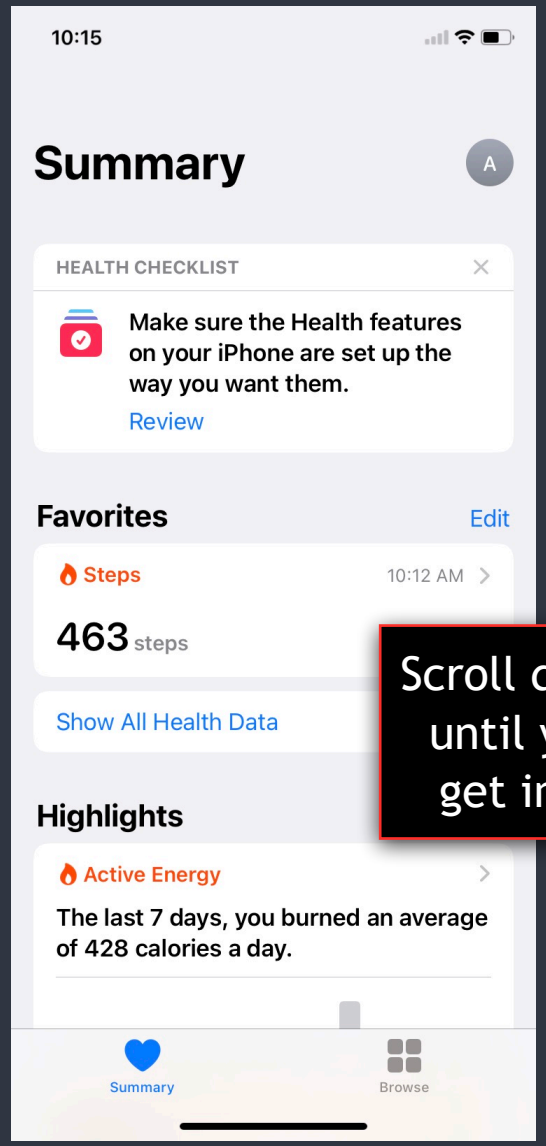


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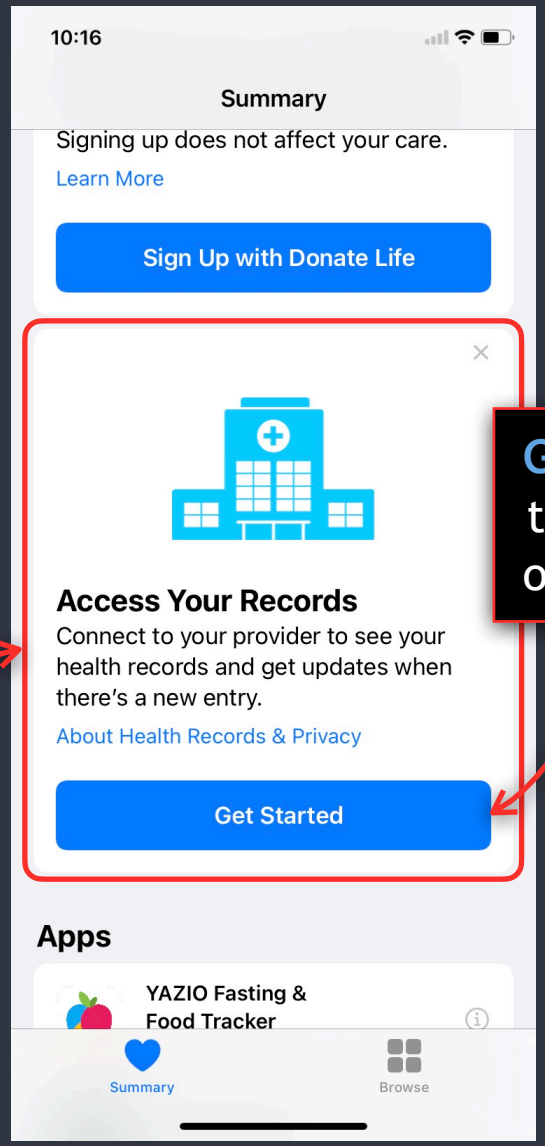
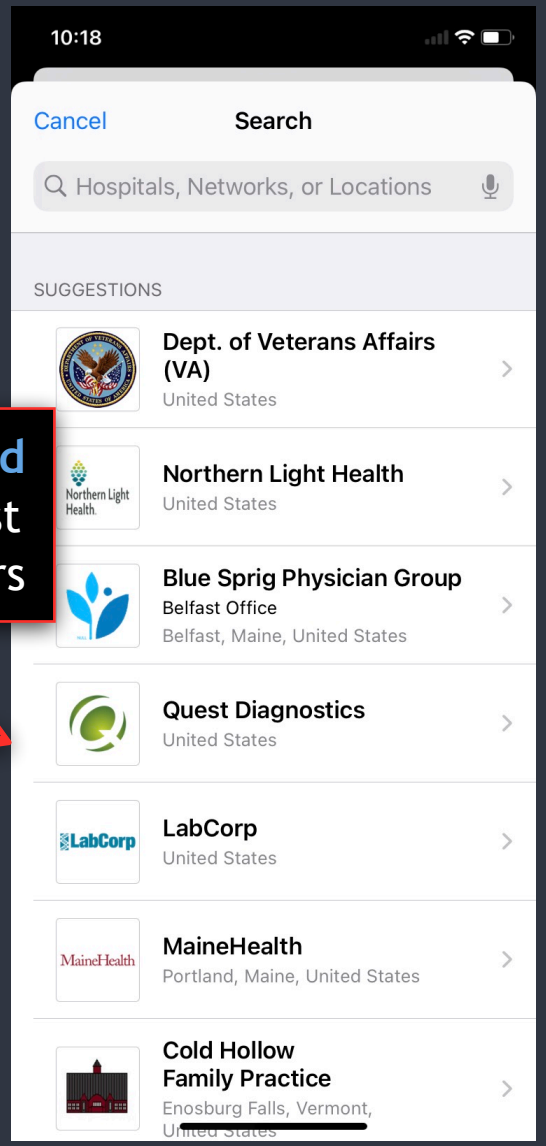



Get Started to get a list of providers

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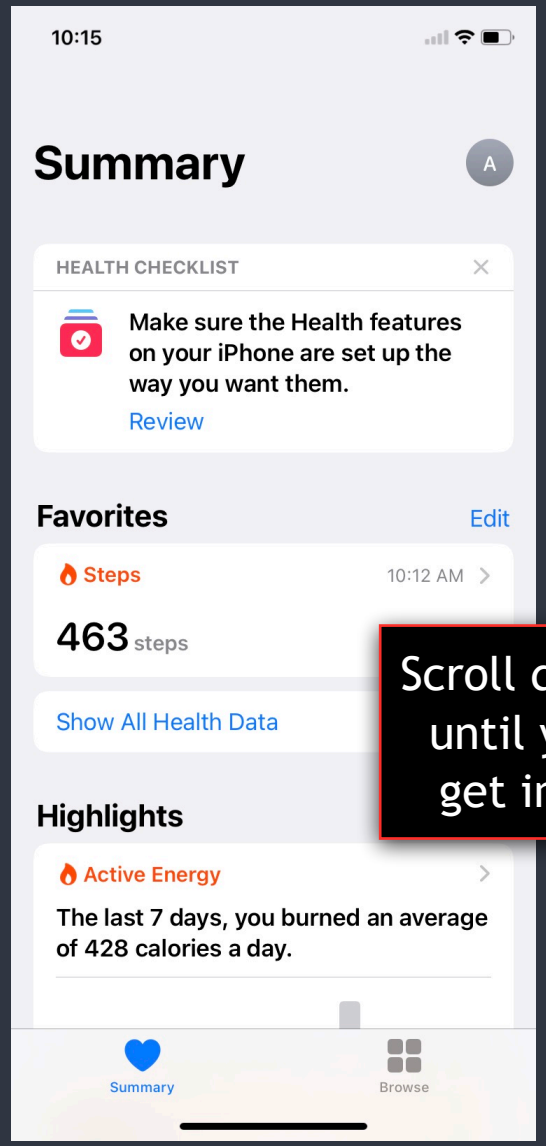


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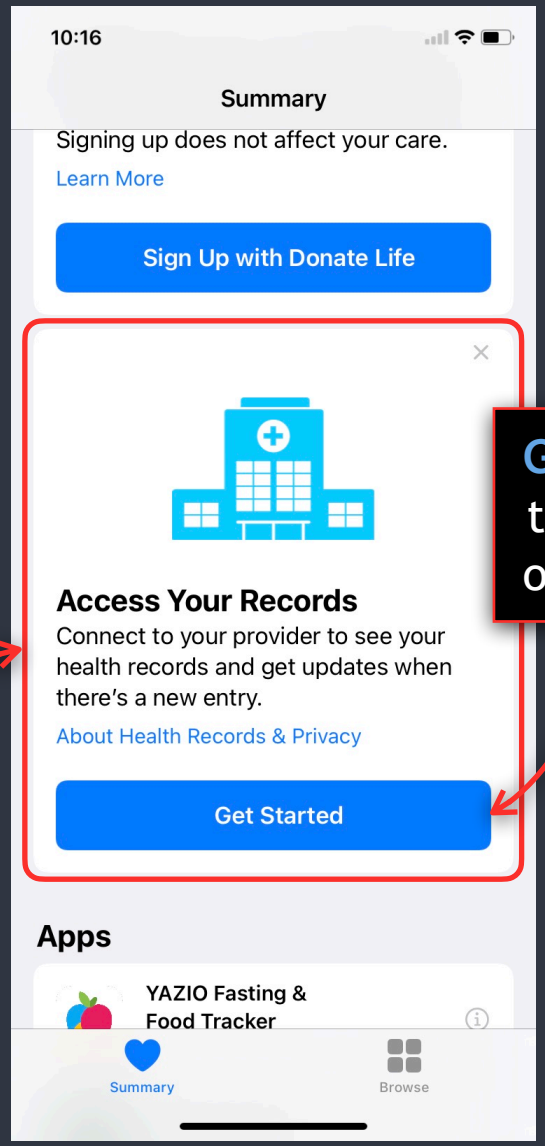


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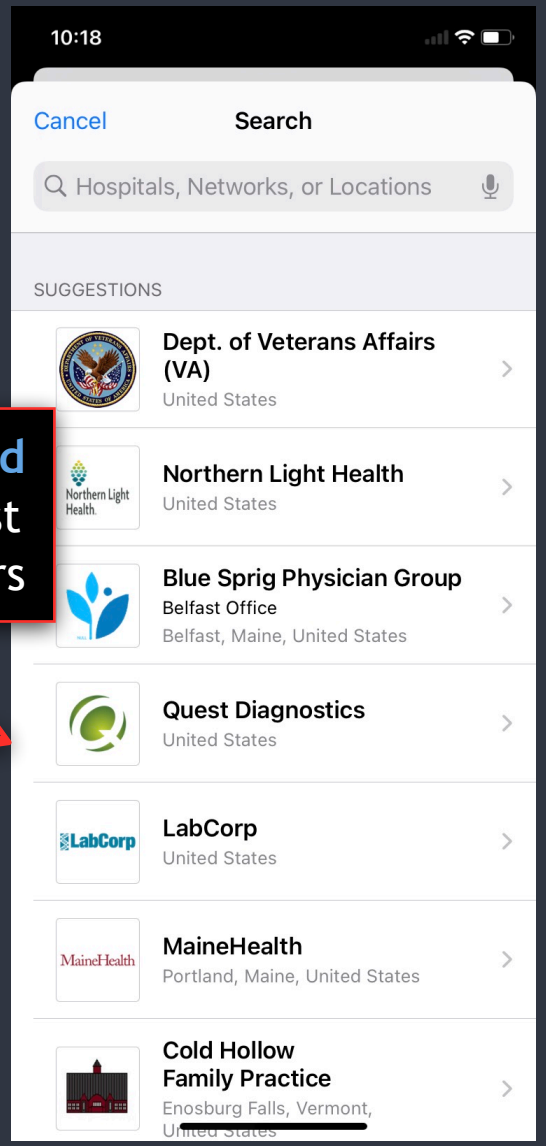
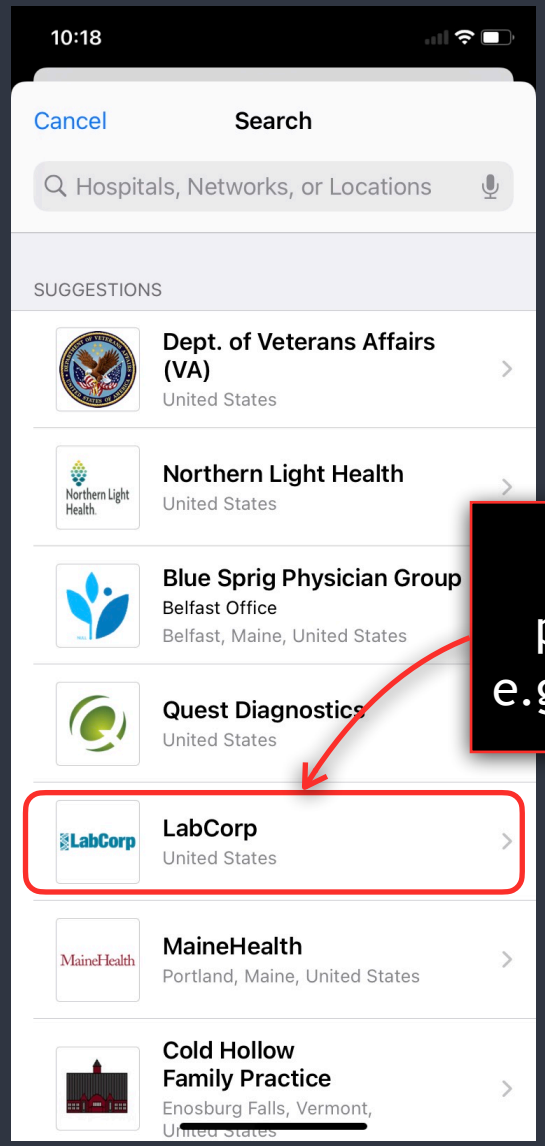



The list of providers is veeryy looooong …

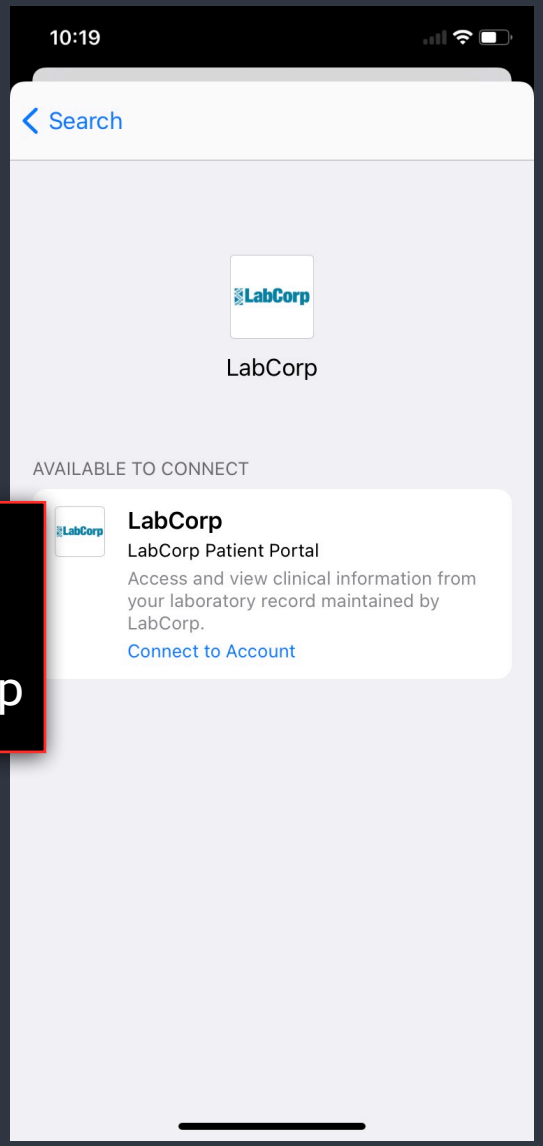
… you can scroll down the list forever.

 |  |

# Search for Providers




Select a provider, e.g. LabCorp

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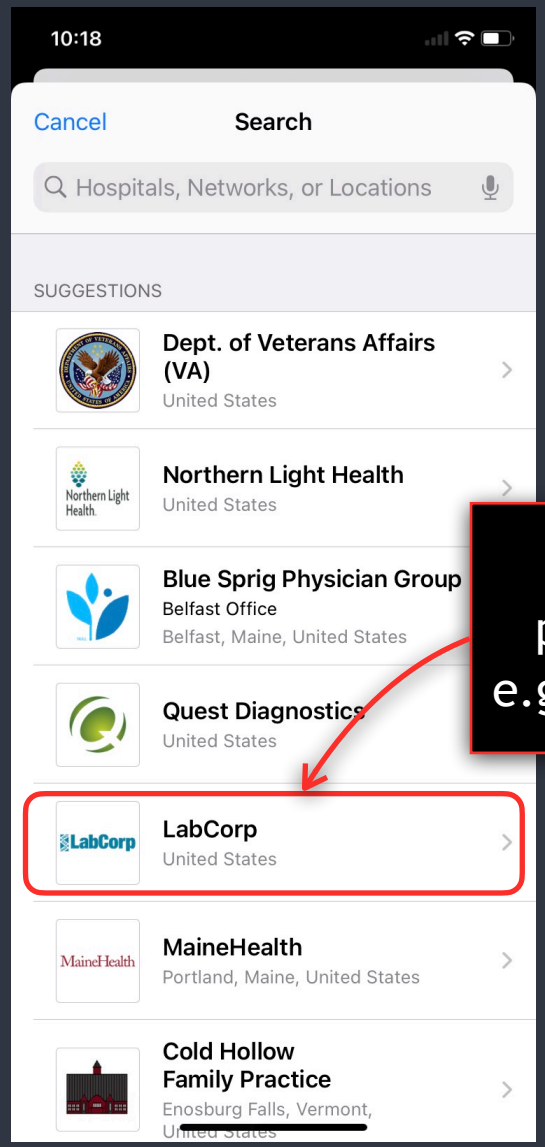
# Search for Providers

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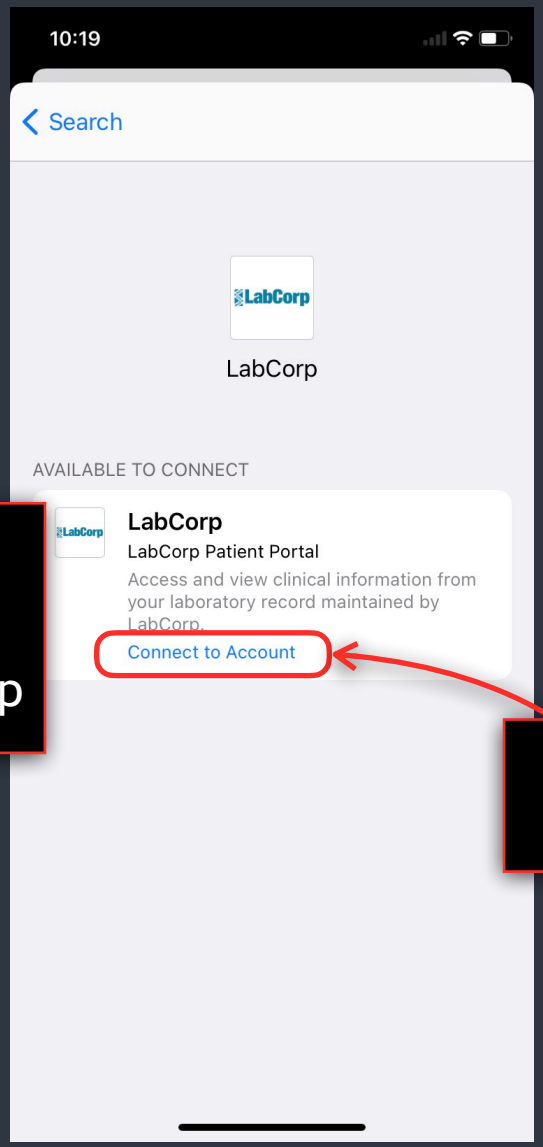
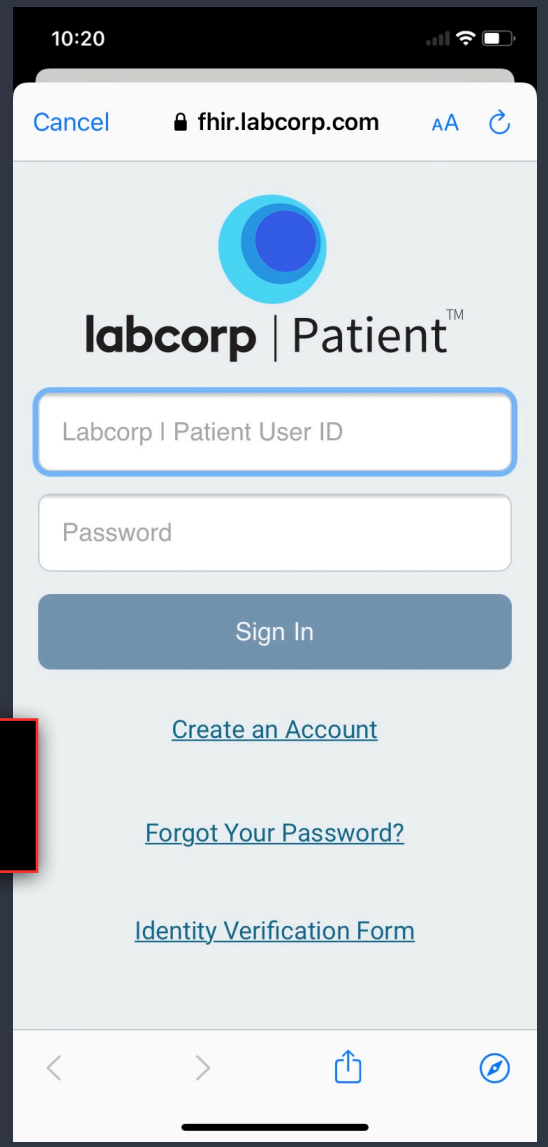



