

# FHIR Webinar 2

## InterSystems and FHIR

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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](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



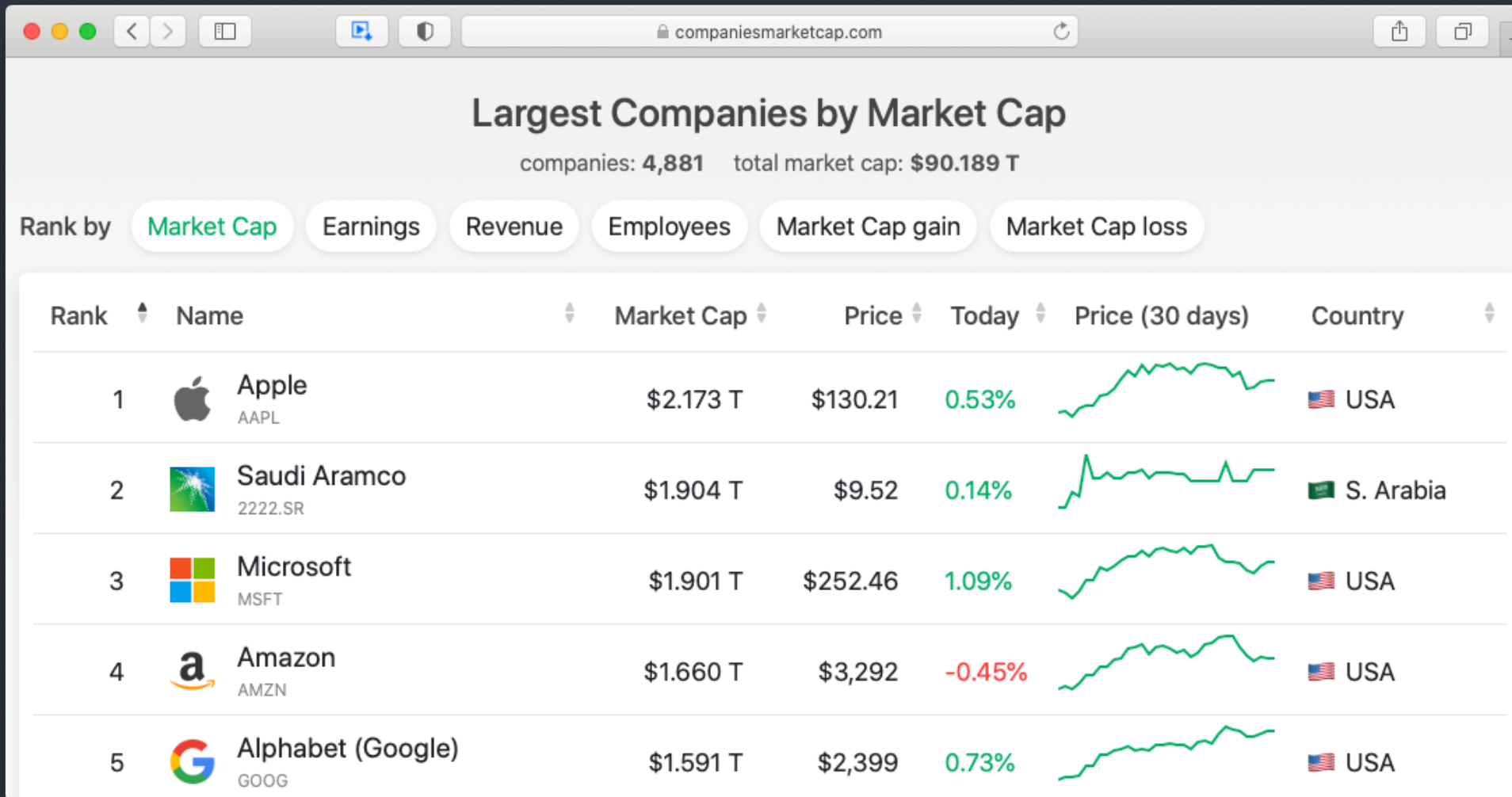
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## Attractive to developers from outside of healthcare

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The screenshot shows a web browser window with the URL 'companiesmarketcap.com'. The page title is 'Largest Companies by Market Cap' with a subtitle 'companies: 4,881 total market cap: \$90.189 T'. Below the title are several filter buttons: 'Market Cap', 'Earnings', 'Revenue', 'Employees', 'Market Cap gain', and 'Market Cap loss'. The 'Market Cap' filter is selected. The main content is a table with the following columns: Rank, Name, Market Cap, Price, Today, Price (30 days), and Country. The table lists the top 5 companies: Apple, Saudi Aramco, Microsoft, Amazon, and Alphabet (Google).

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



## Attractive to developers from outside of healthcare

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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

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These companies are now investing on **FHIR**

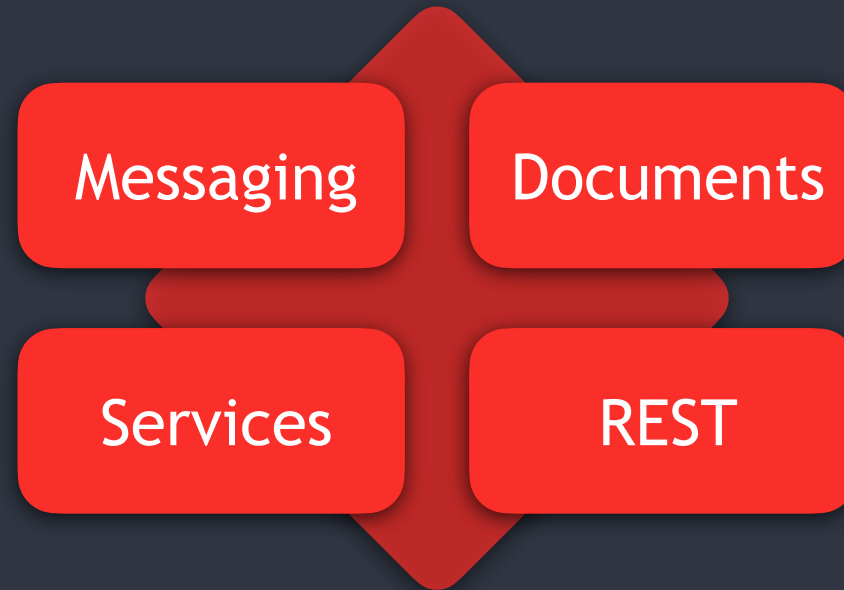


Also

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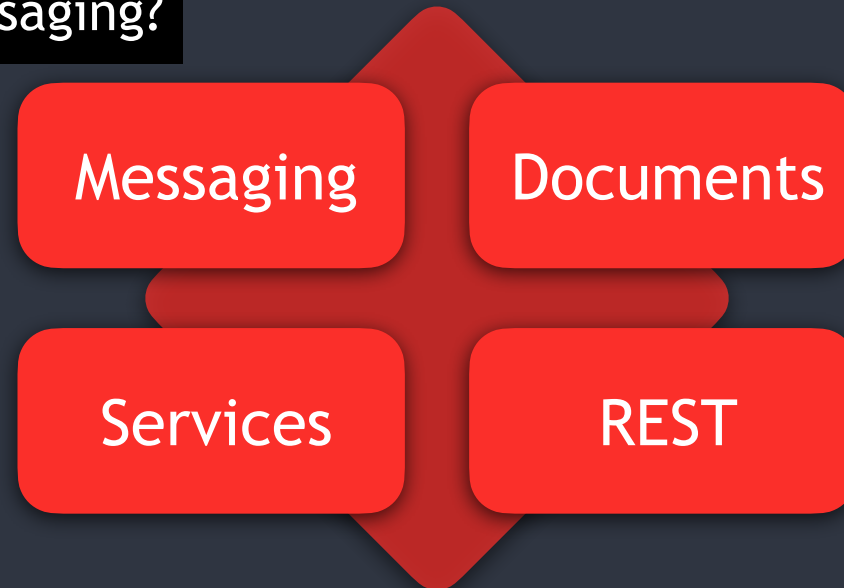


# Use Cases for HL7 FHIR ... and Other HL7 Standards



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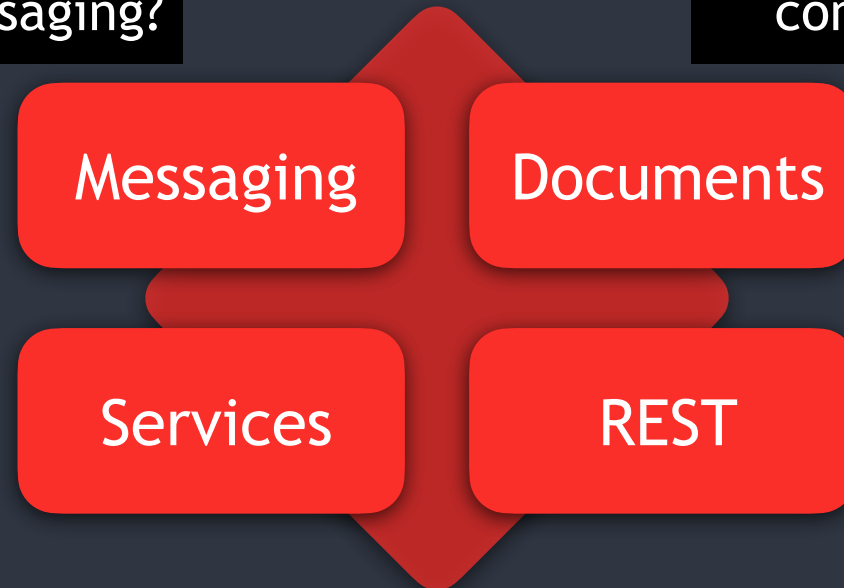
- ▶ HL7 v2 has been, and still is, a good fit for Messaging
- ▶ Why would you replace HL7 v2 with something else for messaging?



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- ▶ Documents has been equal to HL7 v3 CDA
- ▶ HL7 v3 (in general) is perceived as complex ...