Select to connect

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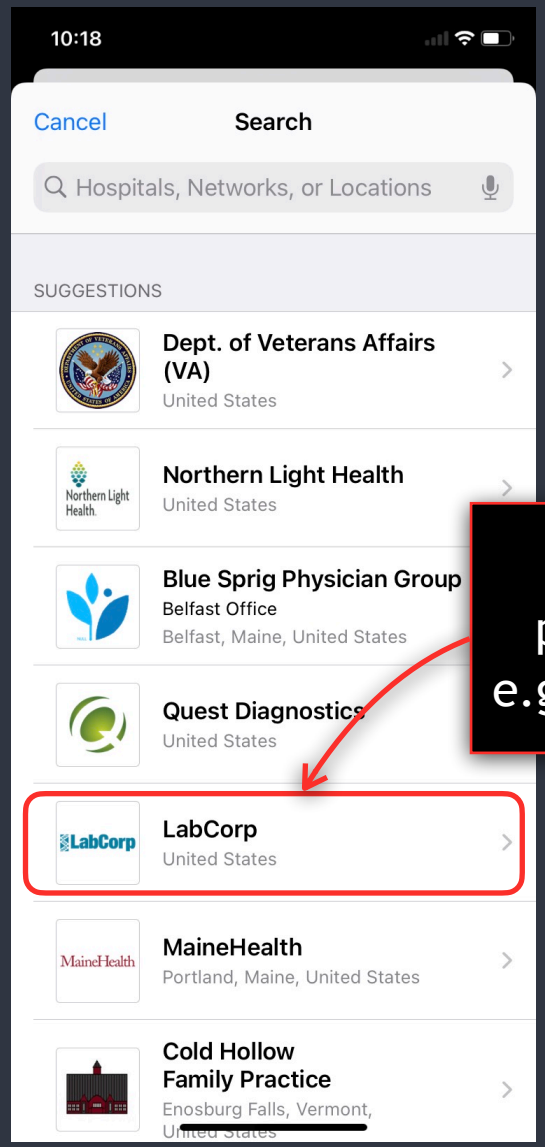


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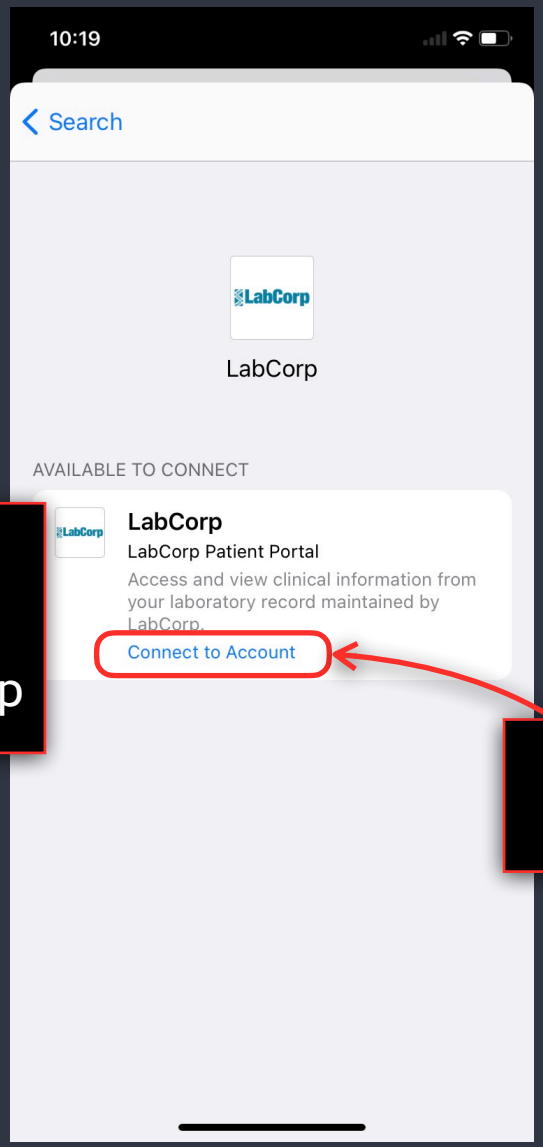


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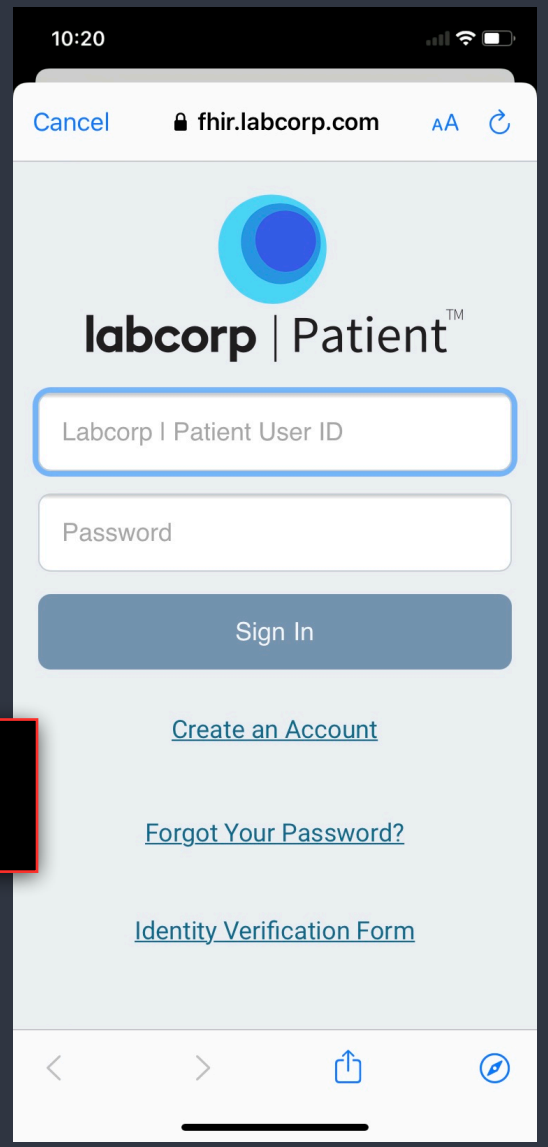


Unfortunately I don't have account in any US provider ...

 |  |

# To Demonstrate Health Records

Unfortunately I don't have account in any US provider ...

... but we do have a demo FHIR service we can use in Australia

 

# To Be Able to Search for Providers ...

Region "Finland" won't work, so I changed the Region to United States to demonstrate this


 |  |

? min.

# Connecting to
and
# Authorising Our Demo

 |  |

# Start from a QR Code ...

**From:** <[redacted]@apple.com> on behalf of [redacted]@apple.com>
**Date:** Tuesday, 25 February 2020 at 10:32 am
**To:** [redacted]@intersystems.com>
**Cc:** [redacted]@intersystems.com>, [redacted]@intersystems.com>
**Subject:** Re: Sandbox testing

Try scanning this QR code from the iPhone you want to test with.

Thanks,

[redacted]

 |  |

# Start from a QR Code ...

**From:** <[redacted]@apple.com> on behalf of [redacted]@apple.com>
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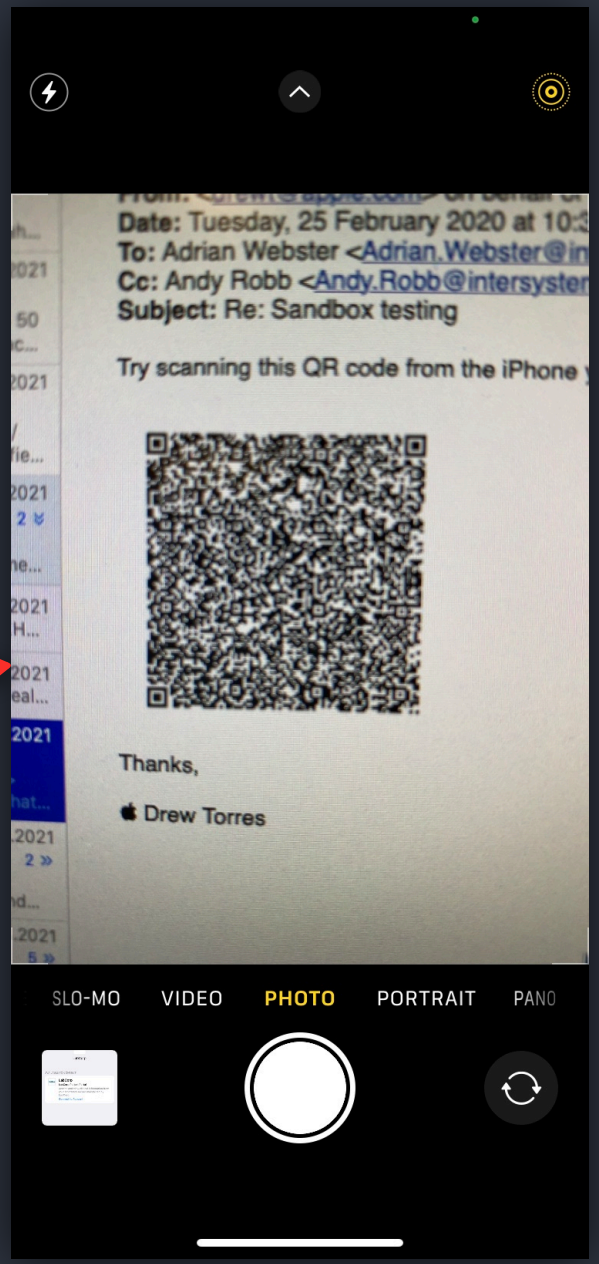
[redacted]

Thanks,

[redacted]

Use the iPhone camera to scan the QR code

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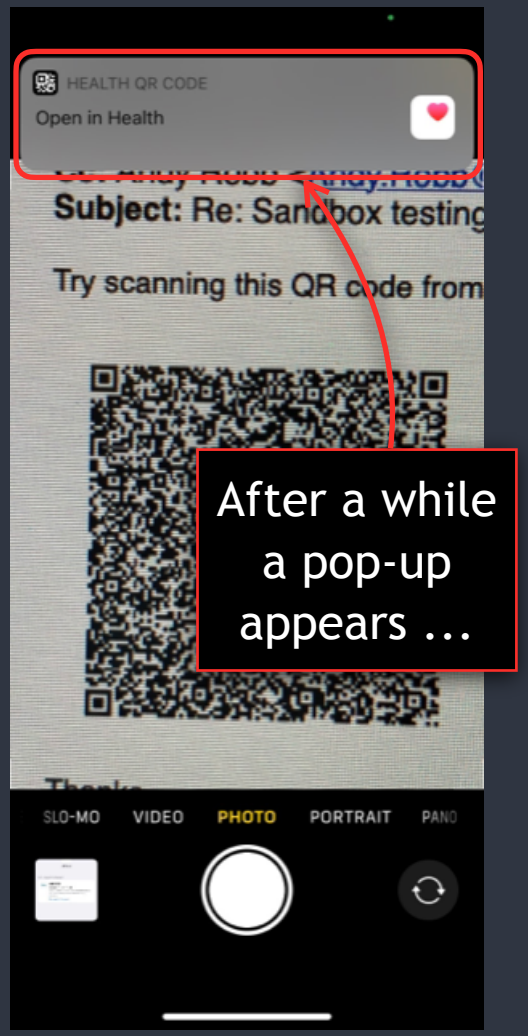
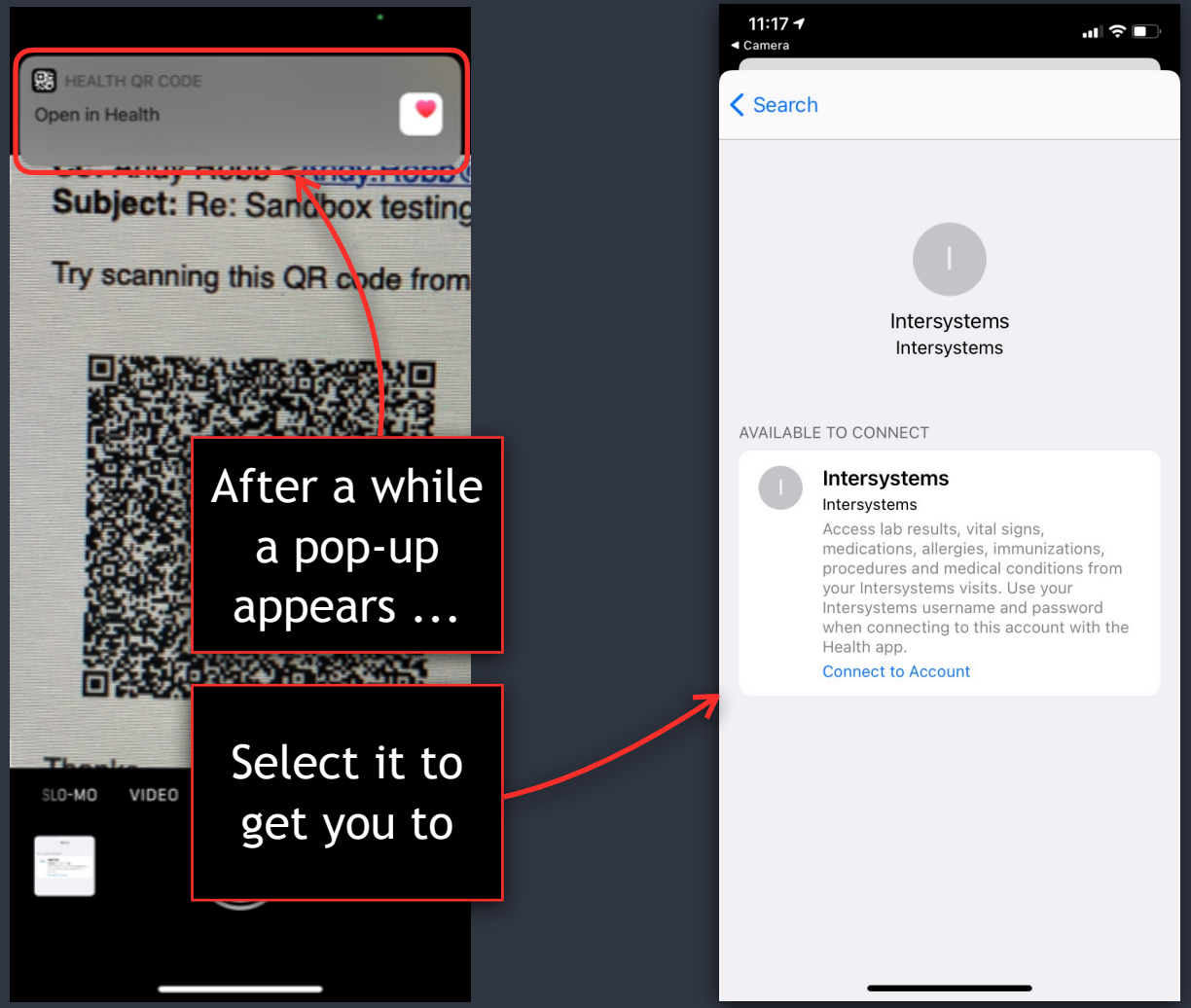
# You Start from a QR Code ...




After a while a pop-up appears ...

 |  |

# You Start from a QR Code ...







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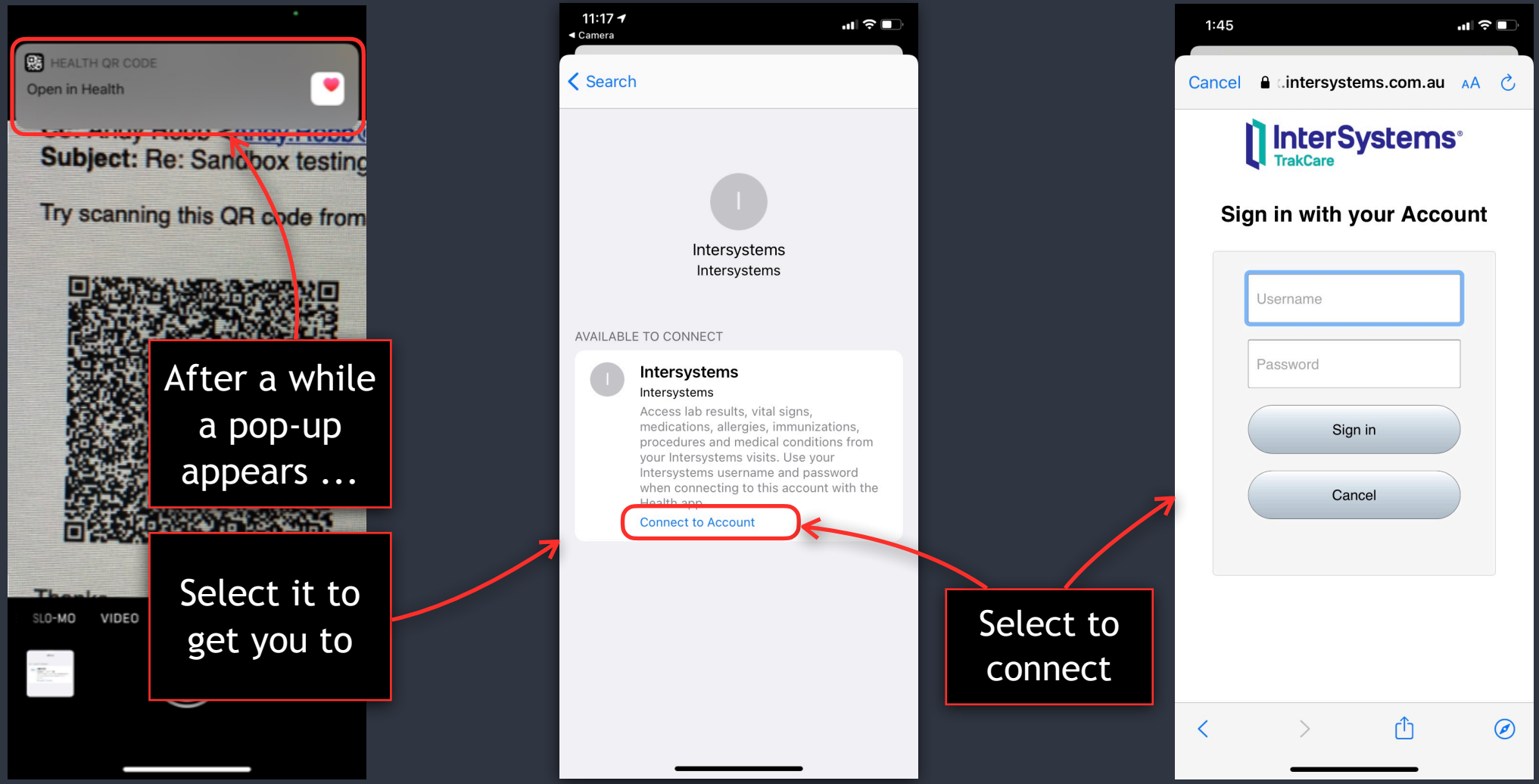


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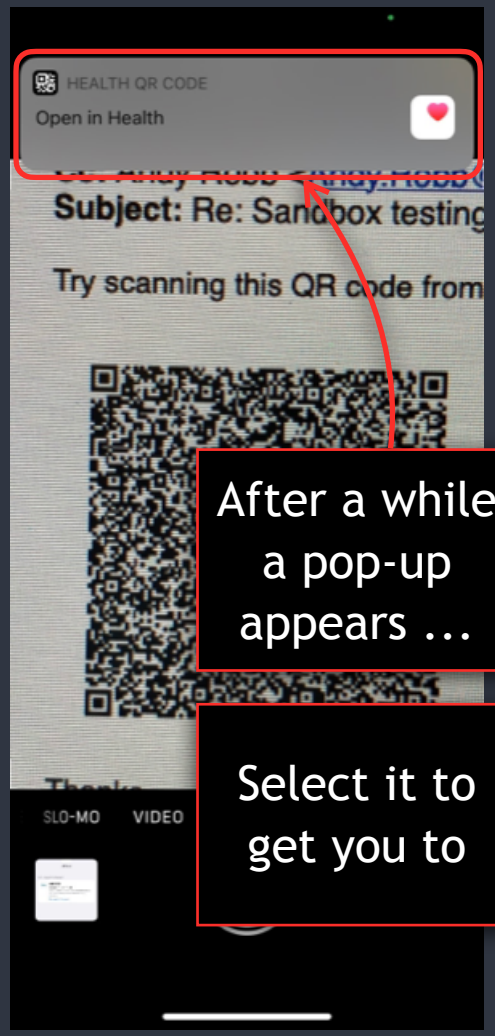
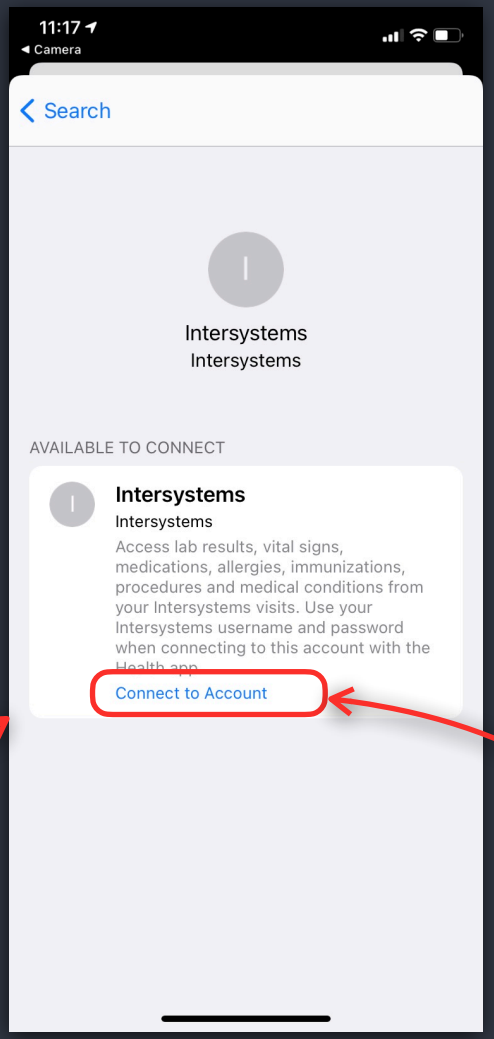
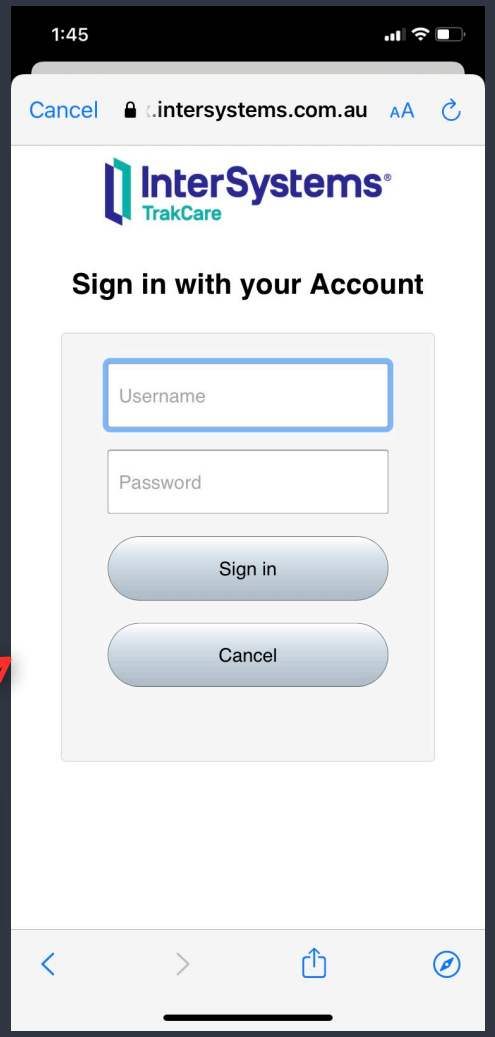



After a while a pop-up appears ...

Select it to get you to



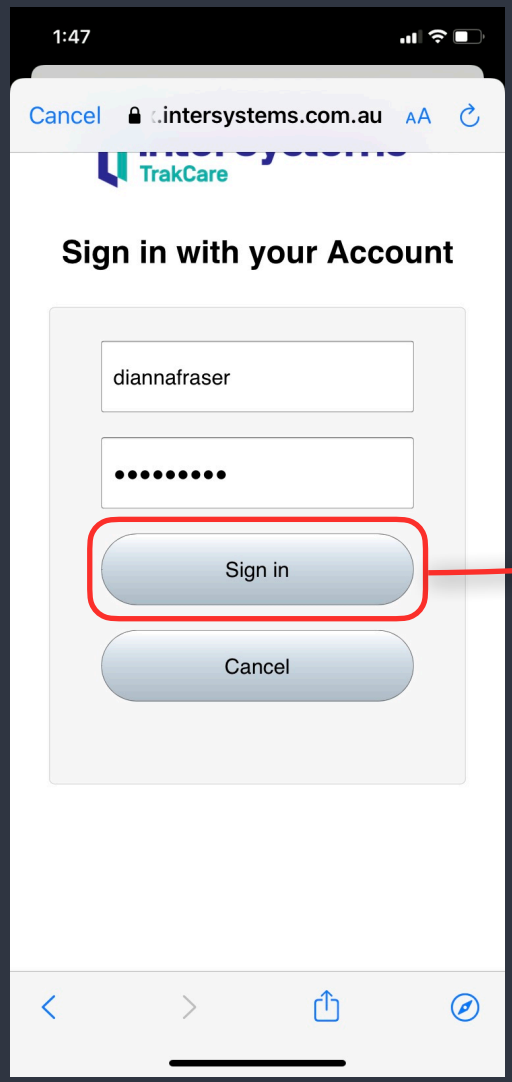

Select to connect

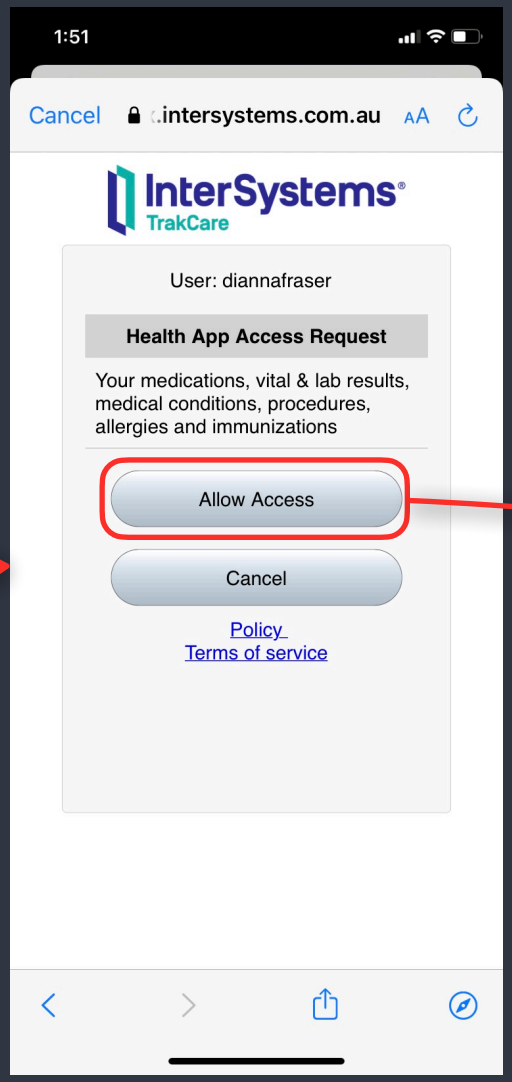


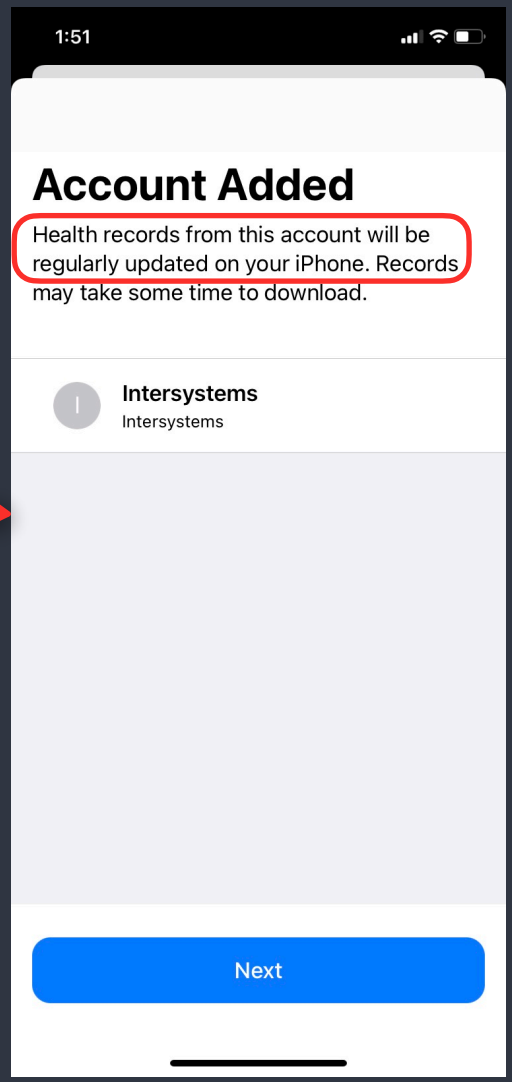

You need to authenticate and authorise the provider to give the app your health records ...

 |  |

# Authenticate and Authorise ...

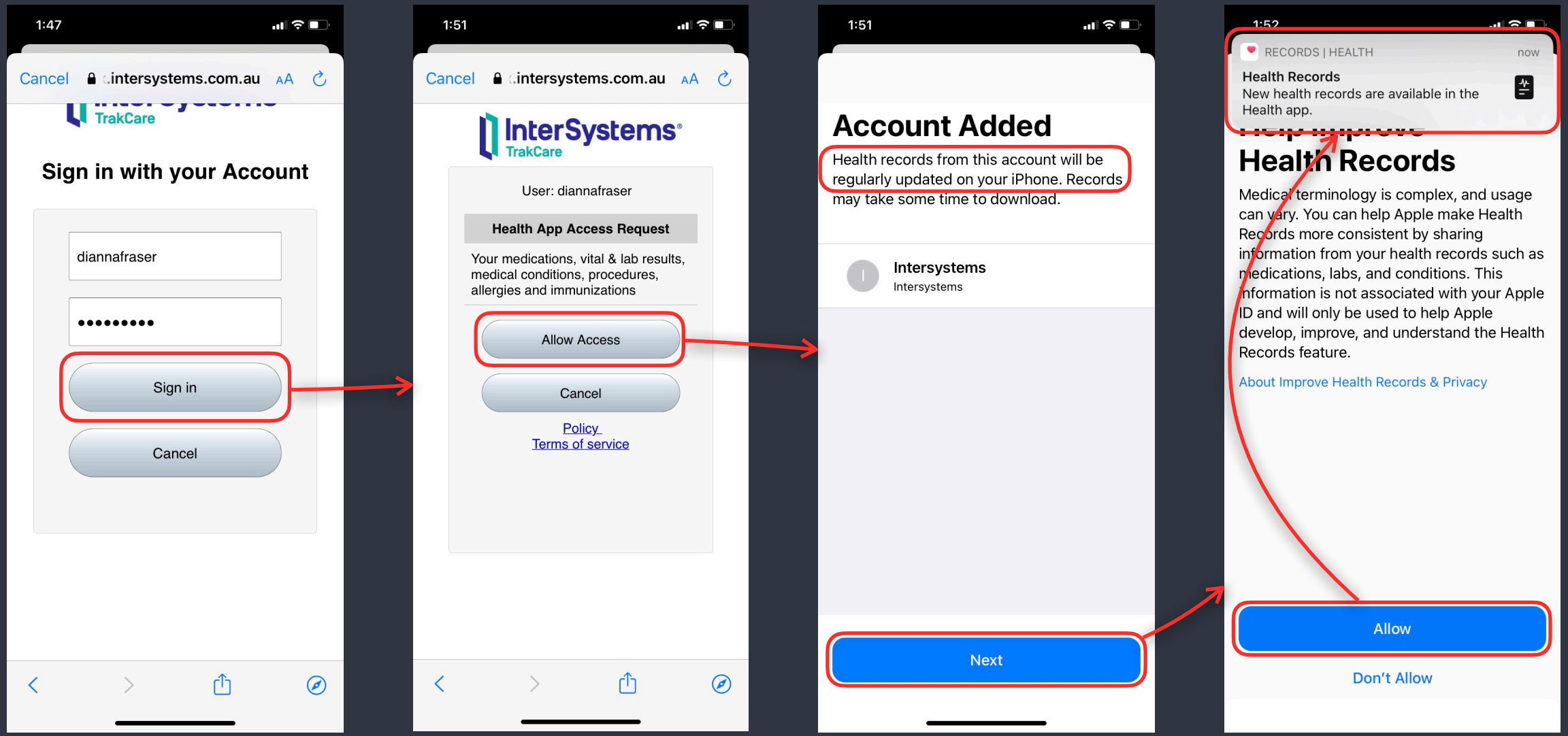


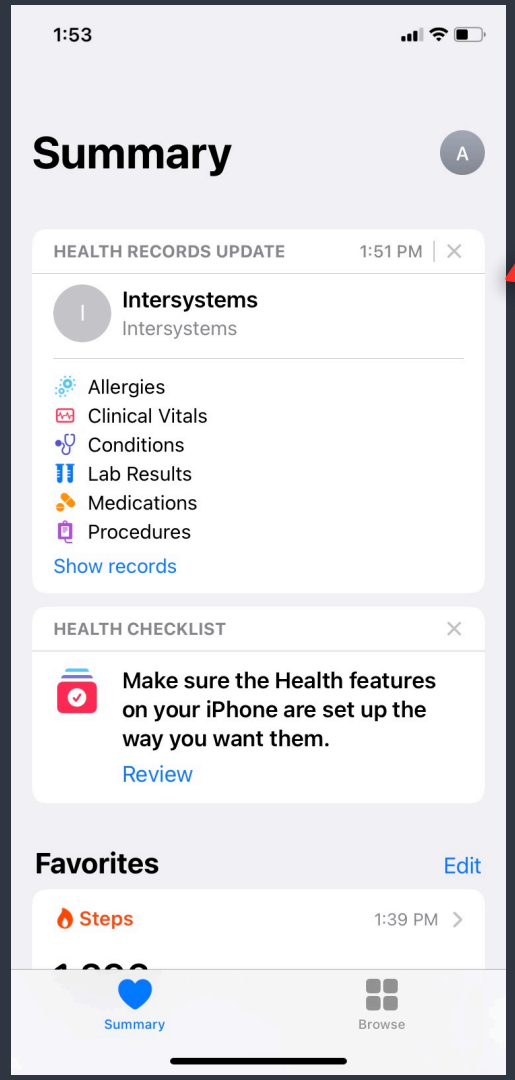

 |  |

# Authenticate and Authorise ...

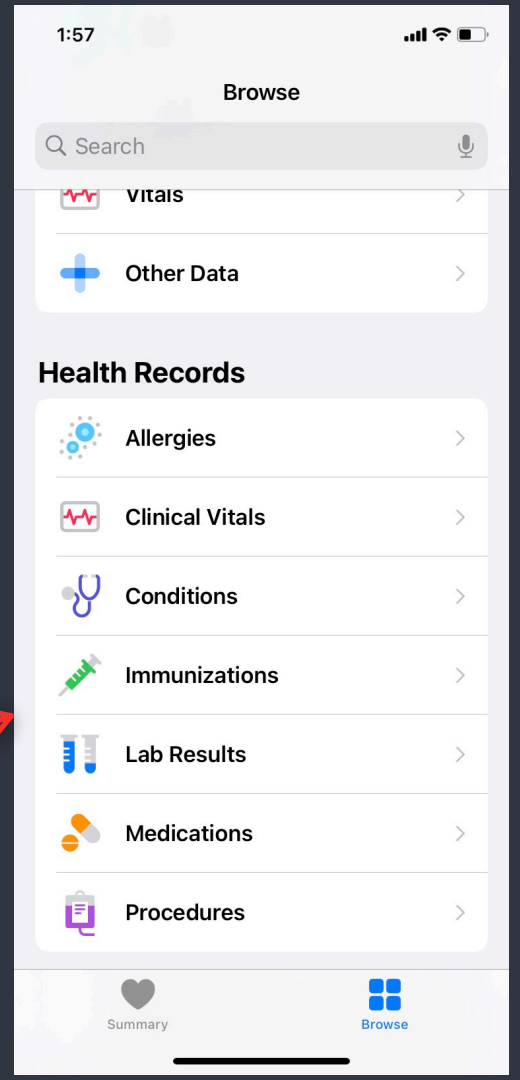



 |  |

# View the Health Records




Health Records can be viewed
ordered by time
or
grouped by type




 |  |

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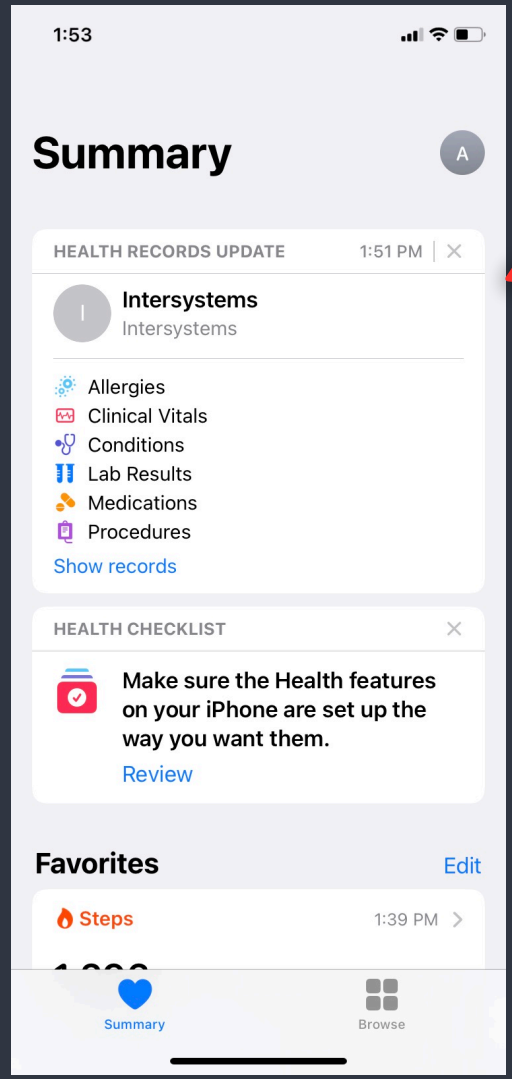