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Messaging

Documents

Services

REST

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- ▶ Definitely not a case for v2 or v3!
- ▶ Providing an API for building applications is something that only HL7 FHIR is a good fit for

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Messaging

Documents

Services

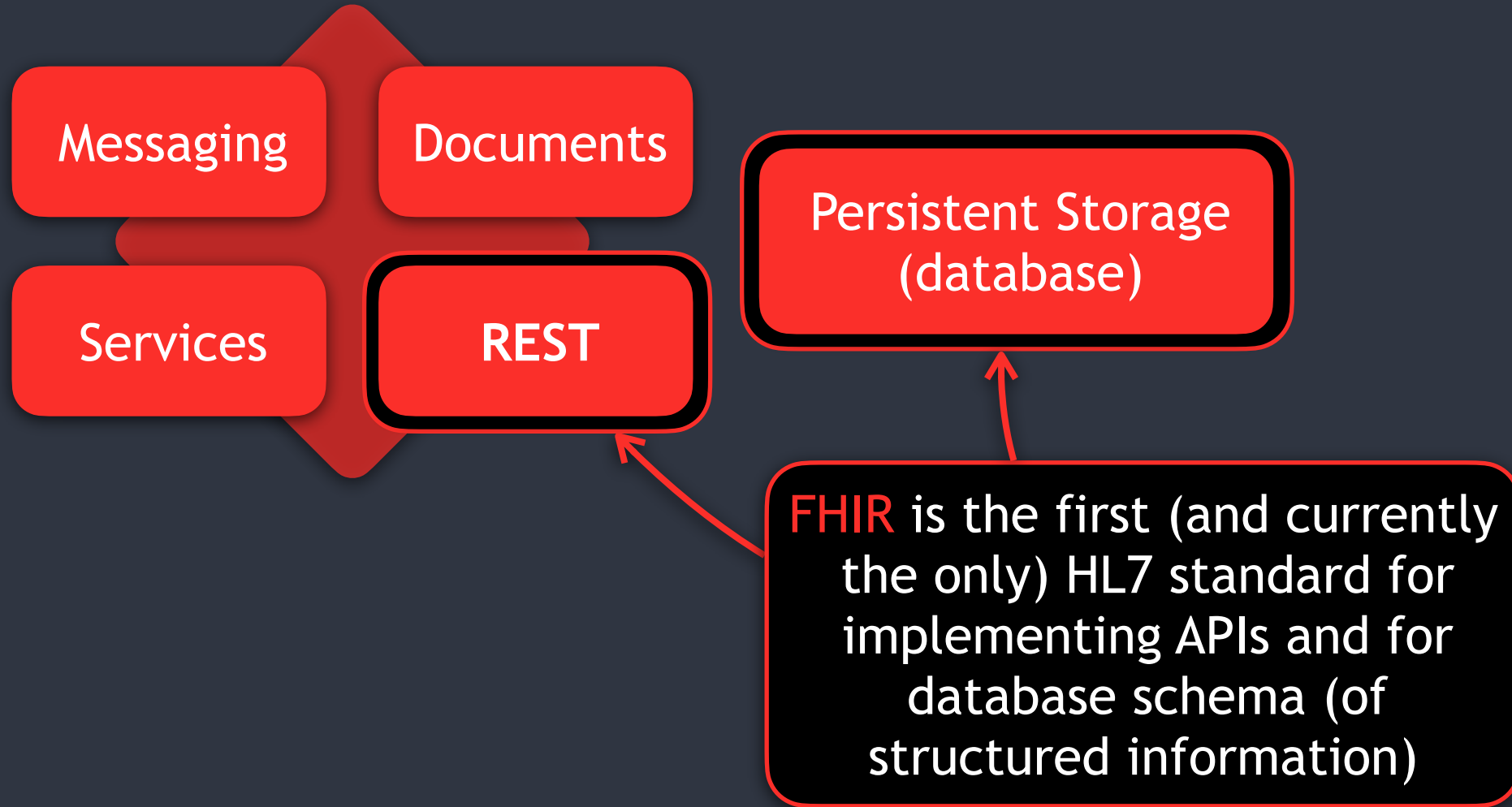
REST

Persistent Storage  
(database)

- ▶ Services have been implemented so far with HL7 v3
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# HL7 FHIR ... and Other HL7 Standards - Summary



12 min.

# InterSystems Offering and FHIR



HL7 FHIR is (still) **HOT** ...

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
- 2.
- 3.



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1. Healthcare application backends: Not just new applications based solely on FHIR, but FHIR enabling existing application - both as servers and clients
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)



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

The vendors supporting FHIR include impressive giants like Apple, Google, Microsoft



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1. InterSystems has far the longest experience in using FHIR
- 2.
- 3.



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

The vendors supporting FHIR include impressive giants like Apple, Google, Microsoft

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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

**FHIR  
Server**

**FHIR  
Client**

**Transformations  
to and from FHIR**

**Business  
Services**

**Business  
Operations**



# Products of InterSystems

FHIR Server

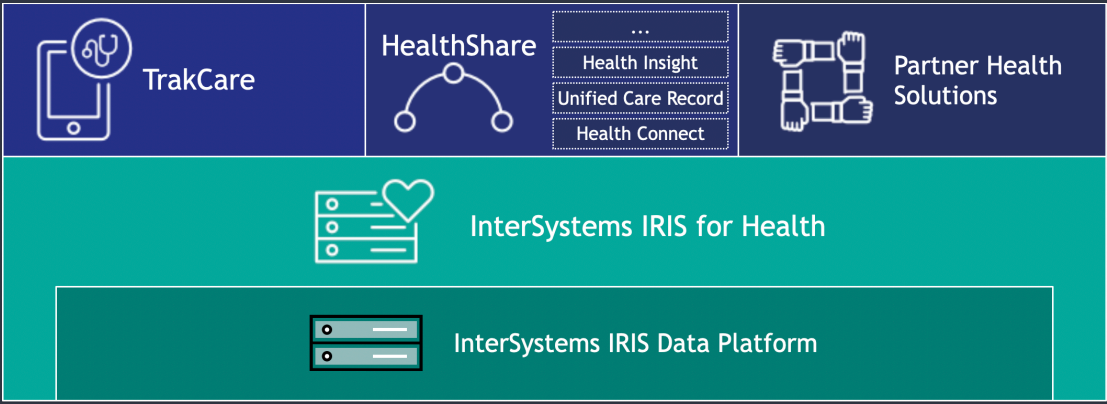
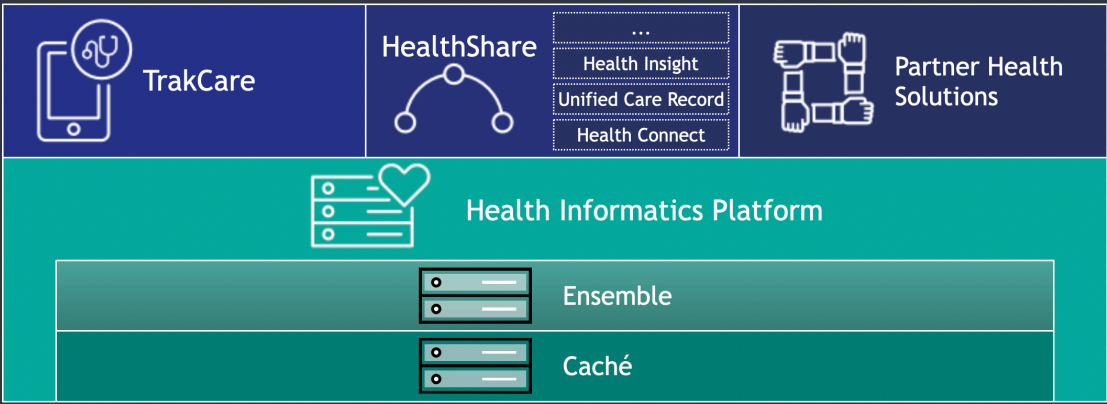
FHIR Client

Transformations to and from FHIR

Business Services

Business Operations

Solution



Platform

Time



# Products of InterSystems

FHIR Server

FHIR Client

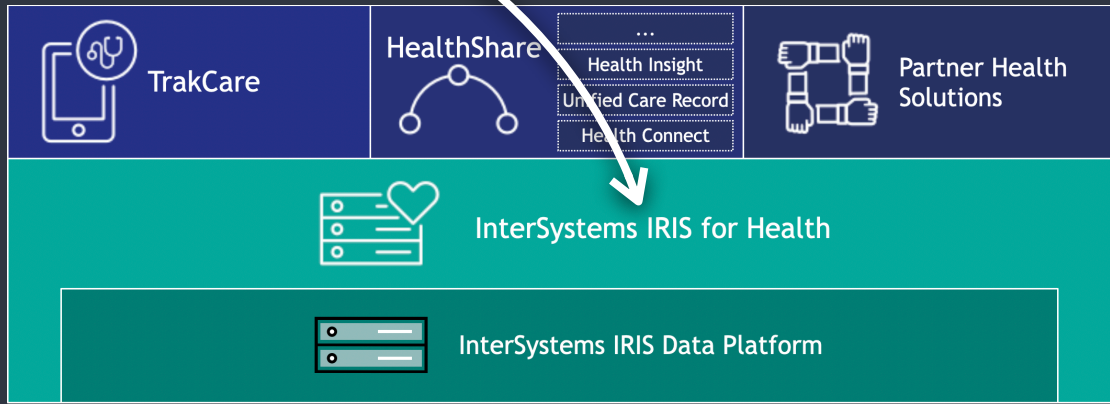
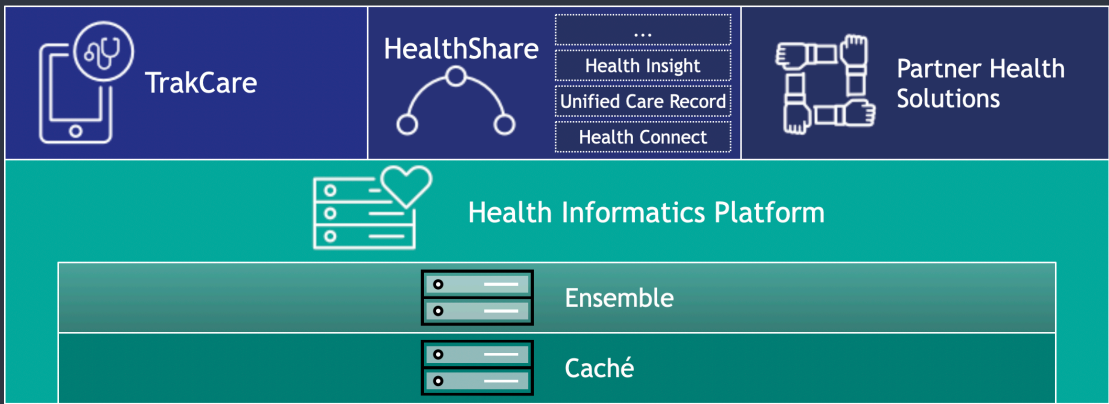
Transformations to and from FHIR

Business Services

Business Operations

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

Solution



Platform

Time



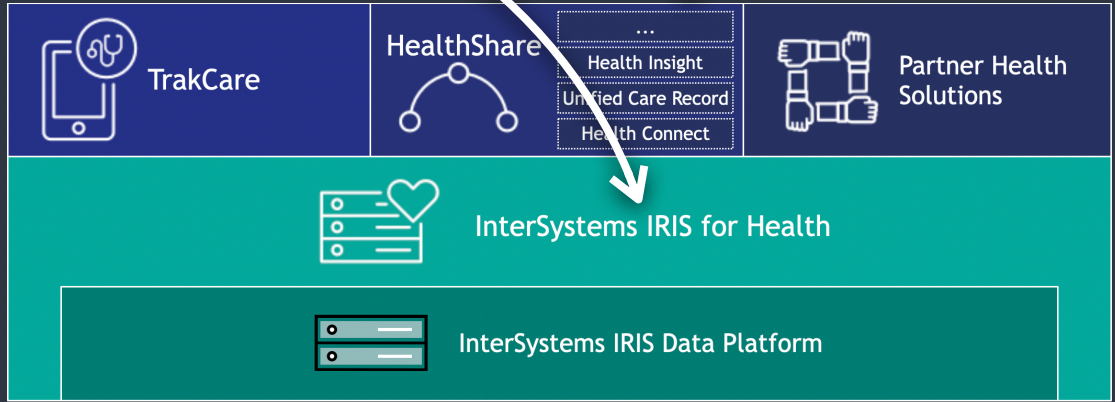
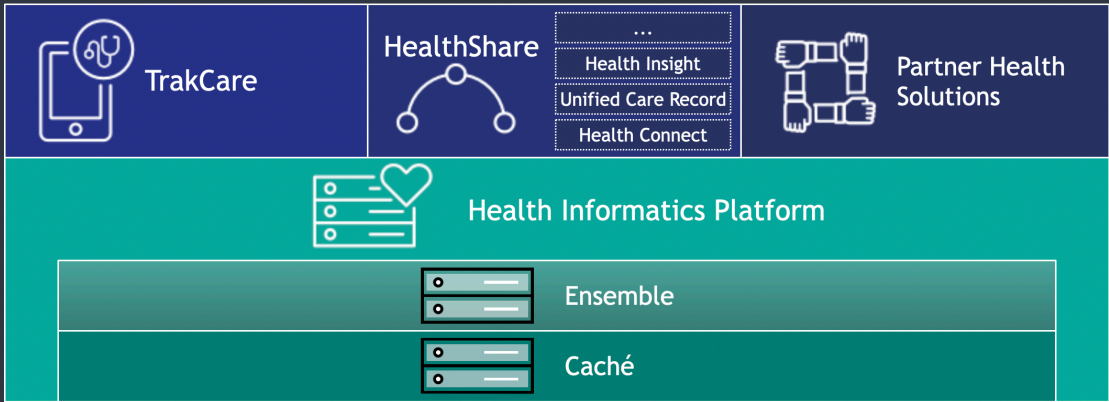
# Products of InterSystems

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

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

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

Solution



Platform

Time



# Products of InterSystems

FHIR Server

FHIR Client

Transformations to and from FHIR

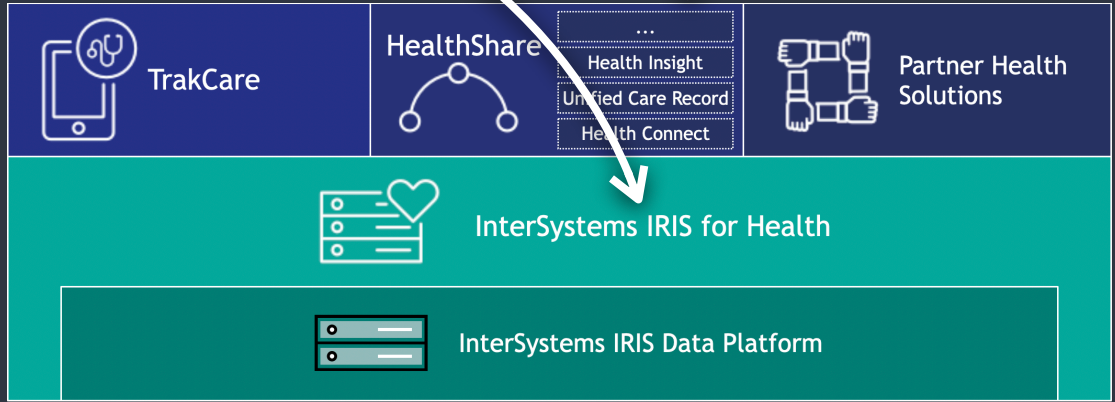
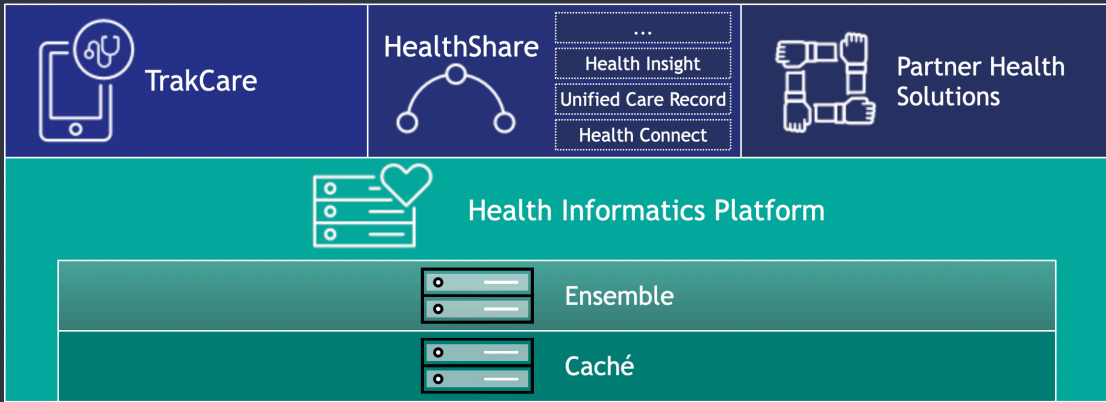
Business Services

Business Operations

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

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Solution



Platform

Time

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

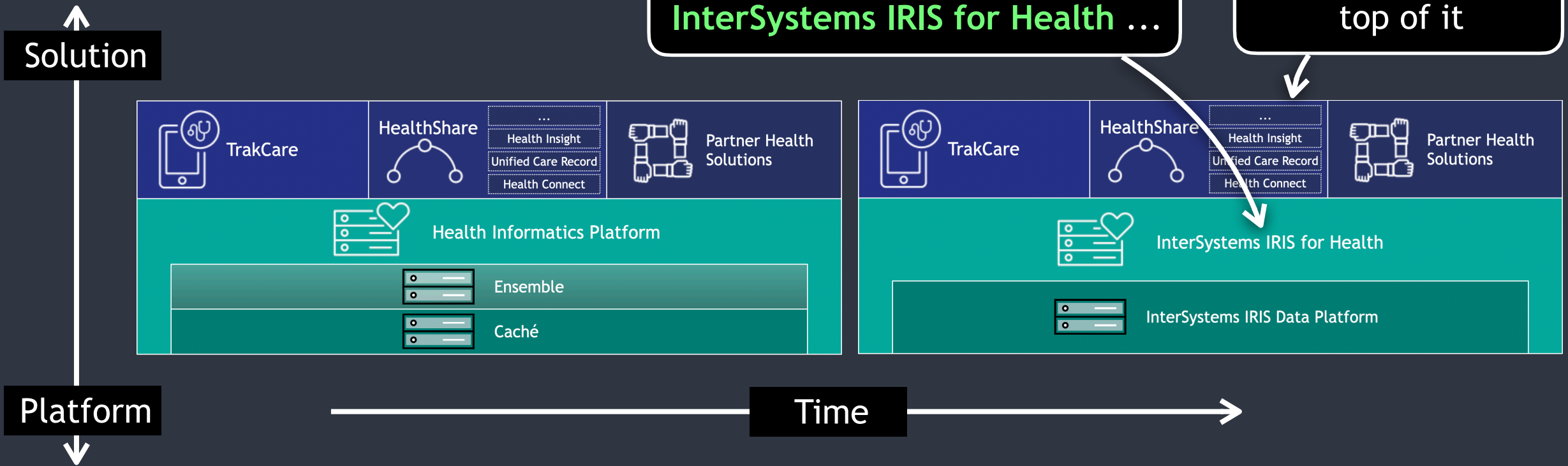
Transformations to and from FHIR

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Business Operations

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

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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