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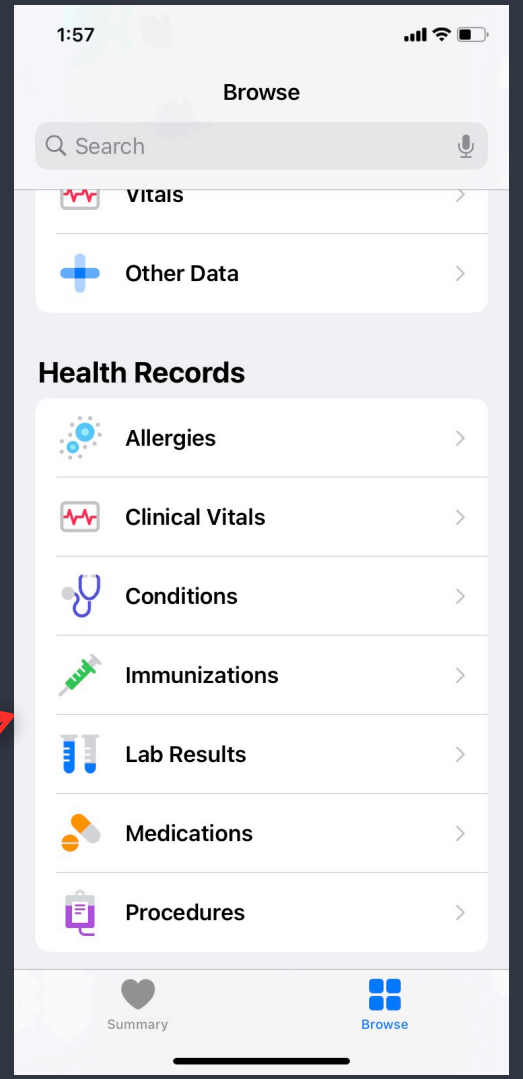


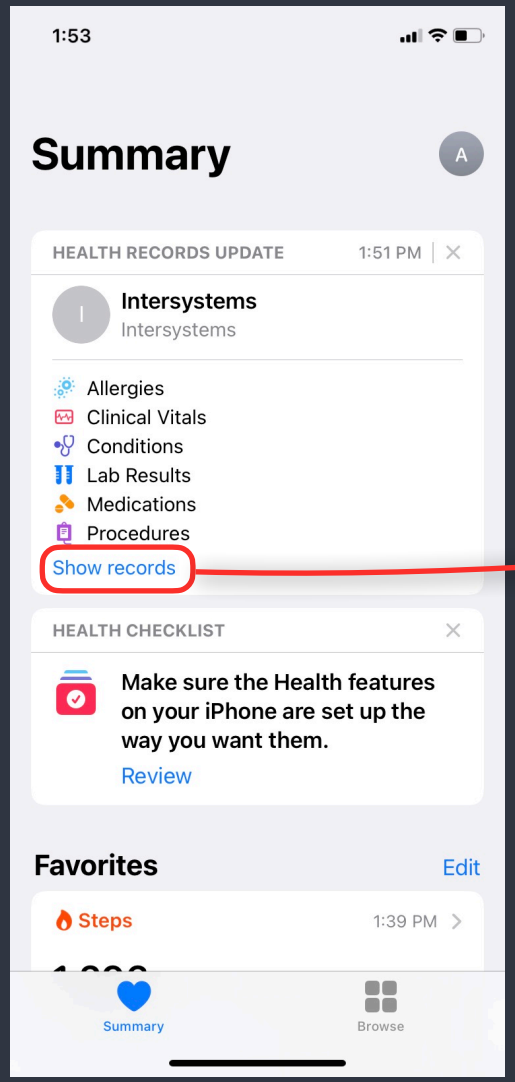

 |  |

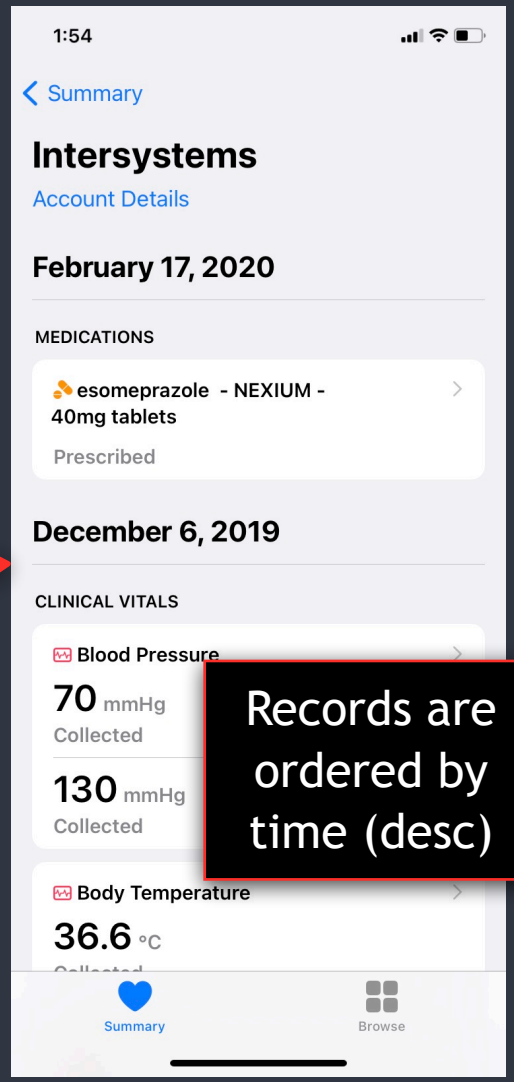
? min.

# Viewing Health Records

# View the Health Records - Summary

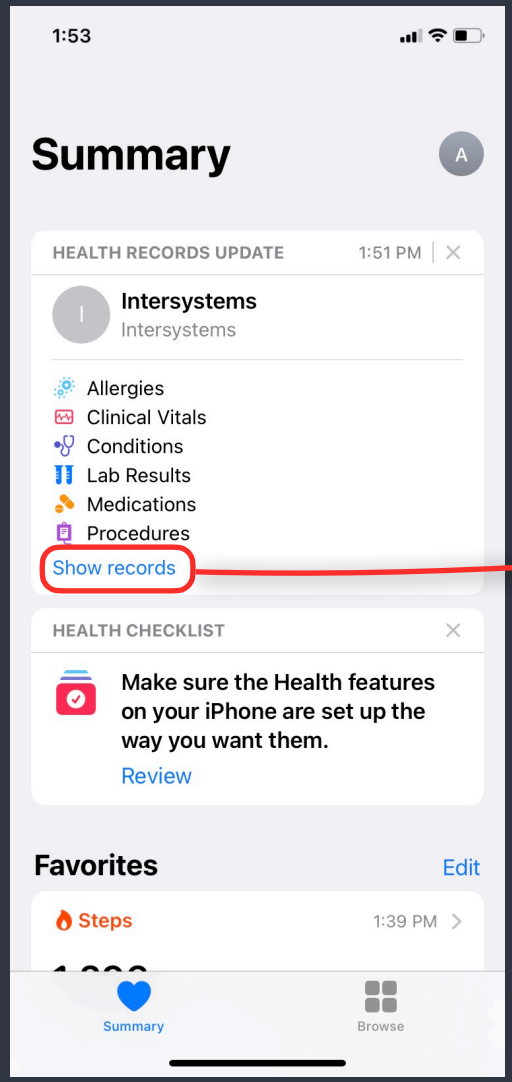


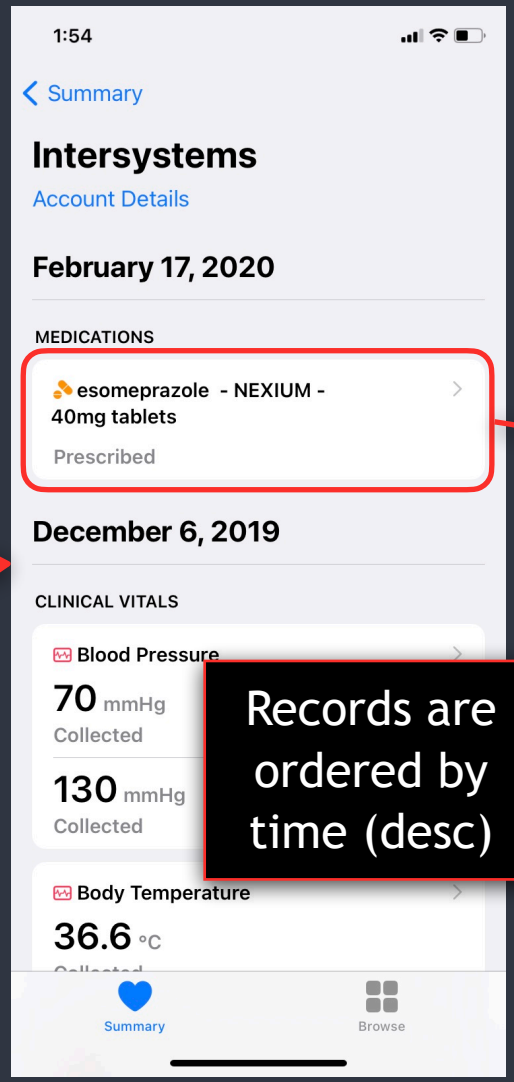



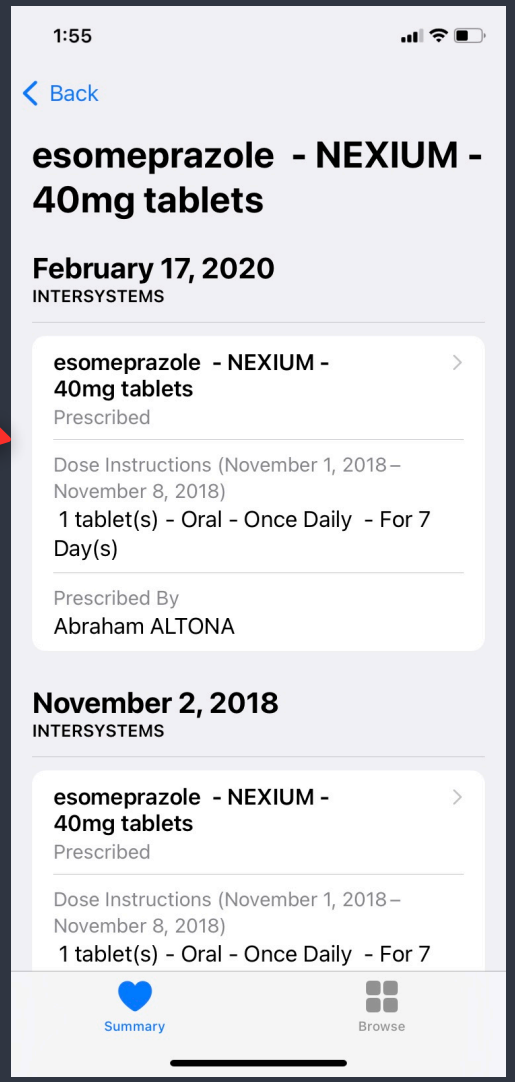

Records are ordered by time (desc)

 |  |

# View the Health Records - Summary




Records are ordered by time (desc)

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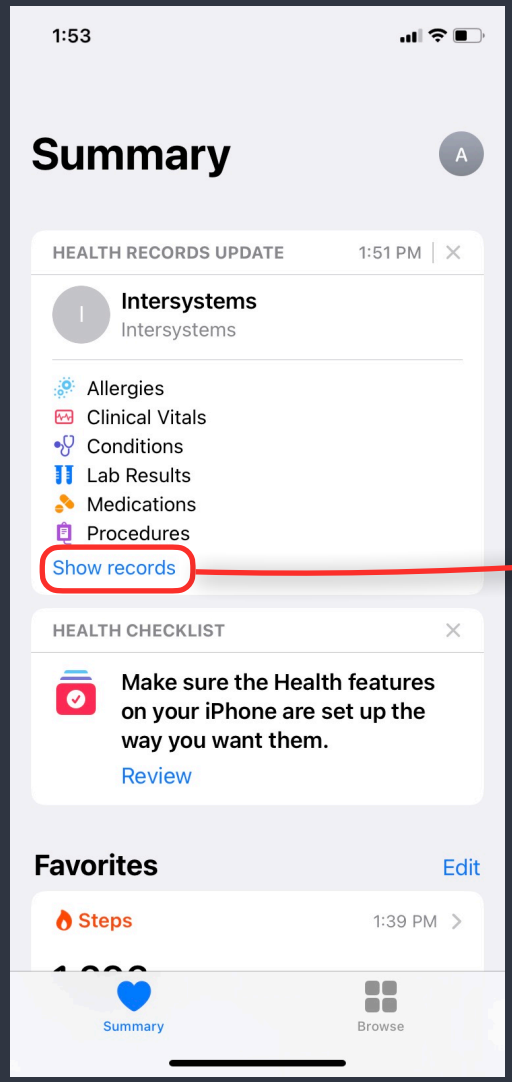
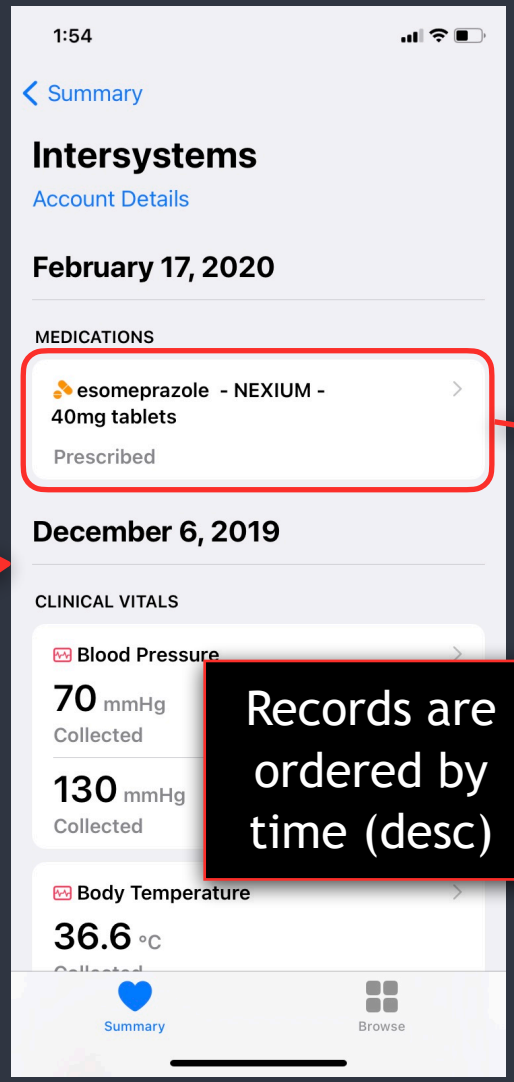
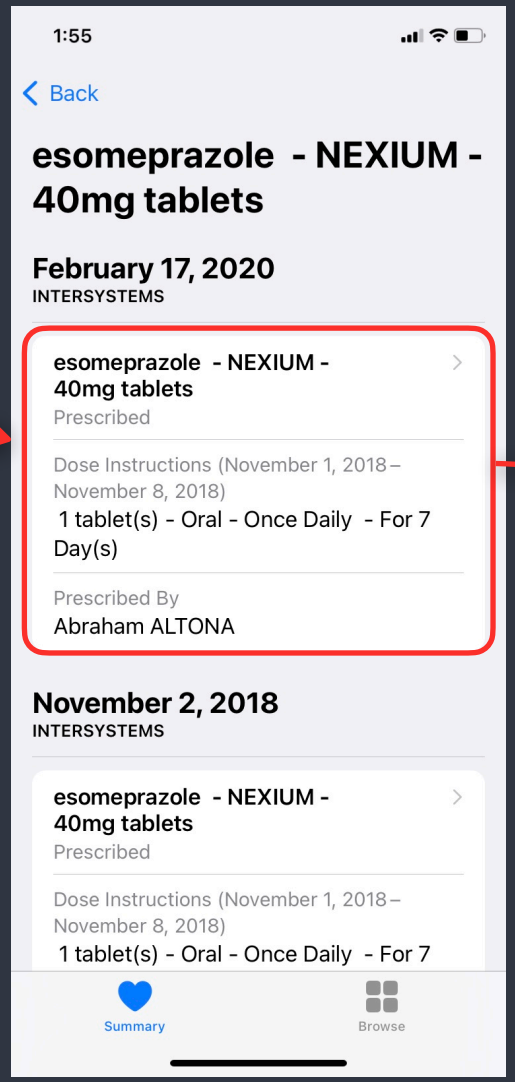
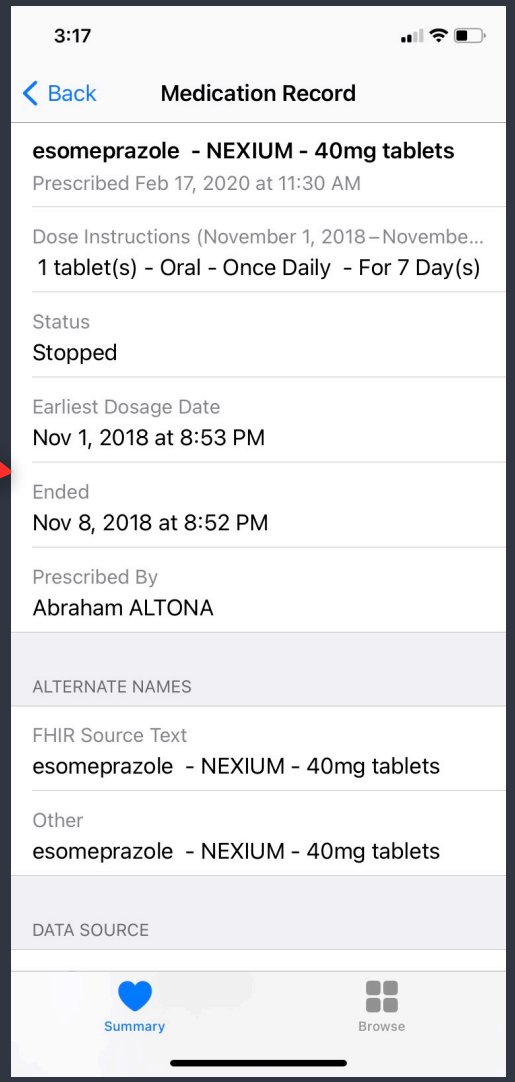


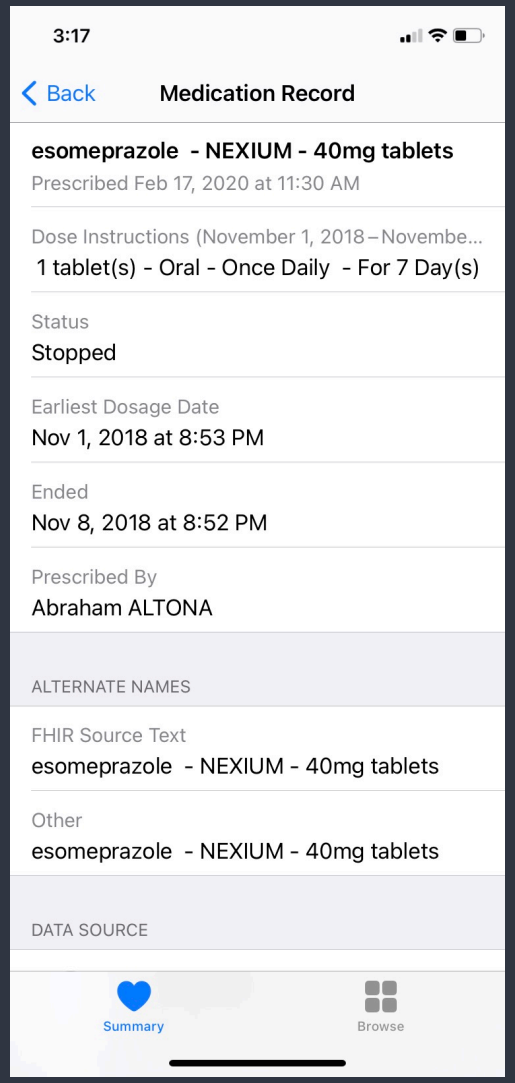

Records are ordered by time (desc)