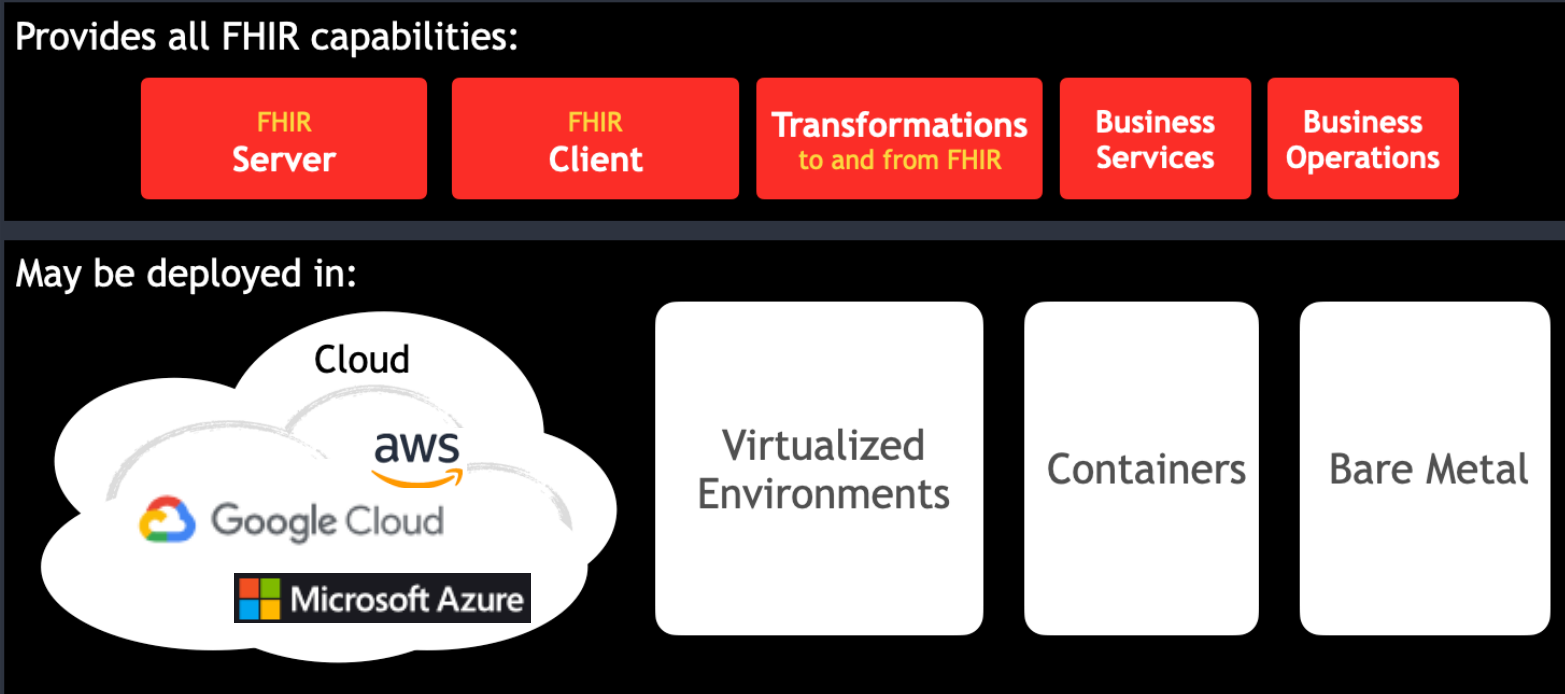
# HealthShare Health Connect

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



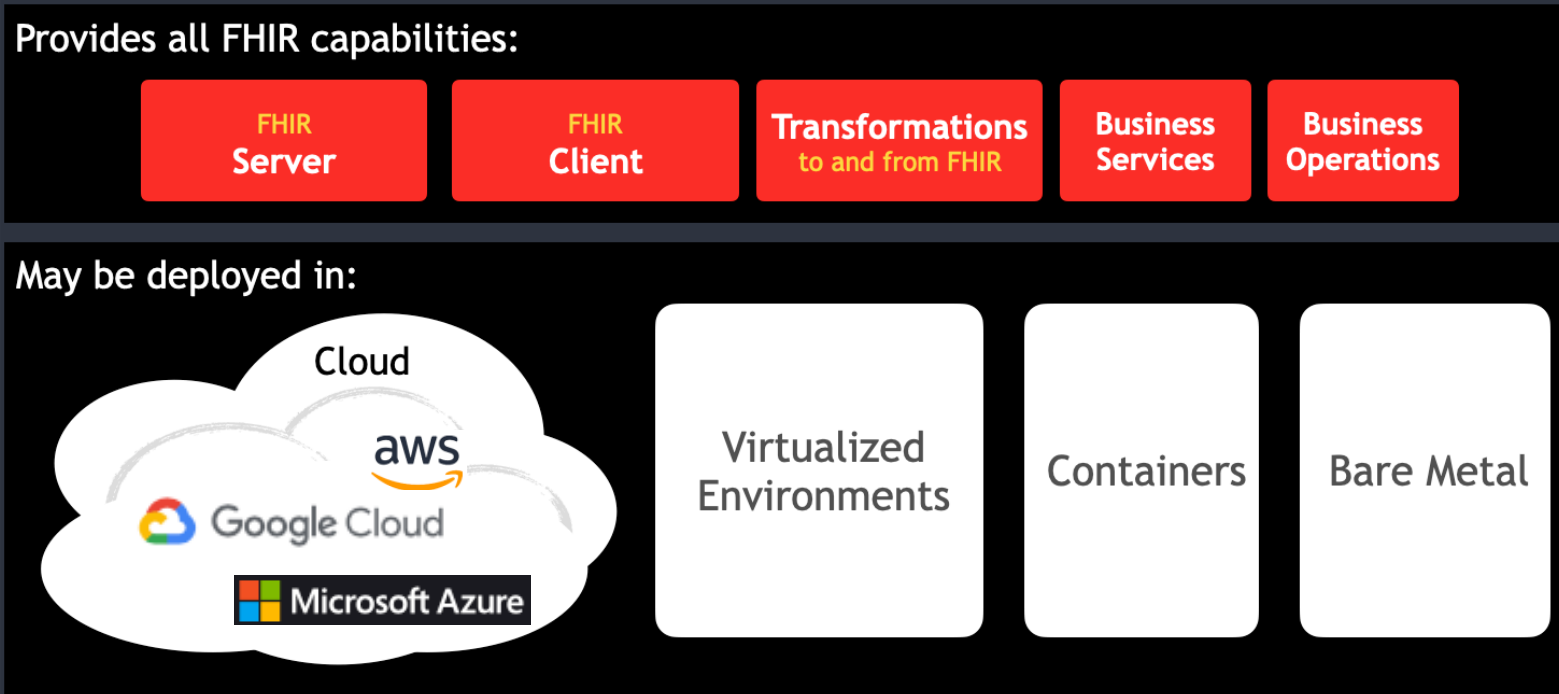
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The use of HealthShare Health Connect is restricted to *integration* by licensing.



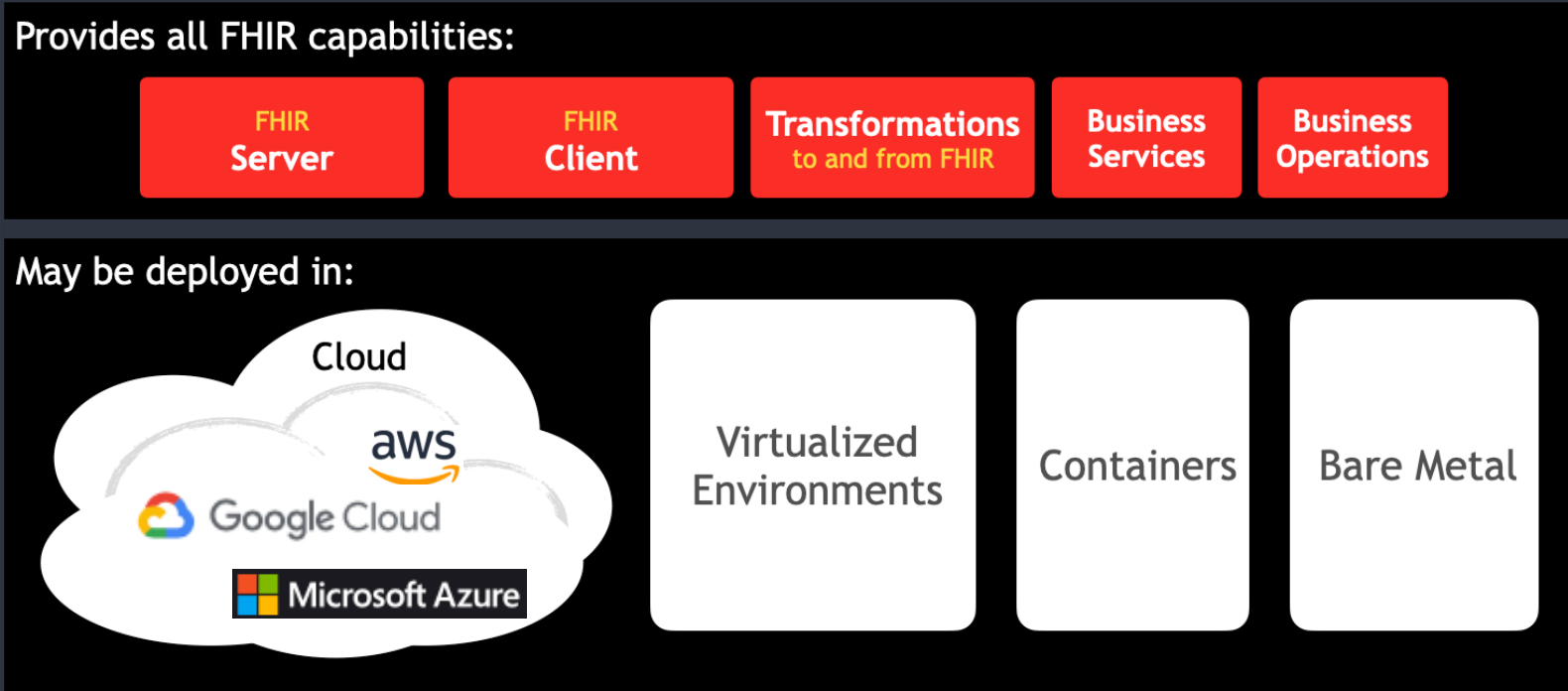
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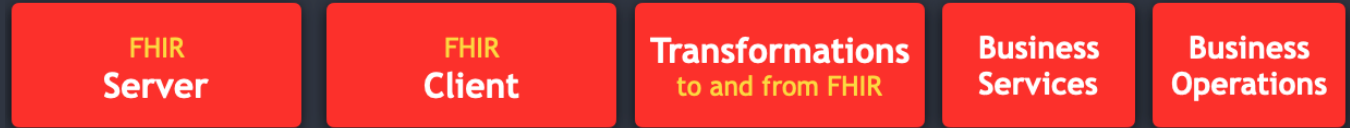
... is based on IRIS for Health ...



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

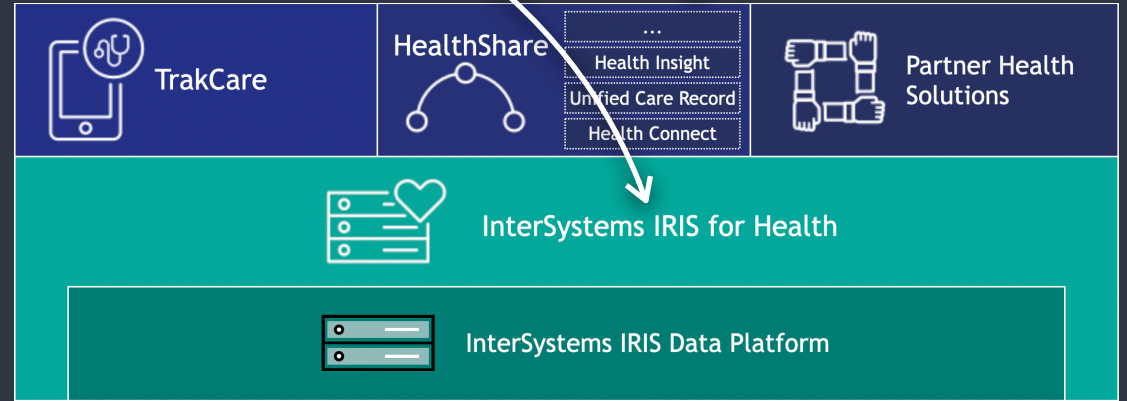
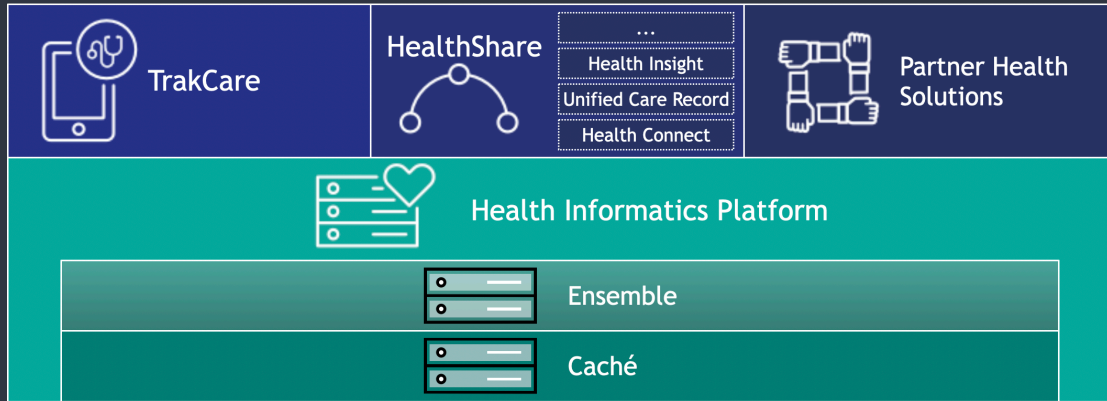


# Summary



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

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



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




? min.


# Deploying a New Instance of IRIS FHIR Accelerator Service



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

portal.trial.isccloud.io





Login to InterSystems  
Managed Services Portal

Username or email

Password

LOGIN

[Create New Account](#) [Forgot password?](#)

2. Log In

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

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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**

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portal.trial.isccloud.io

ANSSI KAUPPI

Deployments / Create

Deployments

Create Deployment

Settings

### 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 Name**  
Name assigned to this deployment

4 **Review**

**4. Select to continue...**

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portal.trial.isccloud.io ANSSI KAUPPI

Deployments / Create

### Create InterSystems IRIS® Deployment

1 Deployment Options  
InterSystems IRIS® Service and Deployment Size

2 Cloud Options  
Cloud Provider and Region

Cloud Provider  
aws

Region  
us-east-2

CONTINUE

3 Deployment Name  
Name assigned to this deployment. Cannot be changed once created

4 Review

**5. Select to continue ...**

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Deployments / Create

### Create InterSystems IRIS® Deployment

1 Deployment Options  
InterSystems IRIS® Service and Deployment Size

2 Cloud Options  
Cloud Provider and Region

3 Deployment Name  
Name assigned to this deployment. Cannot be changed once created

Preview Deployment 01 of ansikauppi 37 / 50

CONTINUE

4 Review

**6. Assign a name and continue ...**

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Deployments

Create Deployment

Settings

### Create InterSystems IRIS® Deployment

4 Review

Cloud Provider: AWS

Region: us-east-2

InterSystems IRIS® Service: FHIR® Accelerator Service

Deployment Size: Preview

Deployment Name: Preview Deployment 01 of anssikauppi

CREATE

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

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Deployments

Settings

Deployments

InterSystems® Deployments

Preview Deployment 01 of an...  
PENDING

FHIR® Accelerator Service

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✓ You have successfully initiated the creation of a deployment. It may take 5 to 6 minutes for the deployment to complete. ✕

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Deployments

Settings

Deployments

InterSystems® Deployments

Preview Deployment 01 of an...  
CREATING

FHIR® Accelerator Service

CREATE NEW DEPLOYMENT

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**8. Wait ...**

# Creating a Trial Deployment of FHIRaaS

The screenshot shows a web browser window with the URL `portal.trial.iscccloud.io`. The page displays the InterSystems logo and a user profile for ANSSI KAUPPI. A sidebar on the left contains 'Deployments' and 'Settings' tabs. The main content area is titled 'InterSystems® Deployments' and features a card for 'Preview Deployment 01 of an... COMPLETE' with a trash icon, labeled 'FHIR® Accelerator Service'. Below this is a 'CREATE NEW DEPLOYMENT' button. A large black box with the text '9. Finished' is overlaid on the right side of the deployment card. The footer contains the copyright notice '© 1996-2021 – InterSystems® Corporation, Cambridge, MA' and a 'Help' dropdown menu.