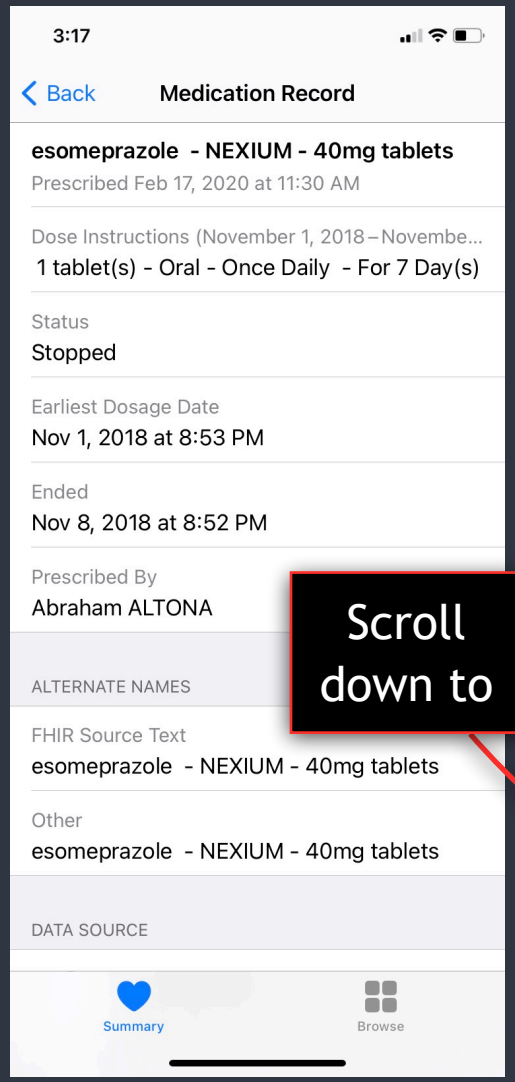

 |  |

# You Can Even View the Source Data ...

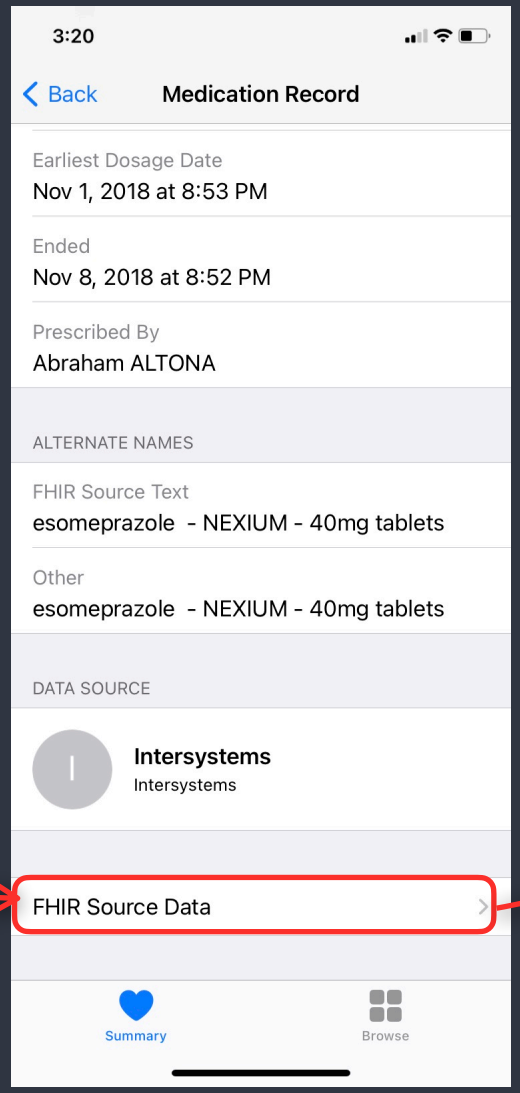


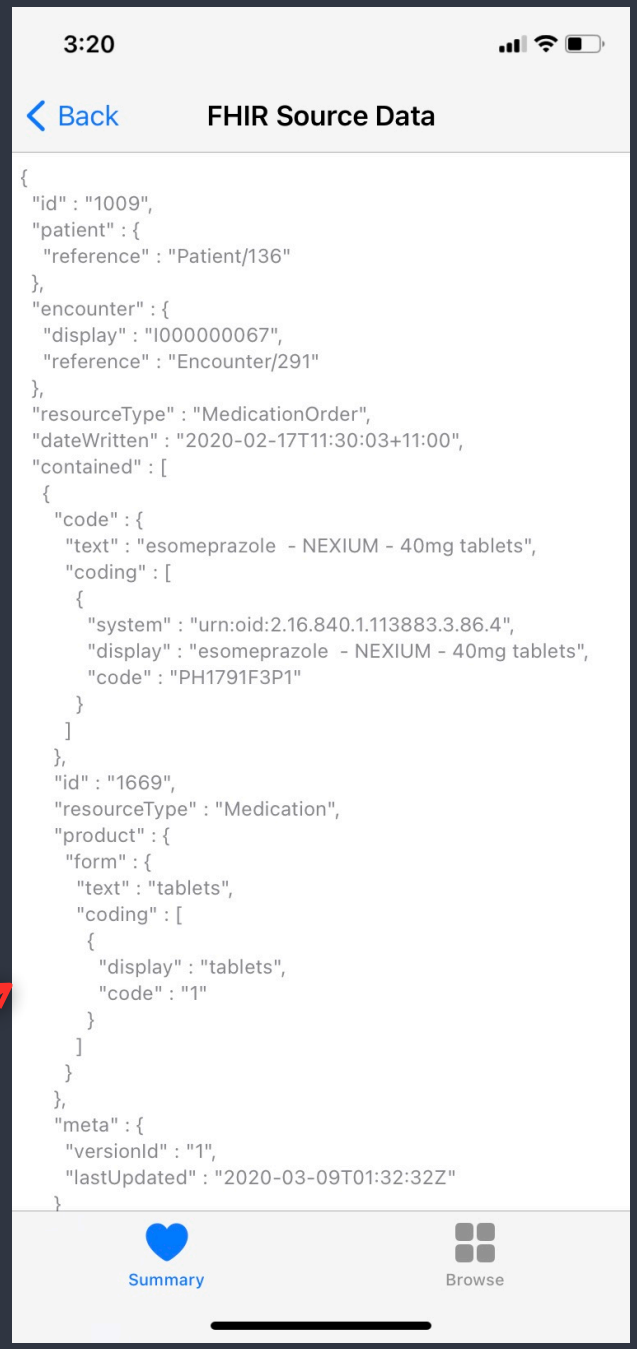

 |  |

# You Can Even View the Source Data ...



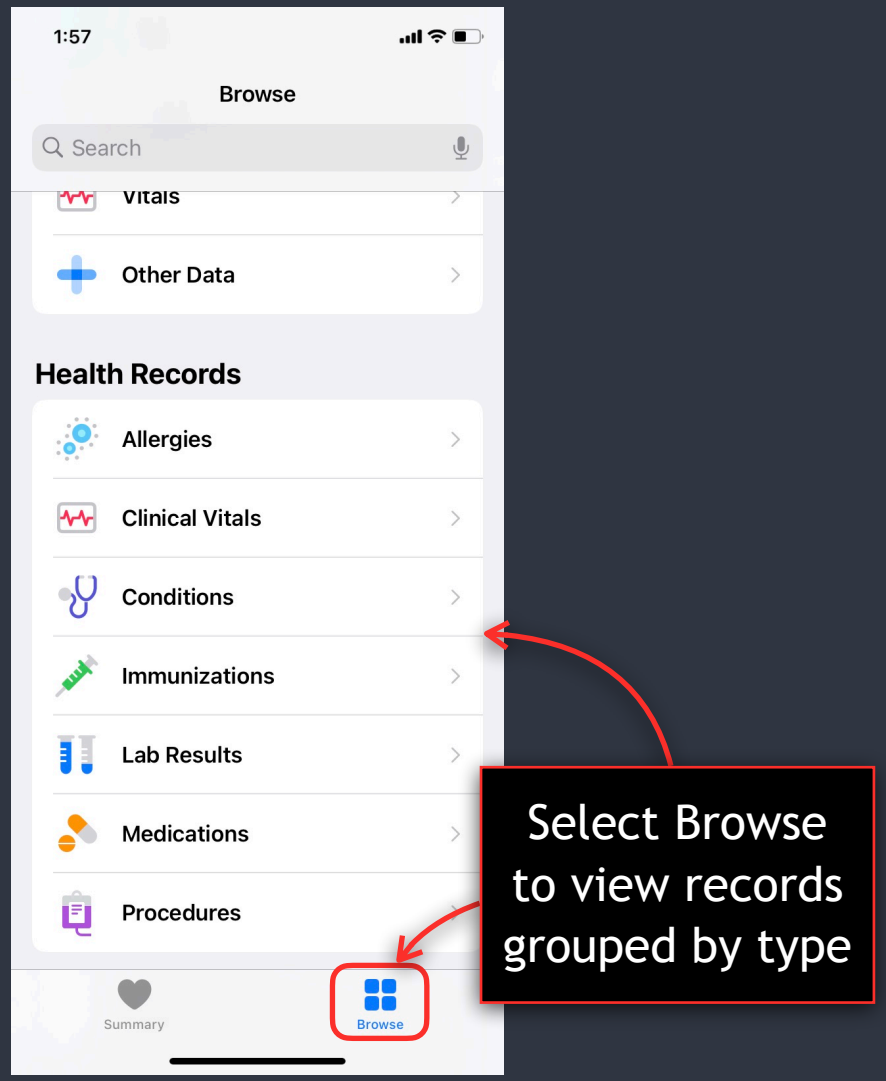

Scroll down to




 |  |

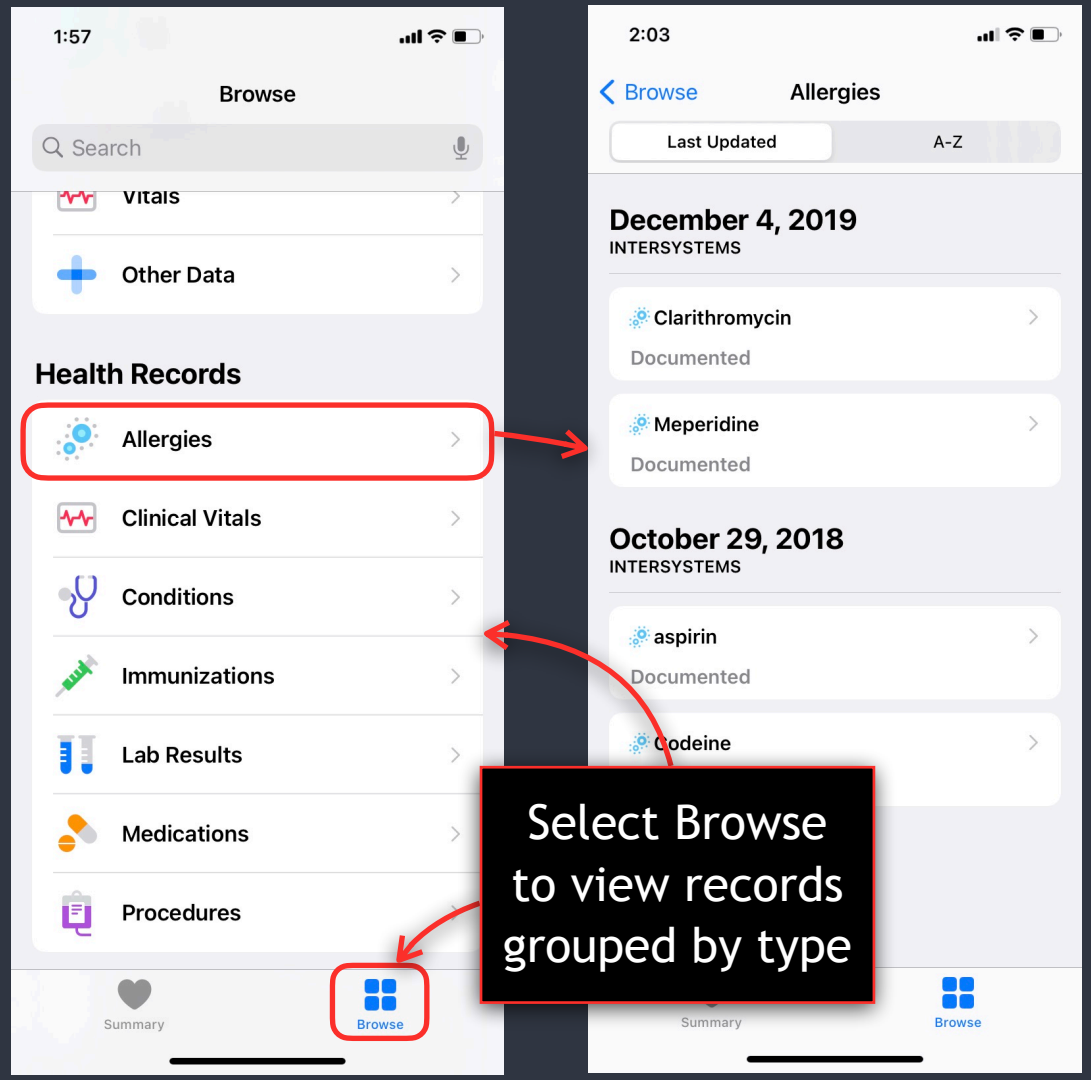
# View the Health Records - Browse - Allergies




Select Browse to view records grouped by type

 |  |

# View the Health Records - Browse - Allergies



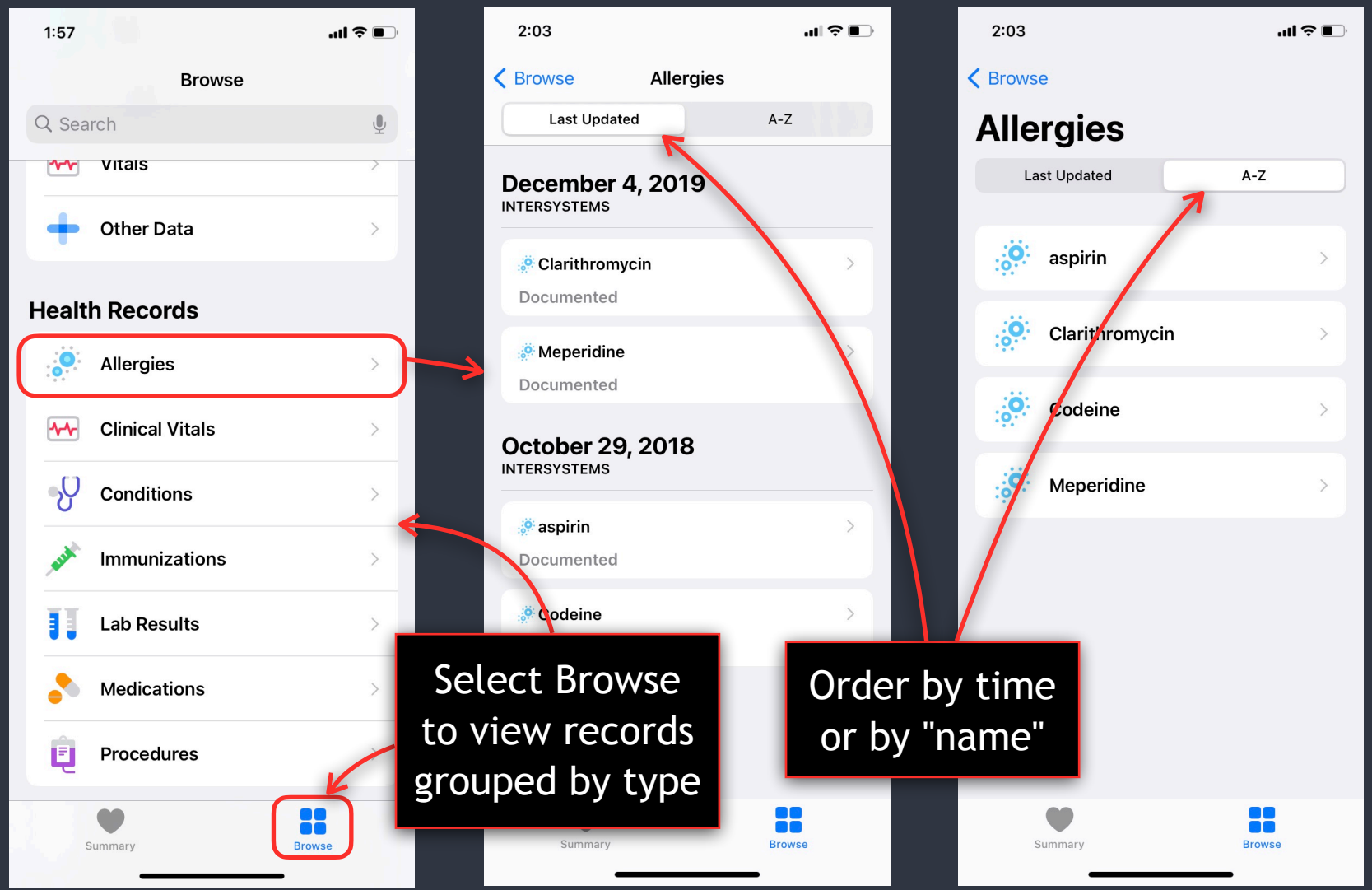




Select Browse to view records grouped by type

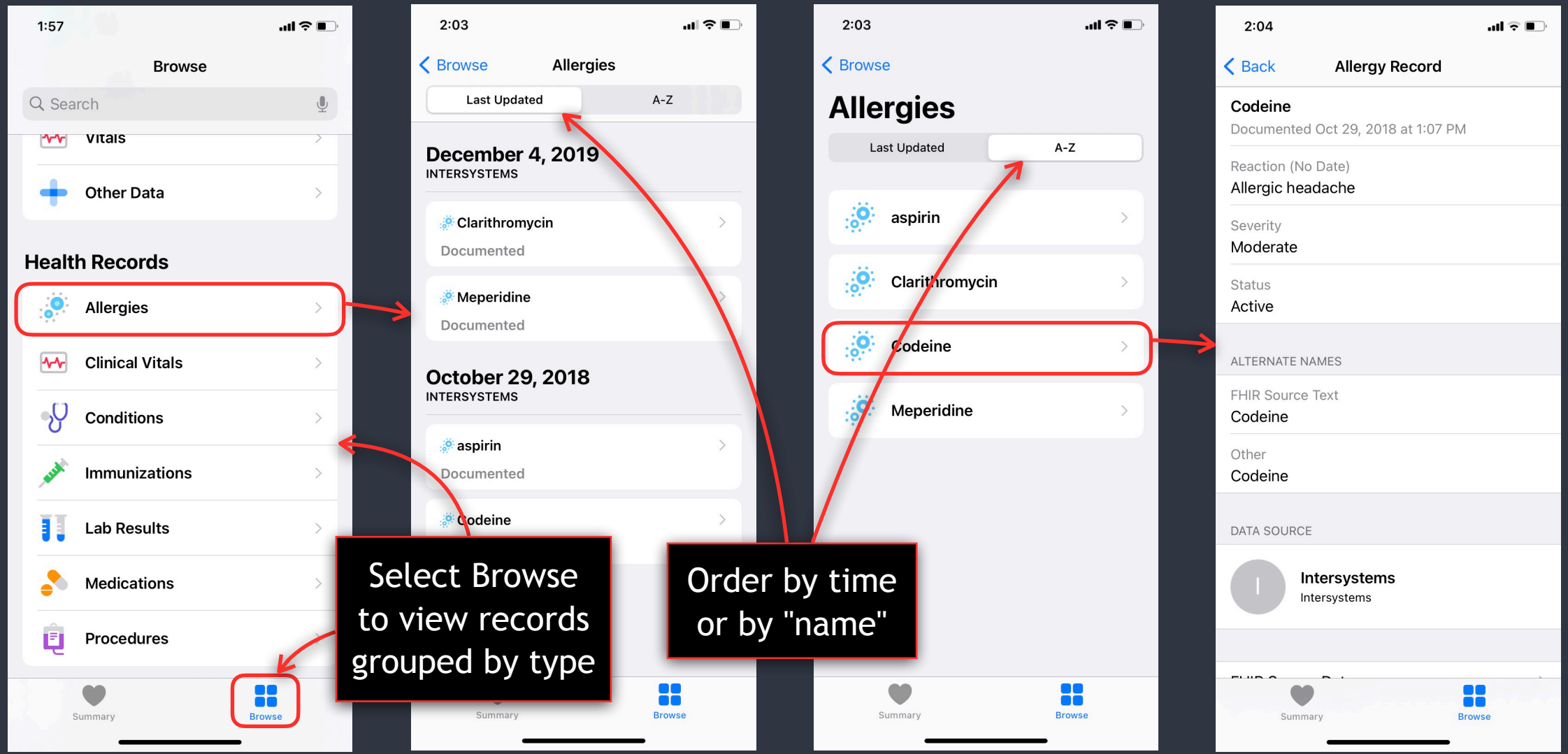
 |  |

# View the Health Records - Browse - Allergies



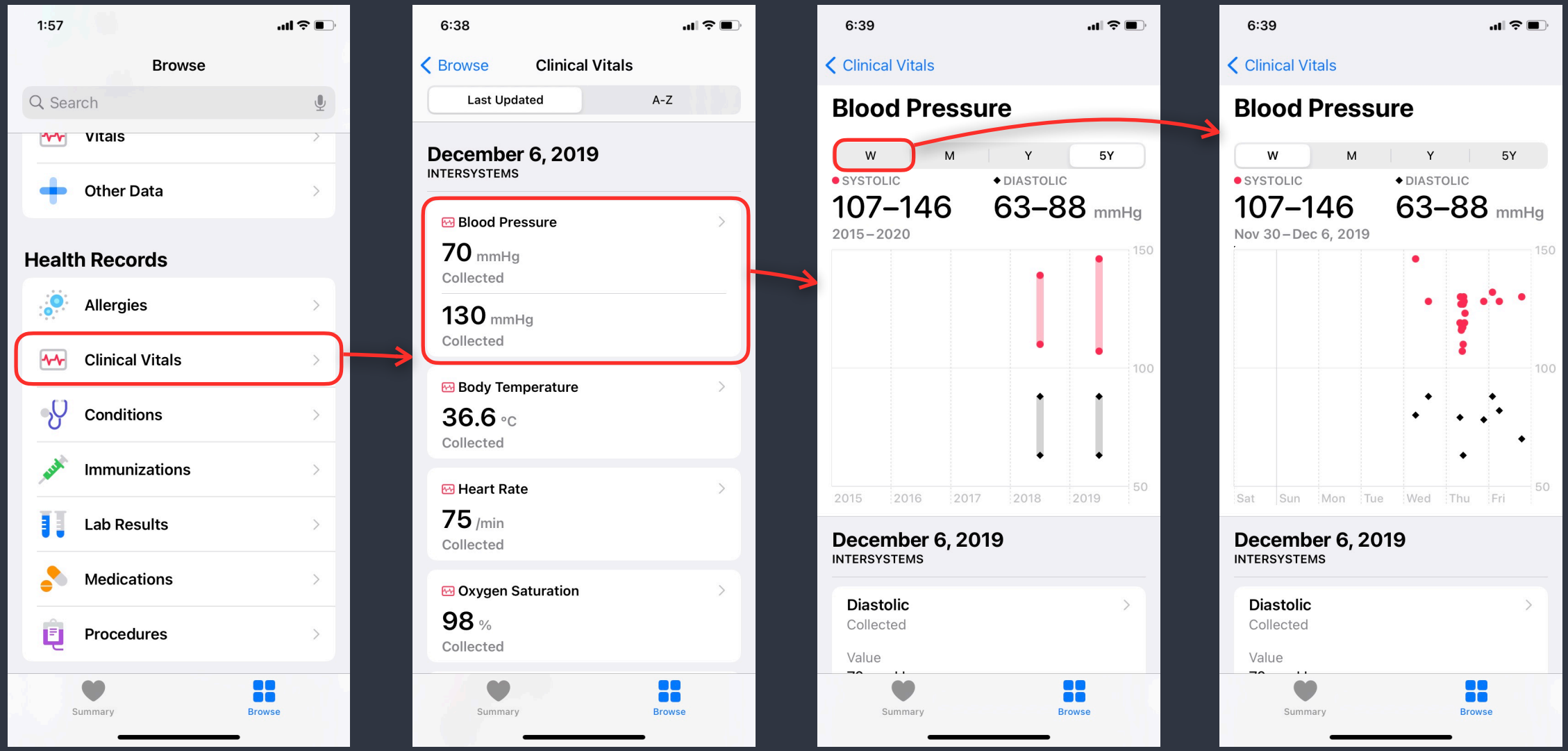

 |  |

# View the Health Records - Browse - Allergies



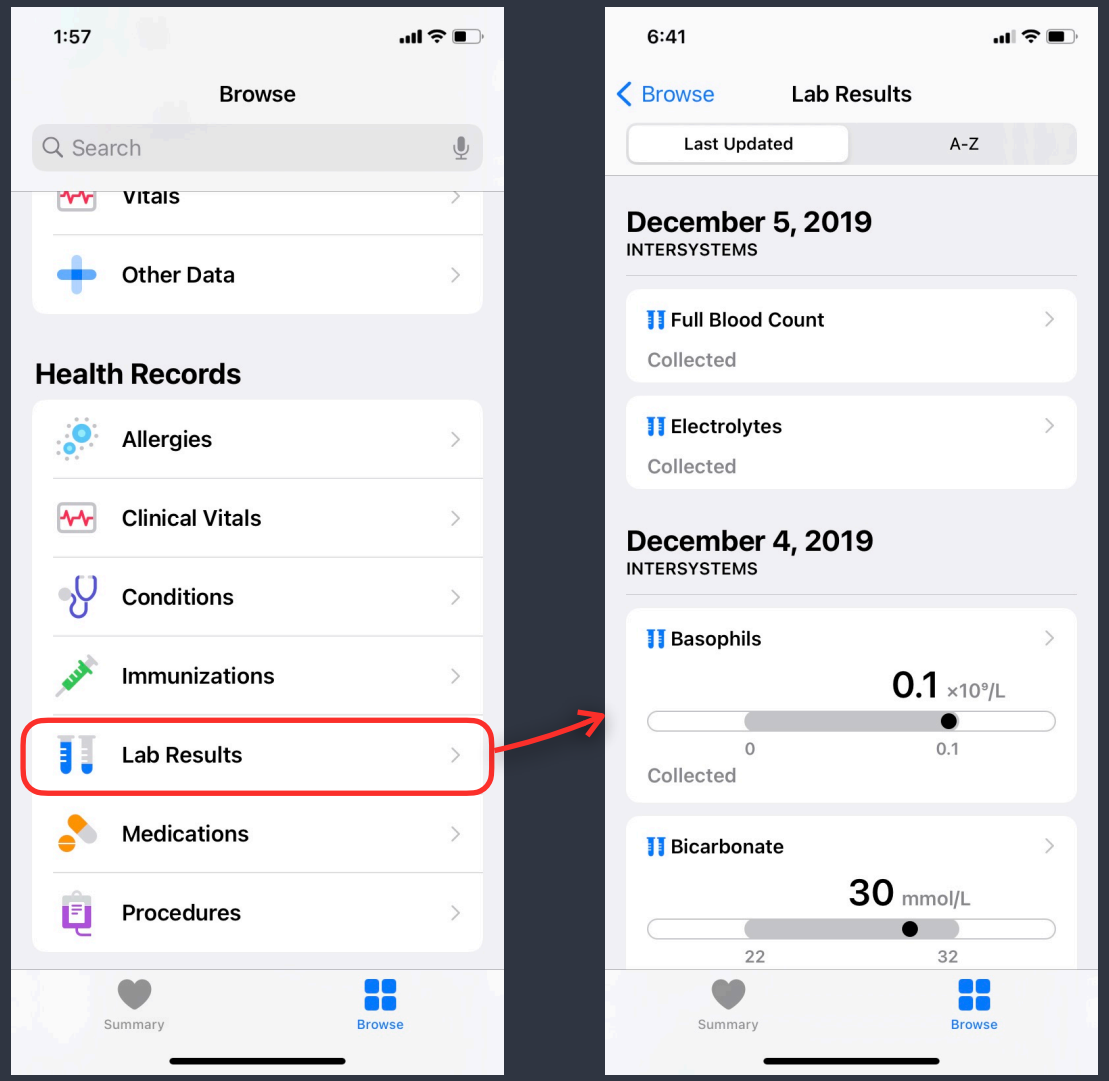

 |  |

# View the Health Records - Browse - Clinical Vitals




 |  |

# View the Health Records - Browse - Lab Results

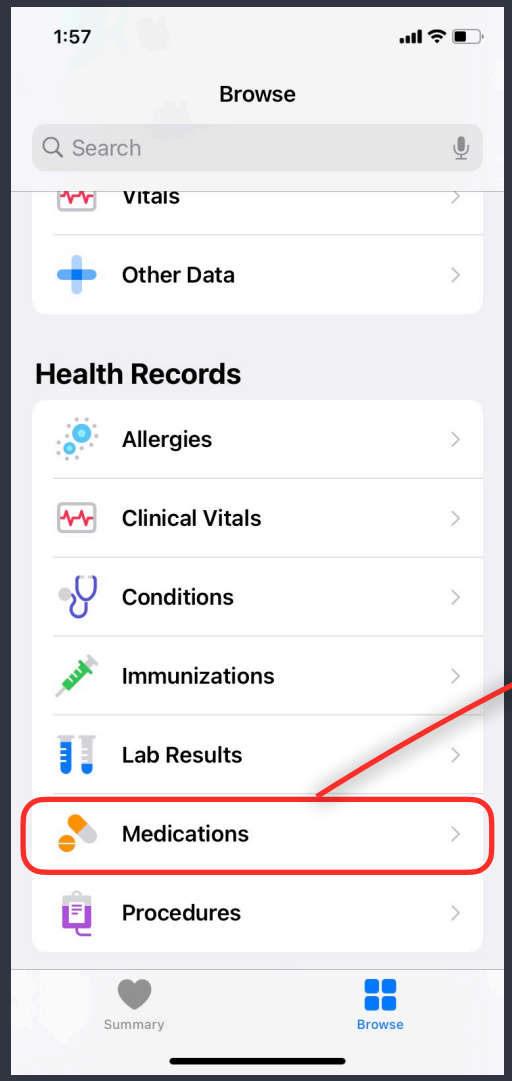


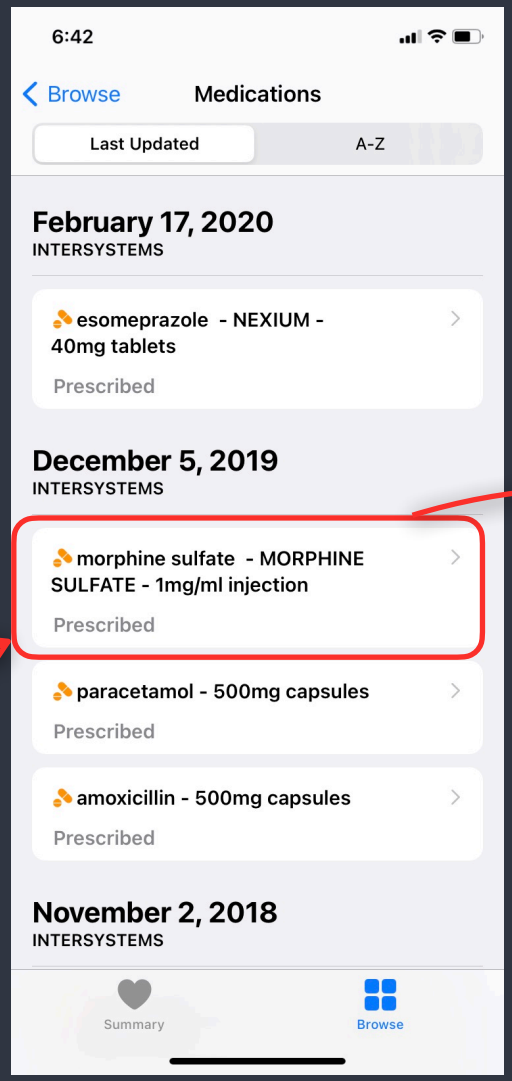


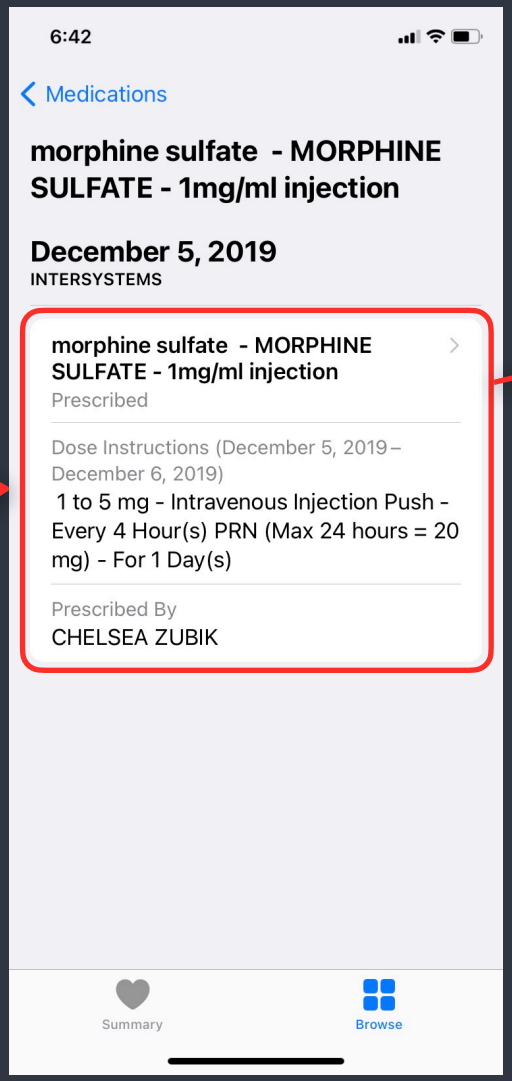


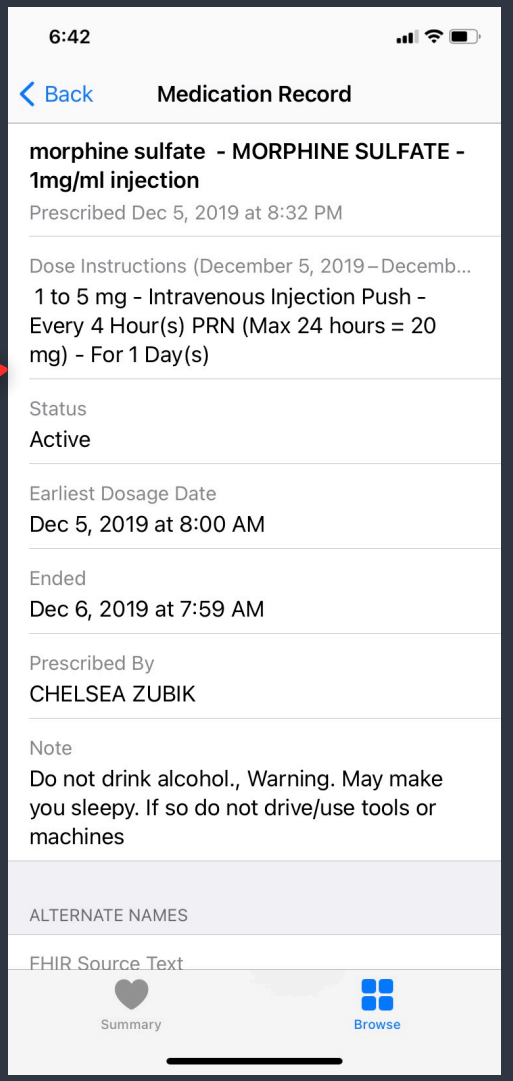
 

# View the Health Records - Browse - Medications



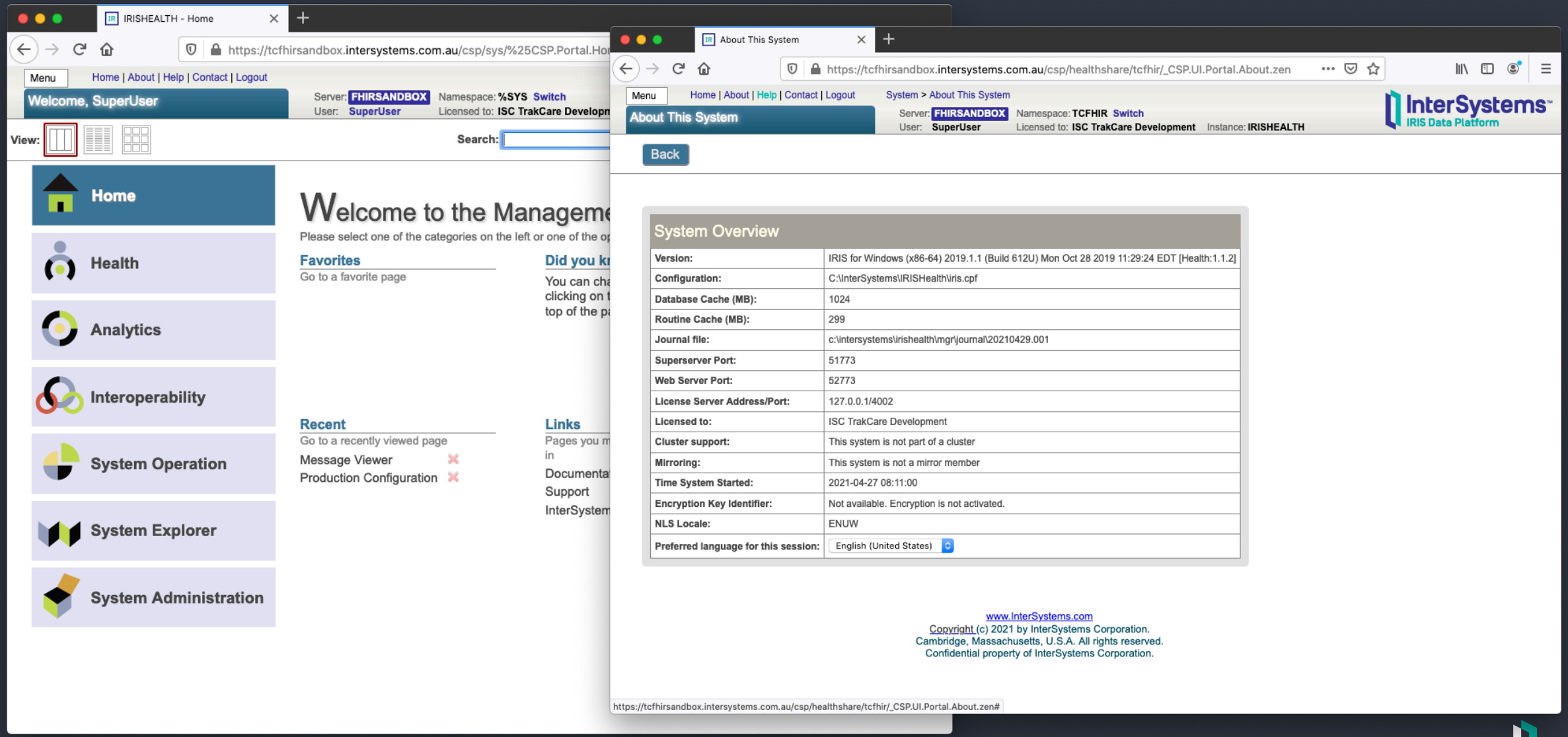

 |  |

? min.