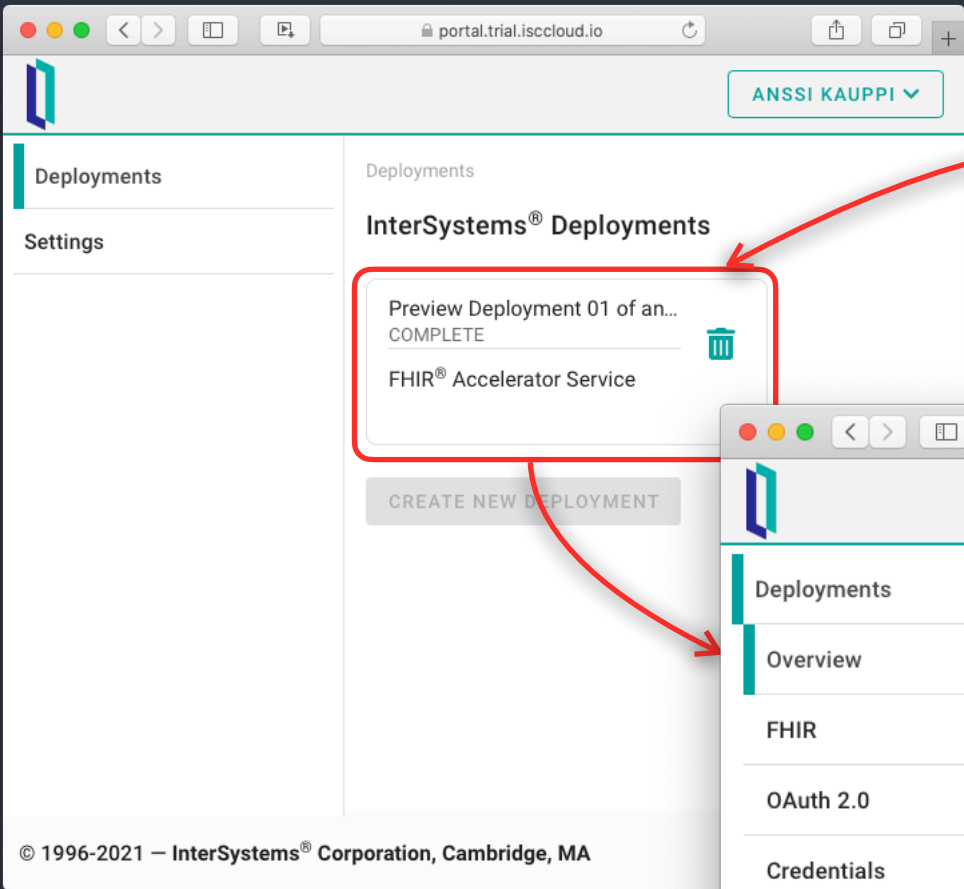
? min.

# Features of IRIS FHIR Accelerator Service

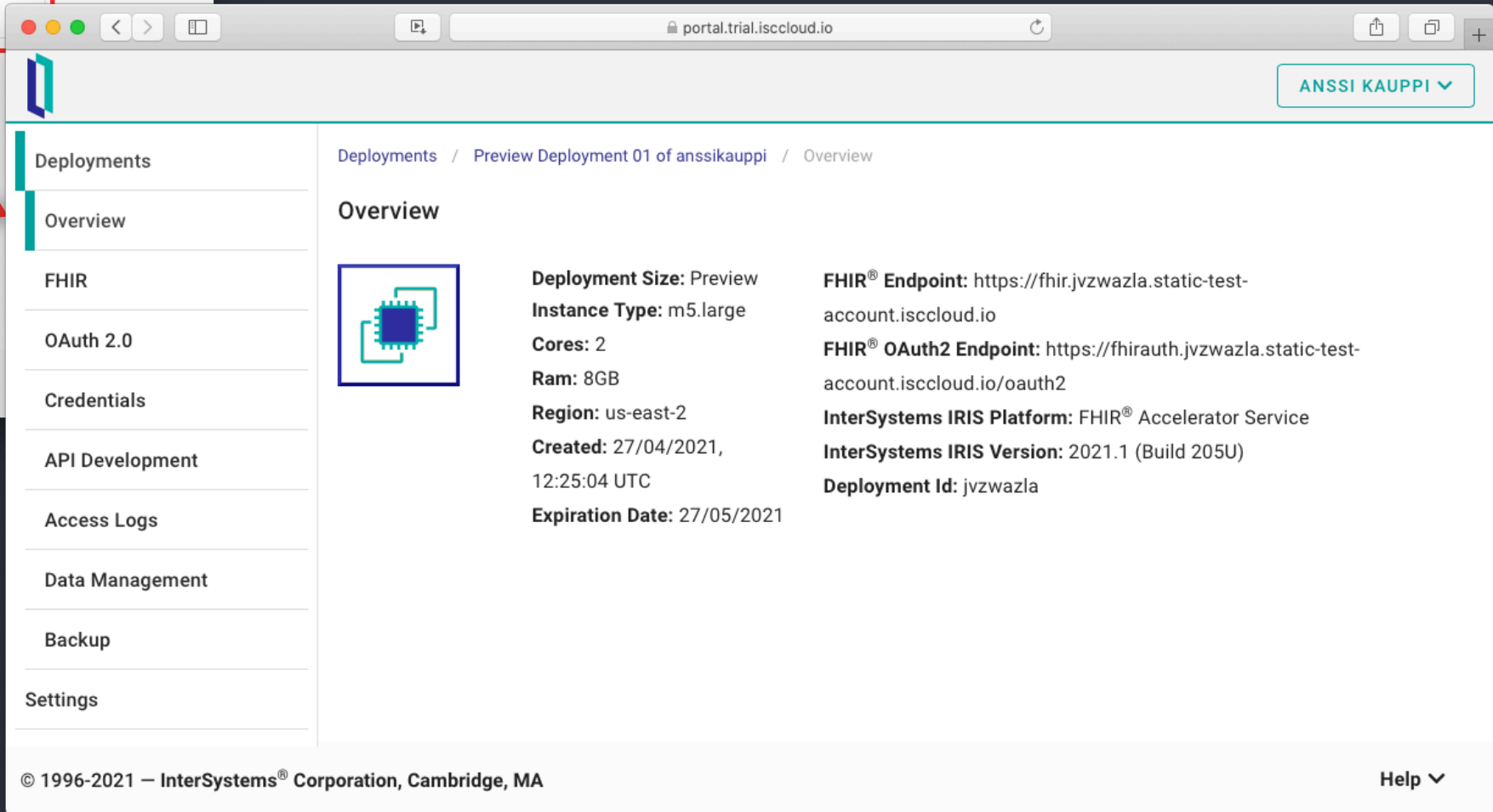


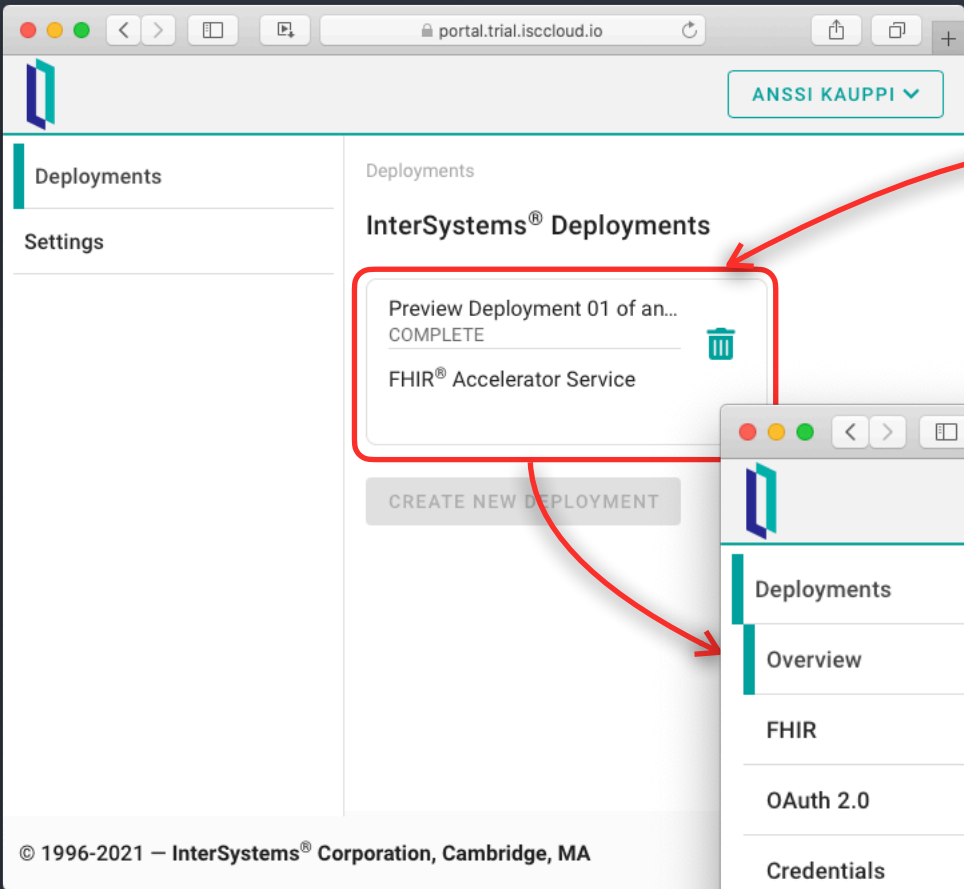
The screenshot shows a web browser window with the URL `portal.trial.isccloud.io`. The page features a navigation sidebar on the left with 'Deployments' and 'Settings' options. The main content area is titled 'InterSystems® Deployments' and displays a single deployment entry: 'Preview Deployment 01 of an...' with a status of 'COMPLETE' and a trash icon. Below this entry is a 'CREATE NEW DEPLOYMENT' button. The user's name 'ANSSI KAUPPI' is visible in the top right corner. The footer contains the copyright notice '© 1996-2021 – InterSystems® Corporation, Cambridge, MA' and a 'Help' link.





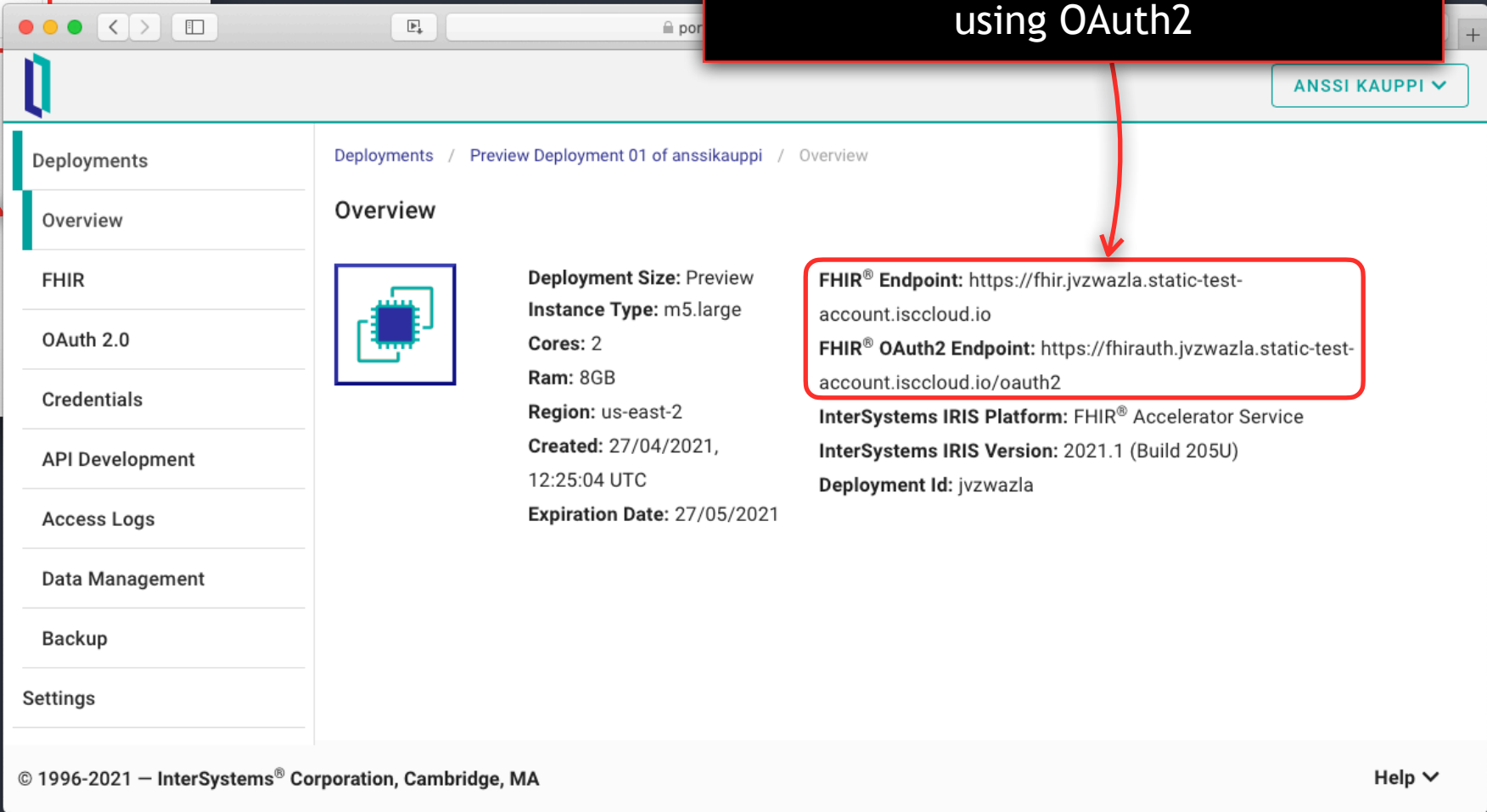
Select the deployment

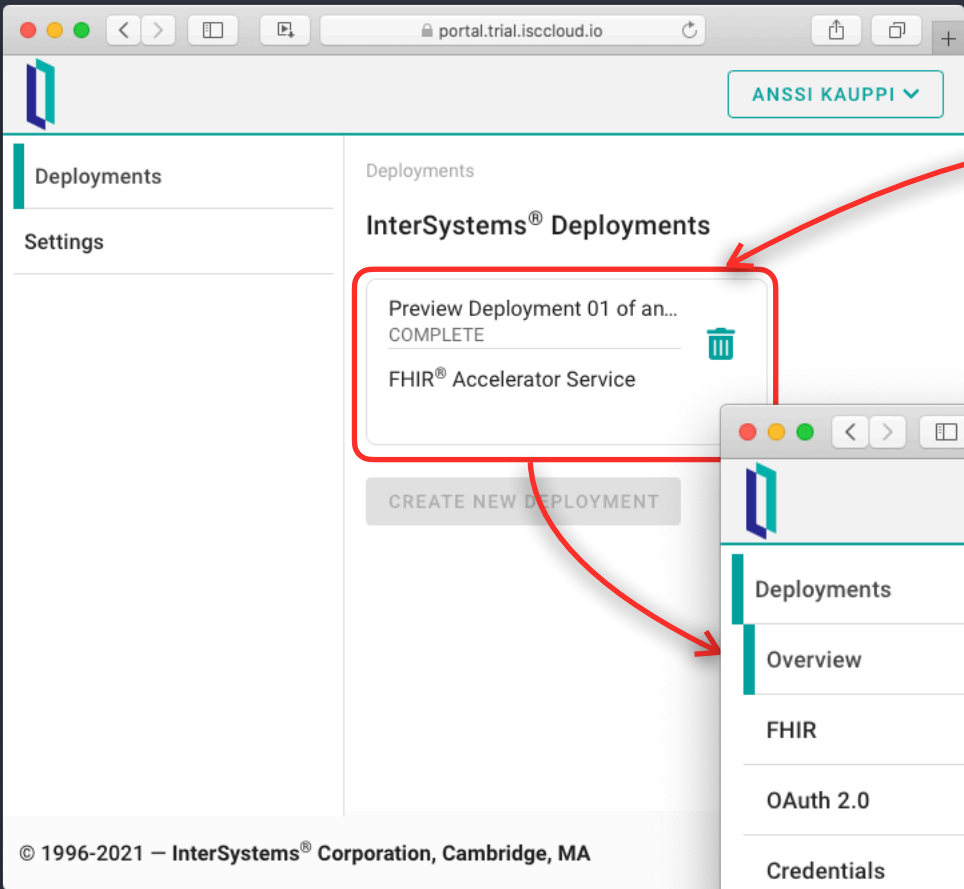




Select the deployment

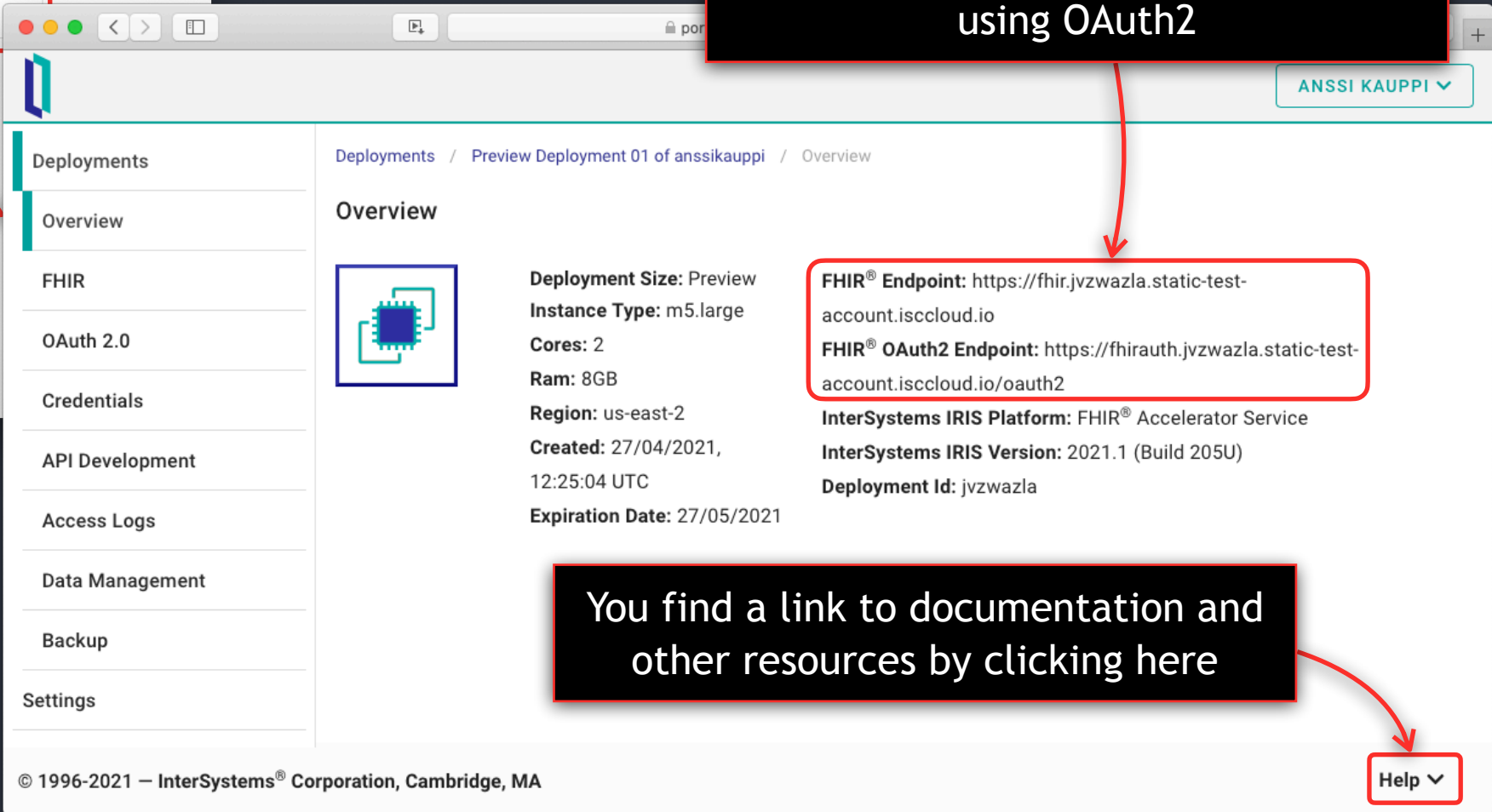
Here are the addresses of the end points for invoking FHIR interactions and for authentication/authorisation using OAuth2