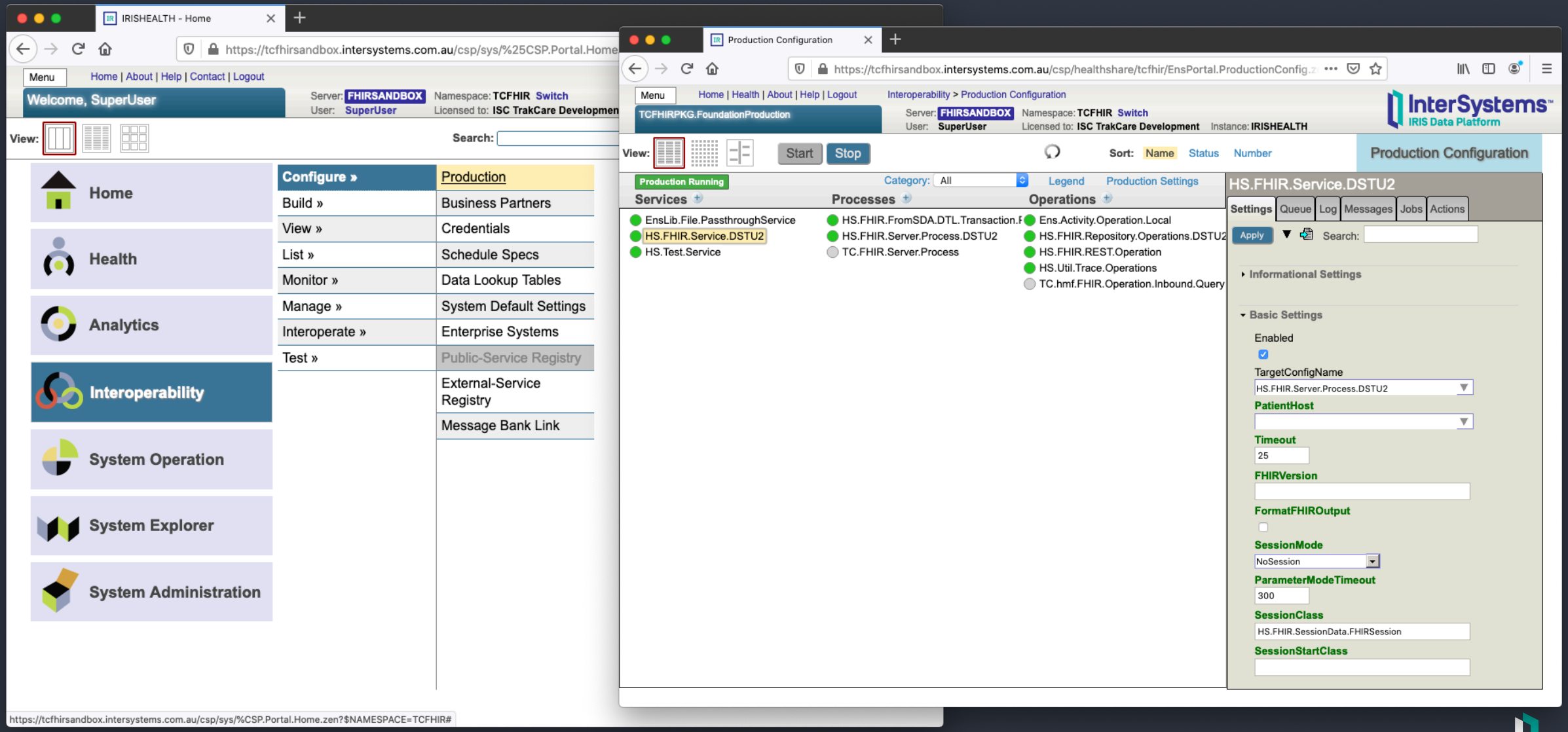
# FHIR Server
based on
# IRIS for Health

 |  |

# FHIR RESTful API Is Served By ...

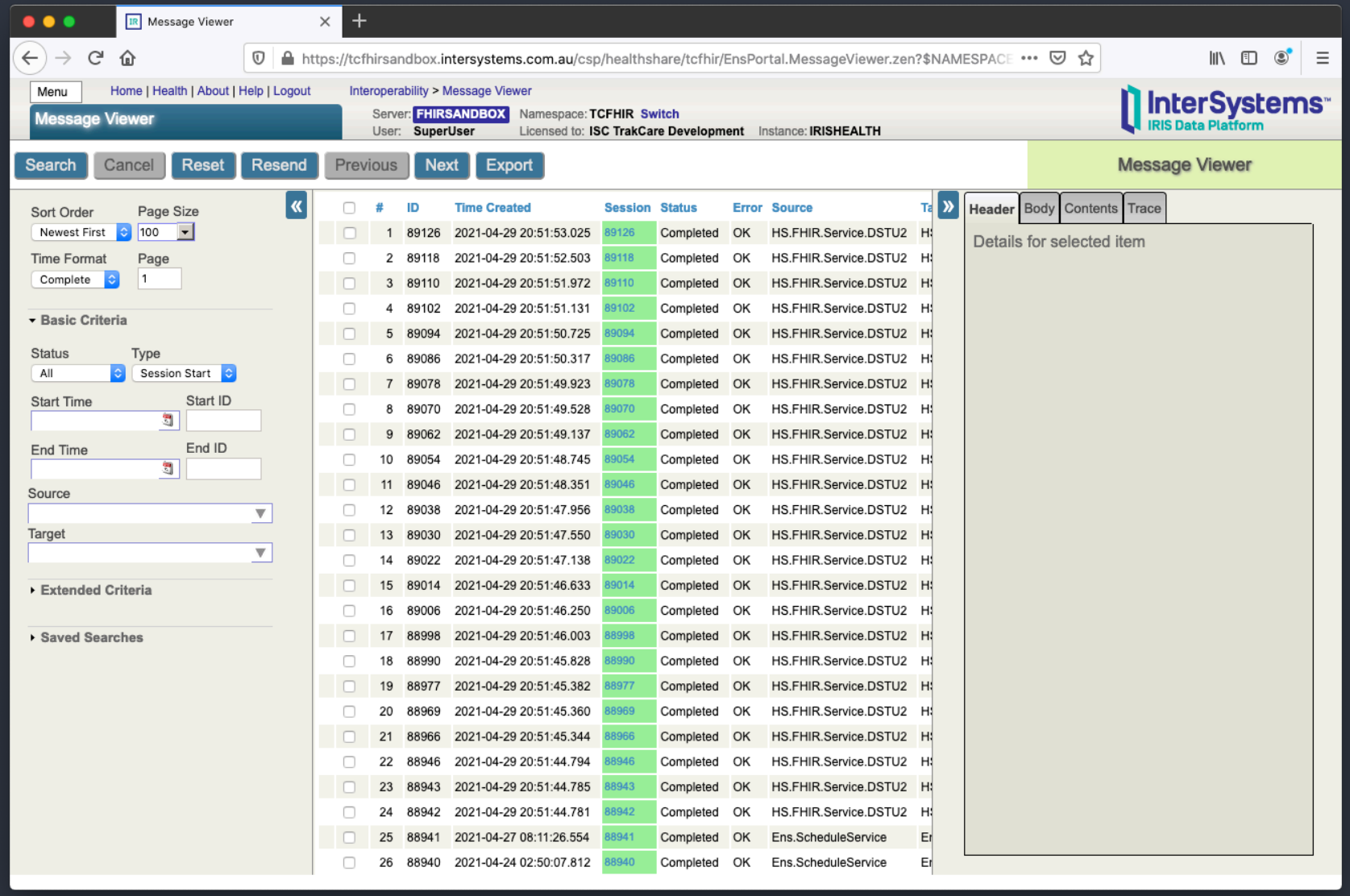


# The Production



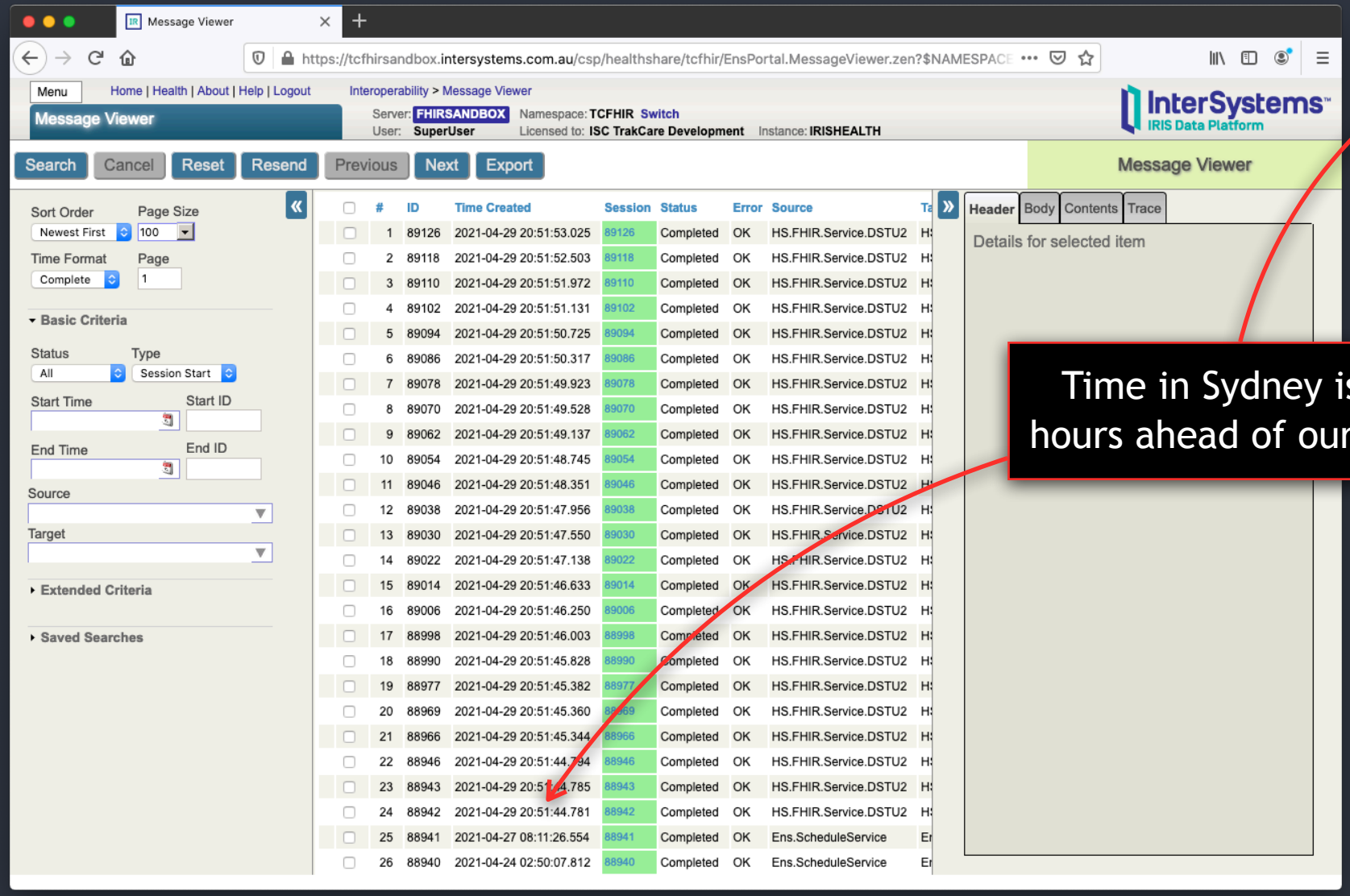

 |  |

# The FHIR Requests from Apple Health App

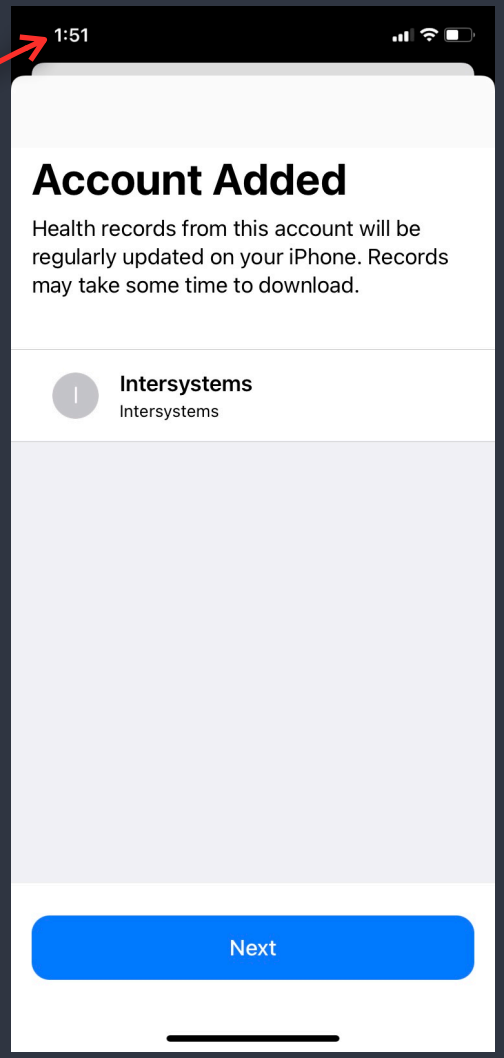



 |  |

# The FHIR Requests from Apple Health App

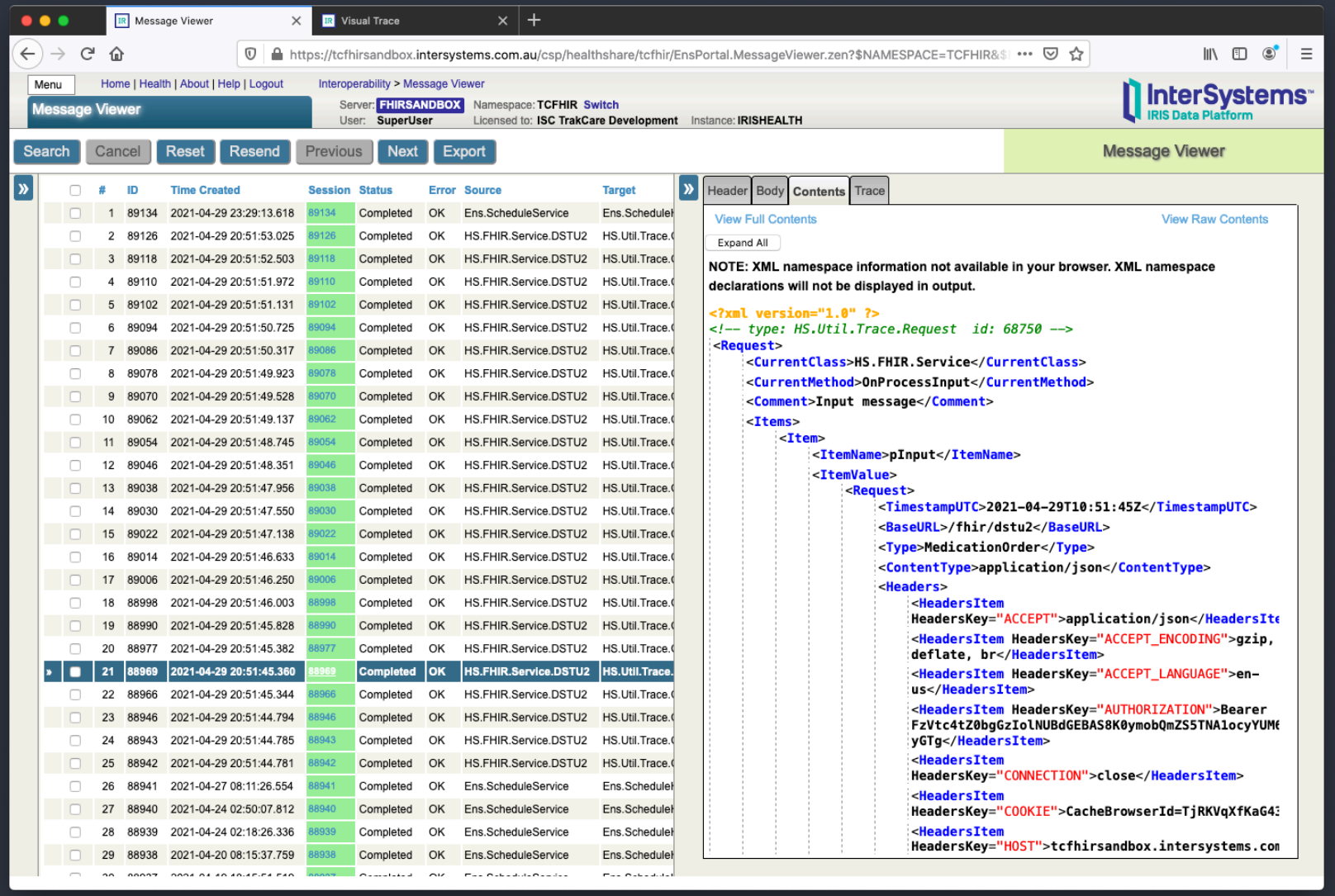



Time in Sydney is 7 hours ahead of ours ...




 |  |

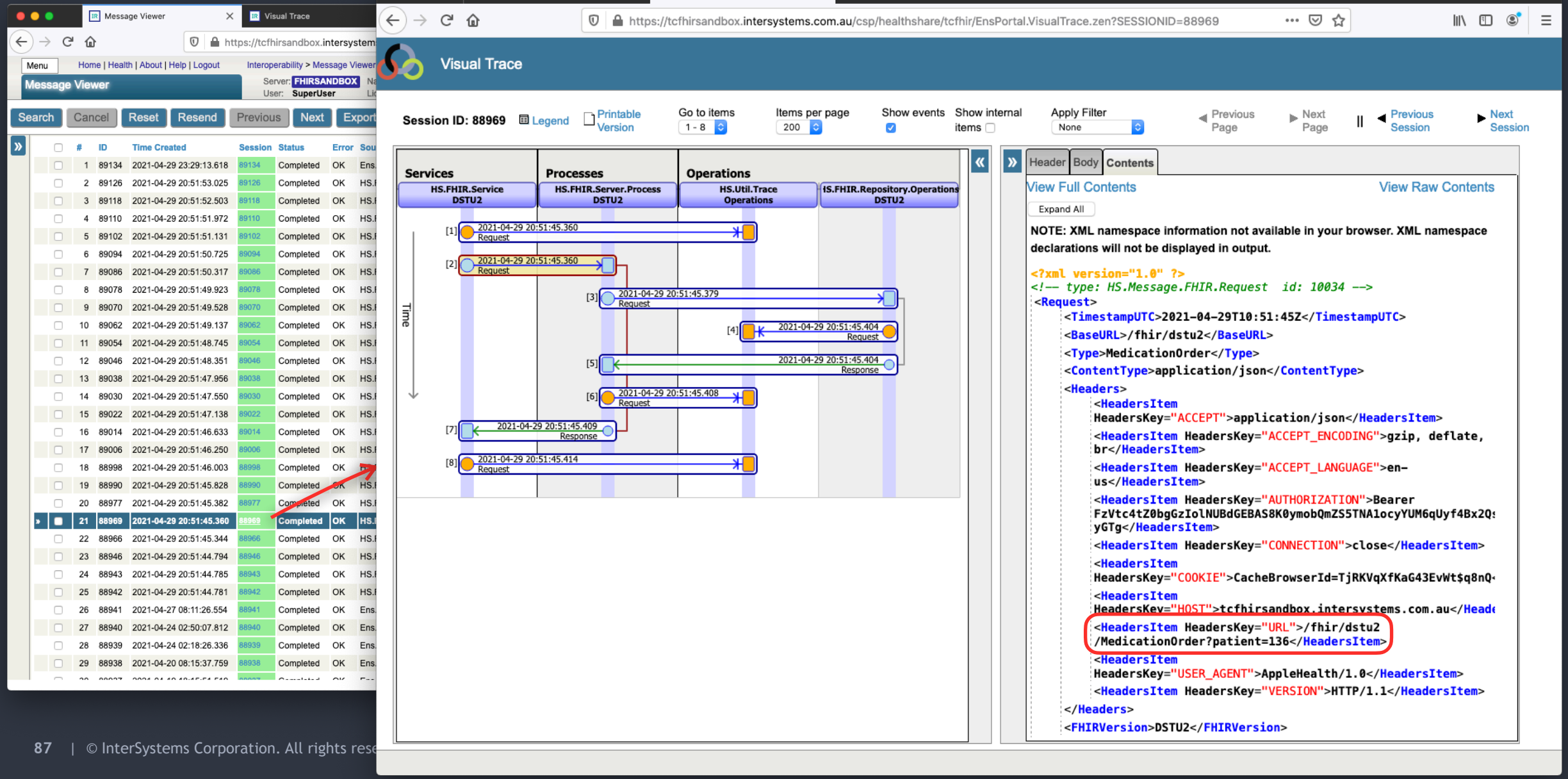
# Request for Medication Orders from Apple Health App