Select the deployment

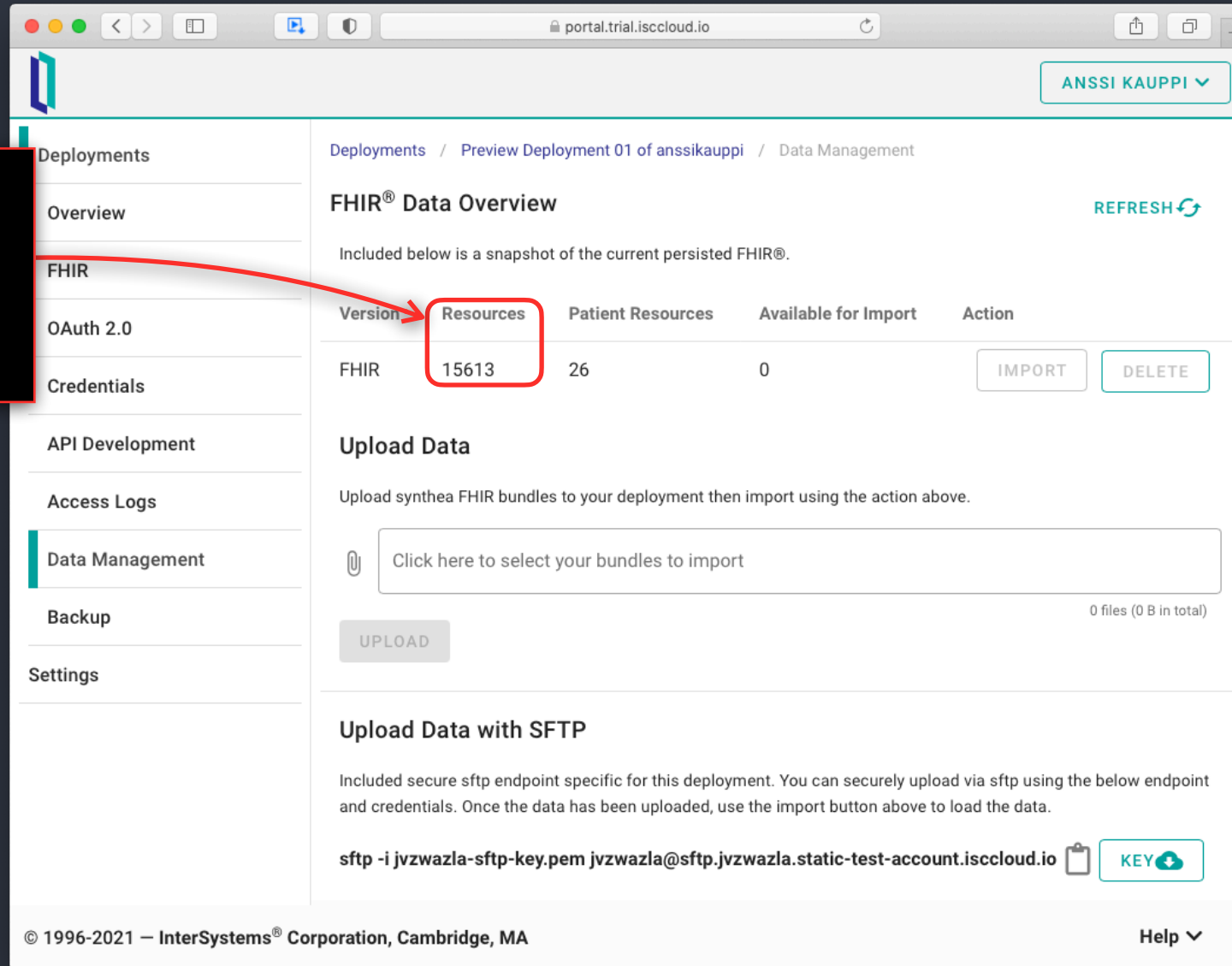
Here are the addresses of the end points for invoking FHIR interactions and for authentication/authorisation using OAuth2



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



portal.trial.isccloud.io

ANSSI KAUPPI

Deployments / Preview Deployment 01 of anssikauppi / Data Management

### FHIR® Data Overview

REFRESH

Included below is a snapshot of the current persisted FHIR®.

Version	Resources	Patient Resources	Available for Import	Action
FHIR	15613	26	0	IMPORT DELETE

### Upload Data

Upload synthea FHIR bundles to your deployment then import using the action above.

Click here to select your bundles to import

0 files (0 B in total)

UPLOAD

### Upload Data with SFTP

Included secure sftp endpoint specific for this deployment. You can securely upload via sftp using the below endpoint and credentials. Once the data has been uploaded, use the import button above to load the data.

```
sftp -i jvzwazla-sftp-key.pem jvzwazla@sftp.jvzwazla.static-test-account.isccloud.io
```

KEY

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Help



# The Service is Preloaded with Test Data

You have thousands of resources preloaded to start experimenting with

The screenshot shows the 'FHIR® Data Overview' page in a web browser. The page has a sidebar on the left with navigation options: Deployments, Overview, FHIR, OAuth 2.0, Credentials, API Development, Access Logs, Data Management (selected), Backup, and Settings. The main content area shows a table of FHIR resources. The table has columns for Version, Resources, Patient Resources, Available for Import, and Action. The 'Resources' column contains the value '15613'. The 'Action' column contains 'IMPORT' and 'DELETE' buttons. A red box highlights the 'Resources' column and the 'DELETE' button. A red arrow points from the 'DELETE' button to a text box on the right. Below the table is an 'Upload Data' section with a file upload area and an 'UPLOAD' button. At the bottom, there is an 'Upload Data with SFTP' section with a terminal command and a 'KEY' button.

Version	Resources	Patient Resources	Available for Import	Action
FHIR	15613	26	0	IMPORT DELETE

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



# The Service is Preloaded with Test Data

You have thousands of resources preloaded to start experimenting with

The screenshot shows the 'FHIR® Data Overview' page in a web browser. The page has a sidebar on the left with navigation items: Deployments, Overview, FHIR, OAuth 2.0, Credentials, API Development, Access Logs, Data Management (highlighted), Backup, and Settings. The main content area shows a table of FHIR resources. The table has columns for Version, Resources, Patient Resources, Available for Import, and Action. The 'Resources' column contains the value '15613'. Below the table is an 'Upload Data' section with a file upload area and an 'UPLOAD' button. Below that is an 'Upload Data with SFTP' section with a terminal command and a 'KEY' button. The browser address bar shows 'portal.trial.isccloud.io'. The user name 'ANSSI KAUPPI' is visible in the top right corner.

Version	Resources	Patient Resources	Available for Import	Action
FHIR	15613	26	0	IMPORT DELETE

**Upload Data**  
Upload synthea FHIR bundles to your deployment then import using the action above.

Click here to select your bundles to import

0 files (0 B in total)

UPLOAD

**Upload Data with SFTP**  
Included secure sftp endpoint specific for this deployment. You can securely upload via sftp using the below endpoint and credentials. Once the data has been uploaded, use the import button above to load the data.

```
sftp -i jvzwazla-sftp-key.pem jvzwazla@sftp.jvzwazla.static-test-account.isccloud.io
```

KEY

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

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



# Access Controls

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

The screenshot shows a web browser window at `portal.trial.isccloud.io`. The user is logged in as ANSSI KAUPPI. The left sidebar contains a navigation menu with the following items: Deployments, Overview, FHIR, OAuth 2.0, Credentials (highlighted), API Development, Access Logs, Data Management, Backup, and Settings. The main content area displays the breadcrumb `Deployments / Preview Deployment 01 of anssikauppi / Credentials`. Under the heading **API Keys**, there is a `REFRESH` button and a description: "Add an API Key for immediate consumption of the FHIR® resources." Below this is a `CREATE API KEY` button. The text `No API Keys Found` is displayed. Under the heading **OAuth 2.0 Users**, there is a description: "Add an OAuth2 User to the supplied identity provider for consumption of the FHIR® resources." Below this is a `CREATE IDP USER` button. The text `No Users Found` is displayed. The footer contains the copyright notice `© 1996-2021 – InterSystems® Corporation, Cambridge, MA` and a `Help` dropdown menu.

# Access Controls

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

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.

The screenshot shows a web browser window at `portal.trial.isccloud.io`. The user is logged in as ANSSI KAUPPI. The left sidebar contains a navigation menu with items: Deployments, Overview, FHIR, OAuth 2.0, Credentials (highlighted), API Development, Access Logs, Data Management, Backup, and Settings. The main content area shows the breadcrumb `Deployments / Preview Deployment 01 of anssikauppi / Credentials`. The 'API Keys' section is highlighted with a red box and contains the text: 'Add an API Key for immediate consumption of the FHIR® resources.' Below this is a blue button labeled 'CREATE API KEY'. Underneath, it says 'No API Keys Found'. There is a 'REFRESH' button with a circular arrow icon. Below the API Keys section is the 'OAuth 2.0 Users' section, which contains the text: 'Add an OAuth2 User to the supplied identity provider for consumption of the FHIR® resources.' Below this is a blue button labeled 'CREATE IDP USER'. Underneath, it says 'No Users Found'. At the bottom of the page, there is a copyright notice: '© 1996-2021 — InterSystems® Corporation, Cambridge, MA' and a 'Help' dropdown menu.

# Access Controls

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

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

The screenshot shows a web application interface for managing access controls. The browser address bar displays 'portal.trial.isccloud.io'. The user 'ANSSI KAUPPI' is logged in. The left sidebar contains a navigation menu with items: Deployments, Overview, FHIR, OAuth 2.0, Credentials, API Development, Access Logs, Data Management, Backup, and Settings. The main content area is titled 'Deployments / Preview Deployment 01 of anssikauppi / Credentials'. It features two sections: 'API Keys' and 'OAuth 2.0 Users'. The 'API Keys' section includes a 'REFRESH' button, a description 'Add an API Key for immediate consumption of the FHIR® resources.', a 'CREATE API KEY' button, and the text 'No API Keys Found'. The 'OAuth 2.0 Users' section includes a description 'Add an OAuth2 User to the supplied identity provider for consumption of the FHIR® resources.', a 'CREATE IDP USER' button, and the text 'No Users Found'. Red arrows point from the text boxes on the left to the 'API Keys' and 'OAuth 2.0' menu items.

portal.trial.isccloud.io

ANSSI KAUPPI

Deployments / Preview Deployment 01 of anssikauppi / Credentials

**API Keys** REFRESH

Add an API Key for immediate consumption of the FHIR® resources.

CREATE API KEY

No API Keys Found

**OAuth 2.0 Users**

Add an OAuth2 User to the supplied identity provider for consumption of the FHIR® resources.

CREATE IDP USER

No Users Found

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Help

# Access Controls

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

**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)

portal.trial.isccloud.io

ANSSI KAUPPI

Deployments / Preview Deployment 01 of anssikauppi / OAuth 2

OAuth 2.0 Strategies

Create OAuth Strategy

1 Identity Provider

Built In Identity Providers

Amazon Cognito Identity Provider

External Identity Providers

Google Identity Provider

Azure Identity Provider

Ping Identity Provider

Okta Identity Provider

CONTINUE

2 Identity Provider App Definition

3 App Scopes Builder

CANCEL

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Help

# Access Controls

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

**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)

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

portal.trial.isccloud.io

ANSSI KAUPPI

Deployments / Preview Deployment 01 of anssikauppi / OAuth 2

OAuth 2.0 Strategies

Create OAuth Strategy

1 Identity Provider

Built In Identity Providers

Amazon Cognito  
Identity Provider

External Identity Providers

Google  
Identity Provider

Azure  
Identity Provider

Ping  
Identity Provider

Okta  
Identity Provider

CONTINUE

2 Identity Provider App Definition

3 App Scopes Builder

CANCEL

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Help

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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 either the built-in identity provider...

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

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

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

portal.trial.iscloud.io

ANSSI KAUPPI

Deployments / Preview Deployment 01 of anssikauppi / OAuth 2

OAuth 2.0 Strategies

Create OAuth Strategy

1 Identity Provider

Built In Identity Providers

Amazon Cognito  
Identity Provider

External Identity Providers

Google  
Identity Provider

Azure  
Identity Provider

Ping  
Identity Provider

Okta  
Identity Provider

CONTINUE

2 Identity Provider App Definition

3 App Scopes Builder

CANCEL

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Help

# 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>)

The screenshot shows a web browser window at `portal.trial.isccloud.io`. The user is logged in as ANSSI KAUPPI. The main content area displays the 'Service Definitions' for the FHIR service. A table shows the following data:

Route	Count	Latency	Integration Latency	4xx	5xx
fhir	67	0.06	0.00	67	0

The footer of the page includes the copyright notice: © 1996-2021 – InterSystems® Corporation, Cambridge, MA, and a Help link.