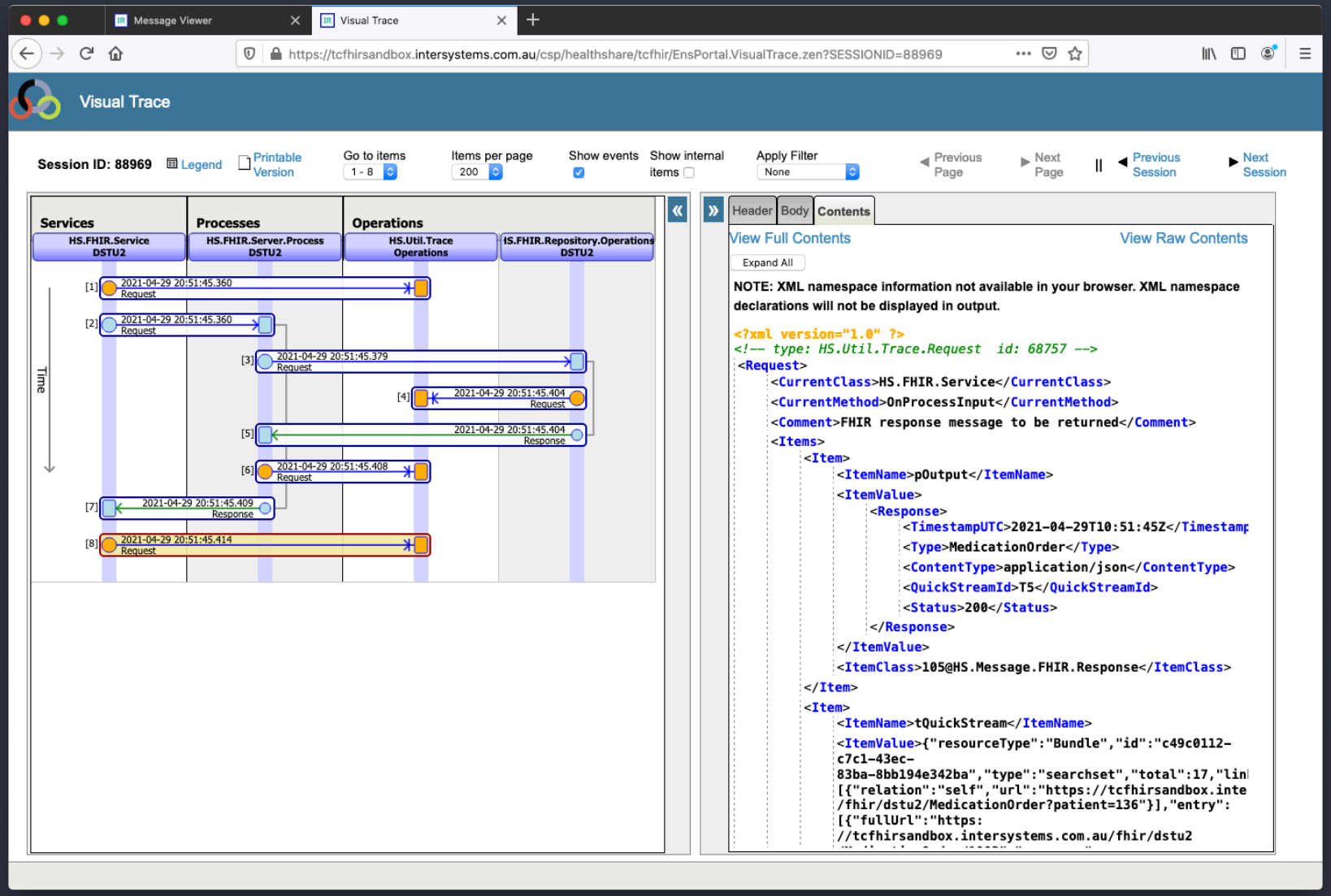

| | # | ID | Time Created | Session | Status | Error | Source | Target |
|---|---|---|---|---|---|---|---|---|
| | 1 | 89134 | 2021-04-29 23:29:13.618 | 89134 | Completed | OK | Ens.ScheduleService | Ens.ScheduleH |
| | 2 | 89126 | 2021-04-29 20:51:53.025 | 89126 | Completed | OK | HS.FHIR.Service.DSTU2 | HS.Util.Trace.( |
| | 3 | 89118 | 2021-04-29 20:51:52.503 | 89118 | Completed | OK | HS.FHIR.Service.DSTU2 | HS.Util.Trace.( |
| | 4 | 89110 | 2021-04-29 20:51:51.972 | 89110 | Completed | OK | HS.FHIR.Service.DSTU2 | HS.Util.Trace.( |
| | 5 | 89102 | 2021-04-29 20:51:51.131 | 89102 | Completed | OK | HS.FHIR.Service.DSTU2 | HS.Util.Trace.( |
| | 6 | 89094 | 2021-04-29 20:51:50.725 | 89094 | Completed | OK | HS.FHIR.Service.DSTU2 | HS.Util.Trace.( |
| | 7 | 89086 | 2021-04-29 20:51:50.317 | 89086 | Completed | OK | HS.FHIR.Service.DSTU2 | HS.Util.Trace.( |
| | 8 | 89078 | 2021-04-29 20:51:49.923 | 89078 | Completed | OK | HS.FHIR.Service.DSTU2 | HS.Util.Trace.( |
| | 9 | 89070 | 2021-04-29 20:51:49.528 | 89070 | Completed | OK | HS.FHIR.Service.DSTU2 | HS.Util.Trace.( |
| | 10 | 89062 | 2021-04-29 20:51:49.137 | 89062 | Completed | OK | HS.FHIR.Service.DSTU2 | HS.Util.Trace.( |
| | 11 | 89054 | 2021-04-29 20:51:48.745 | 89054 | Completed | OK | HS.FHIR.Service.DSTU2 | HS.Util.Trace.( |
| | 12 | 89046 | 2021-04-29 20:51:48.351 | 89046 | Completed | OK | HS.FHIR.Service.DSTU2 | HS.Util.Trace.( |
| | 13 | 89038 | 2021-04-29 20:51:47.956 | 89038 | Completed | OK | HS.FHIR.Service.DSTU2 | HS.Util.Trace.( |
| | 14 | 89030 | 2021-04-29 20:51:47.550 | 89030 | Completed | OK | HS.FHIR.Service.DSTU2 | HS.Util.Trace.( |
| | 15 | 89022 | 2021-04-29 20:51:47.138 | 89022 | Completed | OK | HS.FHIR.Service.DSTU2 | HS.Util.Trace.( |
| | 16 | 89014 | 2021-04-29 20:51:46.633 | 89014 | Completed | OK | HS.FHIR.Service.DSTU2 | HS.Util.Trace.( |
| | 17 | 89006 | 2021-04-29 20:51:46.250 | 89006 | Completed | OK | HS.FHIR.Service.DSTU2 | HS.Util.Trace.( |
| | 18 | 88998 | 2021-04-29 20:51:46.003 | 88998 | Completed | OK | HS.FHIR.Service.DSTU2 | HS.Util.Trace.( |
| | 19 | 88990 | 2021-04-29 20:51:45.828 | 88990 | Completed | OK | HS.FHIR.Service.DSTU2 | HS.Util.Trace.( |
| | 20 | 88977 | 2021-04-29 20:51:45.382 | 88977 | Completed | OK | HS.FHIR.Service.DSTU2 | HS.Util.Trace.( |
| » | 21 | 88969 | 2021-04-29 20:51:45.360 | 88969 | Completed | OK | HS.FHIR.Service.DSTU2 | HS.Util.Trace. |
| | 22 | 88966 | 2021-04-29 20:51:45.344 | 88966 | Completed | OK | HS.FHIR.Service.DSTU2 | HS.Util.Trace.( |
| | 23 | 88946 | 2021-04-29 20:51:44.794 | 88946 | Completed | OK | HS.FHIR.Service.DSTU2 | HS.Util.Trace.( |
| | 24 | 88943 | 2021-04-29 20:51:44.785 | 88943 | Completed | OK | HS.FHIR.Service.DSTU2 | HS.Util.Trace.( |
| | 25 | 88942 | 2021-04-29 20:51:44.781 | 88942 | Completed | OK | HS.FHIR.Service.DSTU2 | HS.Util.Trace.( |
| | 26 | 88941 | 2021-04-27 08:11:26.554 | 88941 | Completed | OK | Ens.ScheduleService | Ens.ScheduleH |
| | 27 | 88940 | 2021-04-24 02:50:07.812 | 88940 | Completed | OK | Ens.ScheduleService | Ens.ScheduleH |
| | 28 | 88939 | 2021-04-24 02:18:26.336 | 88939 | Completed | OK | Ens.ScheduleService | Ens.ScheduleH |
| | 29 | 88938 | 2021-04-20 08:15:37.759 | 88938 | Completed | OK | Ens.ScheduleService | Ens.ScheduleH |

 |  |

# Request for Medication Orders from Apple Health App

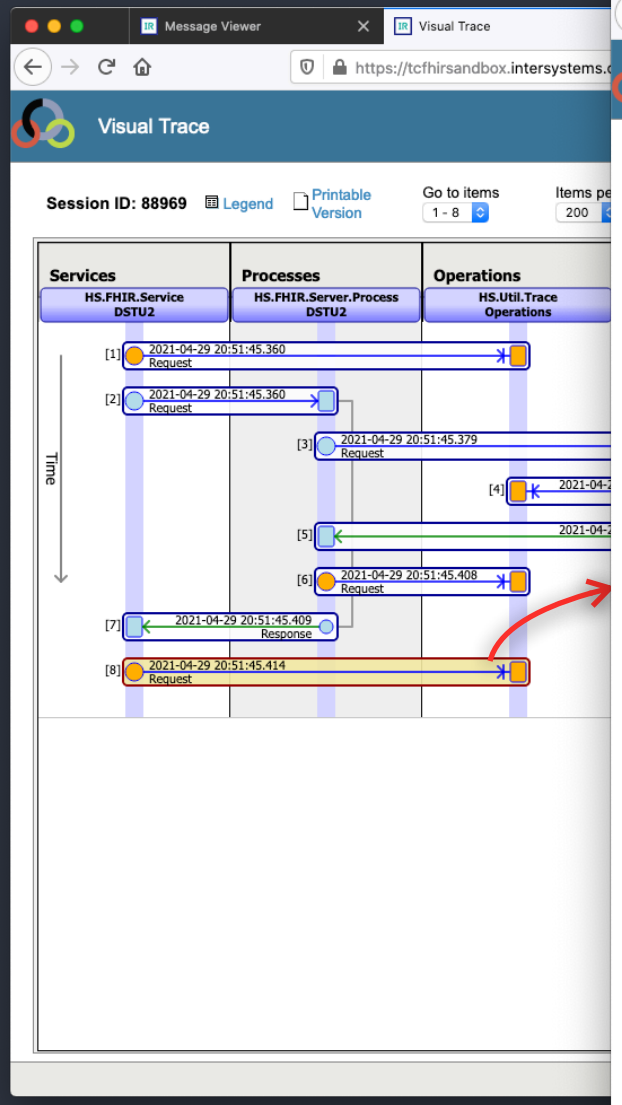


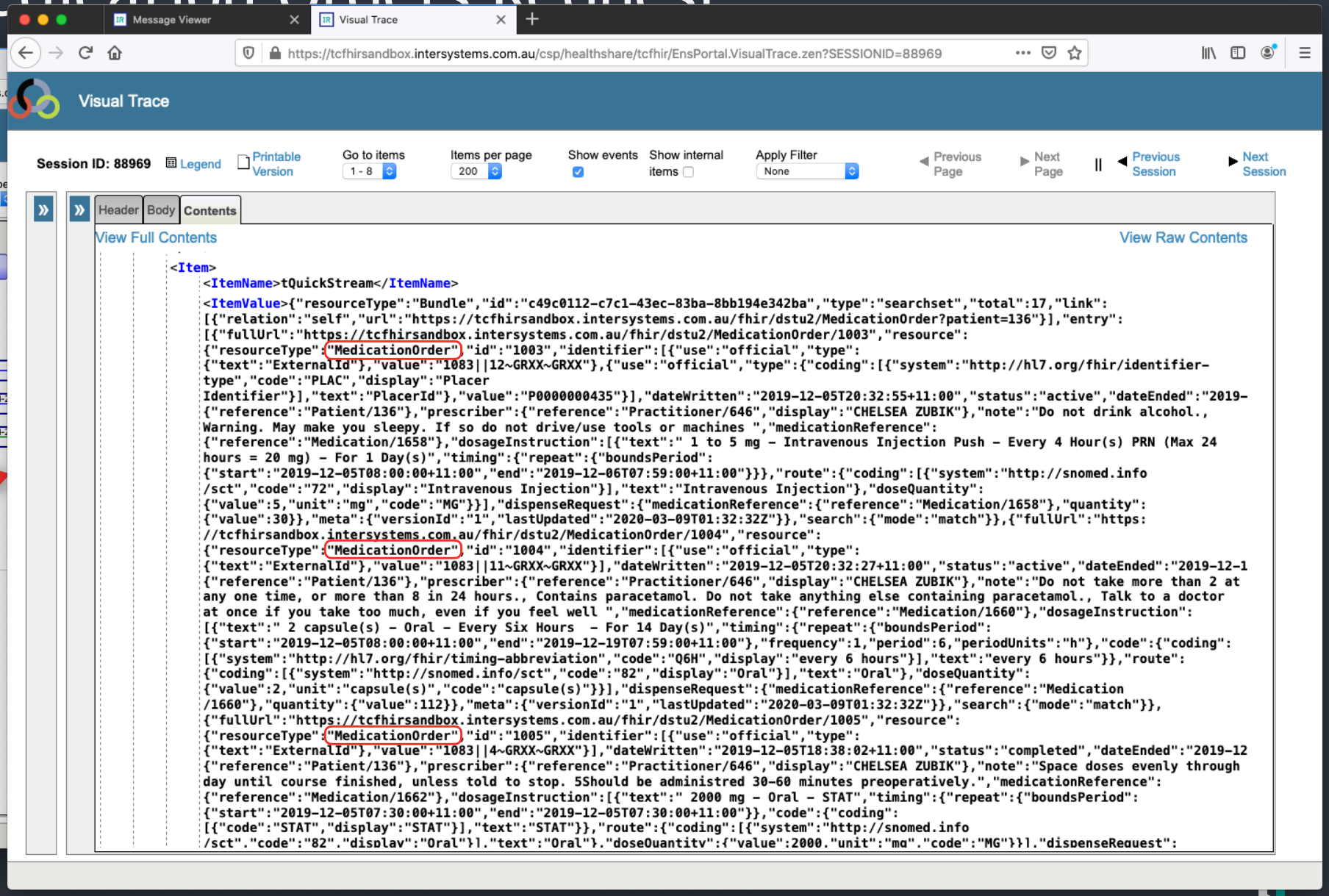
# Response for Medication Orders Request




 |  |

# Response for Medication Orders Request




 |  |

# First 97/1513 Rows of the Response Pretty Printed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{
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    "id": "c49c0112-c7c1-43ec-83ba-8bb194e342ba",
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    "total": 17,
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            "url": "https://tcfhirsandbox.intersystems.com.au/fhir/dstu2/MedicationOrder?patient=136"
        }
    ],
    "entry": [
        {
            "fullUrl": "https://tcfhirsandbox.intersystems.com.au/fhir/dstu2/MedicationOrder/1003",
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                "id": "1003",
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                        "type": {
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                    },
                    {
                        "use": "official",
                        "type": {
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                                    "display": "Placer Identifier"
                                }
                            ],
                            "text": "PlacerId"
                        },
                        "value": "P0000000435"
                    }
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                                }
                            }
                        },
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                            ],
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                        },
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                            "unit": "mg",
                            "code": "MG"
                        }
                    }
                ],
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                    },
                    "quantity": {
                        "value": 30
                    }
                },
                "meta": {
                    "versionId": "1",
                    "lastUpdated": "2020-03-09T01:32:32Z"
                }
```

2 min.

# Summary

 |  |

# HL7 FHIR is (still) HOT ... But is it just hype? ... or is there reasons for it?

https://argonautwiki.hl7.org/w/images/argonautwiki.hl7.org/1/17/Argonaut_Project_Background_and_Overview_Presentation.pdf

## What's so great about FHIR?

### Flexible to document-level and data-level exchange

- Sometimes individual data elements are important, sometimes entire documents are appropriate

### Based on modern internet conventions

- RESTful API – same browser-based approach as used by Facebook, google, twitter, etc
- Infinitely extensible to detailed resources/profiles to meet any use case
- Supports push and pull use cases

### Attractive to developers from outside of healthcare

- Brings new voices into health care and pushes the industry to innovate at internet speed

 |  |

# Attractive to developers from outside of healthcare

- Brings new voices into health care and pushes the industry to innovate at internet speed

companiesmarketcap.com

## Largest Companies by Market Cap

companies: **4,881** total market cap: **$90.189 T**

Rank by | Market Cap | Earnings | Revenue | Employees | Market Cap gain | Market Cap loss

| Rank | Name | Market Cap | Price | Today | Price (30 days) | Country |
|---|---|---|---|---|---|---|
| 1 | Apple AAPL | $2.173 T | $130.21 | 0.53% | | USA |
| 2 | Saudi Aramco 2222.SR | $1.904 T | $9.52 | 0.14% | | S. Arabia |
| 3 | Microsoft MSFT | $1.901 T | $252.46 | 1.09% | | USA |
| 4 | Amazon AMZN | $1.660 T | $3,292 | -0.45% | | USA |
| 5 | Alphabet (Google) GOOG | $1.591 T | $2,399 | 0.73% | | USA |

e.g. these companies are investing on FHIR

Epic

Cerner

InterSystems®
Creative data technology

 |  | source: https://companiesmarketcap.com, 10.5.2021

# Summary

InterSystems provides rich set of FHIR capabilities for solving real world tasks that matter:


... and not just FHIR capabilities, but what ever capabilities are needed in practice:

# Summary

FHIR Server | FHIR Client | Transformations to and from FHIR | Business Services | Business Operations

InterSystems IRIS
FHIR Accelerator Service

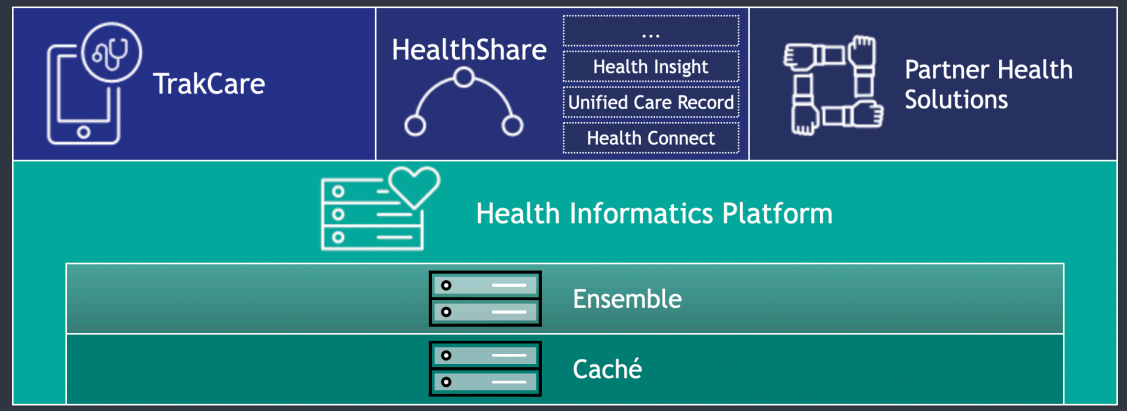
FHIR Server

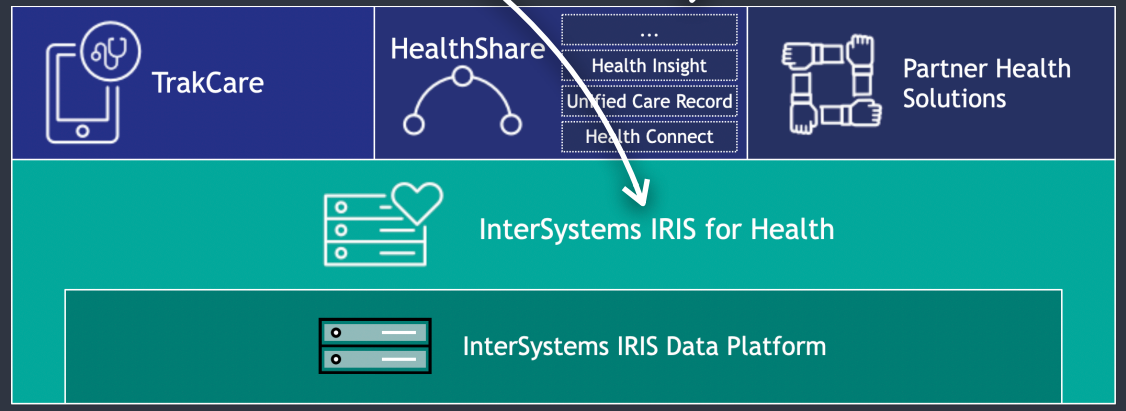
The newest FHIR capabilities are implemented in InterSystems IRIS for Health ...

... and used by the solutions built on top of it

Solution

Platform




Time

In each product, the FHIR capabilities are available for the scope of the product

 |  |

# What is special about InterSystems as provider of FHIR capabilities?

The vendors supporting FHIR include the giants like Apple, Google, Microsoft ...

1. InterSystems has far the longest experience in using FHIR
2. InterSystems has far the biggest implementations so far using FHIR (both applications and HIEs)
3. InterSystems has the longest and deepest experience not only in using FHIR, but health care applications and interoperability in general

The power behind what matters.

InterSystems®
Health | Business | Government

# *Thank you.*