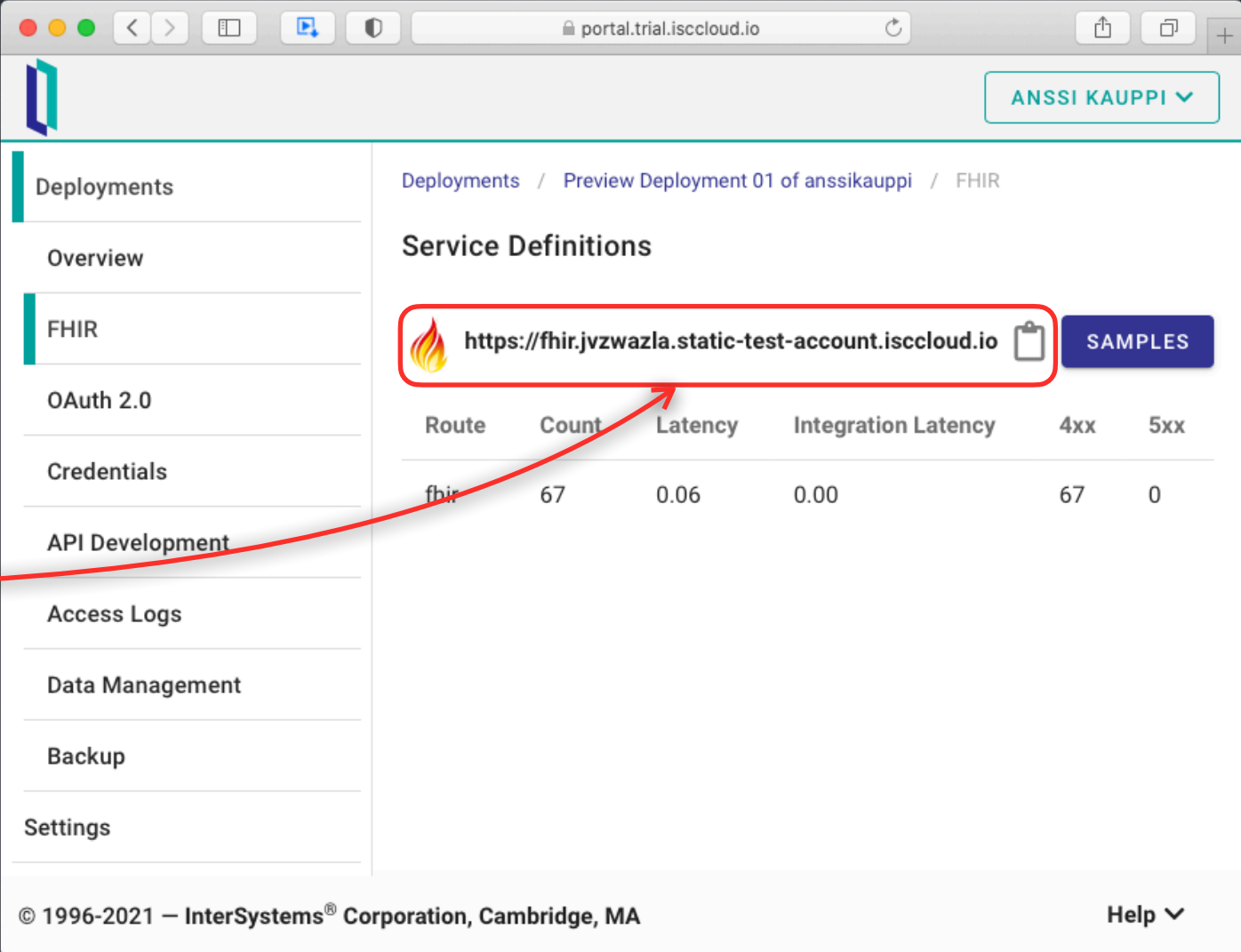


# Start Using the Server through the FHIR RESTful API

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



The screenshot shows the InterSystems portal interface. The browser address bar displays `portal.trial.isccloud.io`. The user is logged in as ANSSI KAUPPI. The left sidebar contains navigation options: Deployments, Overview, FHIR, OAuth 2.0, Credentials, API Development, Access Logs, Data Management, Backup, and Settings. The main content area shows the 'Service Definitions' for the 'FHIR' deployment. A red box highlights the service base URL: `https://fhir.jvzwazla.static-test-account.isccloud.io`. A red arrow points from the text 'You can copy the service base URL here ...' to this URL. Below the URL is a table with the following data:

Route	Count	Latency	Integration Latency	4xx	5xx
fhir	67	0.06	0.00	67	0

At the bottom of the page, the copyright notice reads: © 1996-2021 – InterSystems® Corporation, Cambridge, MA. A 'Help' dropdown menu is visible in the bottom right corner.



# 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

The screenshot displays the Developer Portal interface for API Development. The left sidebar contains a navigation menu with the following items: Deployments, Overview, FHIR, OAuth 2.0, Credentials, **API Development** (highlighted with a red box), Access Logs, Data Management, Backup, and Settings. The main content area is titled "API Development" and shows a "Choose FHIR® Resource" dropdown menu with "Patient" selected. Below this, the "FHIR R4 Patient Resource" is detailed, including its URL and description. A "Servers" section shows a test server URL. The "Patient" resource is expanded to show a list of API endpoints with their methods and lock status:

- POST /Patient
- GET /Patient
- GET /Patient/{id}
- PUT /Patient/{id}
- DELETE /Patient/{id}
- GET /Patient/{id}/\_history
- GET /Patient/{id}/\_history/{vid}

At the bottom, a "Schemas" section shows a list of resources: Patient and Patient.communication.

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# 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

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

The screenshot displays the 'API Development' section of the Developer Portal. The left sidebar contains a navigation menu with 'API Development' highlighted. The main content area shows the 'API Development' page for the 'Patient' resource. A dropdown menu is open, listing various FHIR resources: Patient, Account, ActivityDefinition, AdverseEvent, AllergyIntolerance, Appointment, and AppointmentResponse. The 'Patient' resource is selected. Below the dropdown, the 'Patient' resource details are shown, including a list of API endpoints (POST, GET, PUT, DELETE) and their corresponding URLs. The 'Schemas' section at the bottom shows the 'Patient' and 'Patient.communication' schemas.



# 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

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

... then select an interaction ...

The screenshot displays the Developer Portal interface for API Development. The left sidebar contains a navigation menu with the following items: Deployments, Overview, FHIR, OAuth 2.0, Credentials, API Development (highlighted with a red box), Access Logs, Data Management, Backup, and Settings. The main content area is titled 'API Development' and shows a 'Choose FHIR® Resource' dropdown menu with 'Patient' selected. Below this, the 'FHIR R4 Patient Resource' is displayed with its URL and a description. A red arrow points from the 'API Development' menu item to the 'Patient' resource. Another red arrow points from the '... then select an interaction ...' text to the 'PUT /Patient/{id}' interaction in the 'Patient' resource list. The 'Patient' resource list includes the following interactions:

- POST /Patient
- GET /Patient
- GET /Patient/{id}
- PUT /Patient/{id}
- DELETE /Patient/{id}
- GET /Patient/{id}/\_history
- GET /Patient/{id}/\_history/{vid}

At the bottom, the 'Schemas' section shows 'Patient' and 'Patient.communication'.



# 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

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.) ...

The screenshot displays the Developer Portal interface for API Development. The left sidebar contains a navigation menu with the following items: Deployments, Overview, FHIR, OAuth 2.0, Credentials, API Development (highlighted with a red box), Access Logs, Data Management, Backup, and Settings. The main content area is titled 'API Development' and shows a 'Choose FHIR® Resource' dropdown menu with 'Patient' selected. Below this, the 'FHIR R4 Patient Resource' is displayed with its URL and a description. A red box highlights the 'Patient' resource selection and the list of interactions: POST /Patient, GET /Patient, GET /Patient/{id}, PUT /Patient/{id}, DELETE /Patient/{id}, GET /Patient/{id}/\_history, and GET /Patient/{id}/\_history/{vid}. The 'Schemas' section at the bottom shows 'Patient' and 'Patient.communication'.

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Help ▾

# 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

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

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

The screenshot displays the Developer Portal interface for a user named ANSSI KAUPPI. The left sidebar contains navigation options: Deployments, Overview, FHIR, OAuth 2.0, Credentials, API Development (highlighted with a red box), Access Logs, Data Management, Backup, and Settings. The main area shows a 'Parameters' form with a table for defining request parameters:

Name	Description
id * required	
string (path)	1

Below the table is an 'Execute' button (highlighted with a red box) and a 'Clear' button. The 'Responses' section shows the executed request and response:

**Curl**

```
curl -X GET "https://fhir.jvwazla.static-test-account.iscloud.io/Patient/1" -H "accept: application/fhir+json" -H "x-api-key: oTRcnPwbB9j1V5HfBg0G7n1DsUsj1qTalc08Pj6"
```

**Request URL**

```
https://fhir.jvwazla.static-test-account.iscloud.io/Patient/1
```

**Server response**

Code	Details
200	<p><b>Response body</b></p> <pre>{   "resourceType": "Patient",   "id": "1",   "text": {     "status": "generated",     "div": "&lt;div xmlns=\\"https://www.w3.org/1999/xhtml\\"&gt;Generated by &lt;a href=\\"https://github.com/synthetichealth/synthea\\"&gt;Synthea&lt;/a&gt;. Version identifier: 65d0325\\n . Person seed: 4167751680697849692 Population seed: 1597107330720&lt;/div&gt;"   },   "extension": [     {       "url": "https://hl7.org/fhir/us/core/StructureDefinition/us-core-race",       "extension": [         {           "url": "ombCategory",           "valueCoding": {             "system": "urn:oid:2.16.840.1.113883.6.238",             "code": "2028-9",             "display": "Asian"           }         }       ]     }   ] }</pre> <p><b>Response headers</b></p> <pre>access-control-allow-methods: * access-control-allow-origin: * access-control-expose-headers: * content-length: 3410 content-location: https://fhir.jvwazla.static-test-account.isc-</pre>

Red arrows point from the text boxes to the 'Execute' button and the response details section.



# 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

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

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

You can download the response body ...

The screenshot shows the Developer Portal interface for a FHIR API. The left sidebar contains navigation options: Deployments, Overview, FHIR, OAuth 2.0, Credentials, API Development (highlighted with a red box), Access Logs, Data Management, Backup, and Settings. The main area displays the 'Parameters' section with a table:

Name	Description
id * required	
string (path)	1

Below the parameters is an 'Execute' button (highlighted with a red box) and a 'Clear' button. The 'Responses' section shows the following details:

- Curl:** `curl -X GET "https://fhir.jvwazla.static-test-account.iscloud.io/Patient/1" -H "accept: application/fhir+json" -H "x-api-key: oTRcnPwb89jIV5Hf8oG7n1DsUsjLqTalcobPj6"`
- Request URL:** `https://fhir.jvwazla.static-test-account.iscloud.io/Patient/1`
- Server response:**

Code	Details
200	<p><b>Response body</b></p> <pre>{   "resourceType": "Patient",   "id": "1",   "status": "generated",   "div": "&lt;div xmlns='https://www.w3.org/1999/xhtml'&gt;Generated by &lt;a href='https://github.com/synthetichealth/synthea'&gt;Synthea&lt;/a&gt;. Version identifier: 65d0325\n . Person seed: 4167751680697849692 Population seed: 1597107330720&lt;/div&gt;" }</pre> <p><b>Response headers</b></p> <pre>access-control-allow-methods: * access-control-allow-origin: * access-control-expose-headers: * content-length: 3410 content-location: https://fhir.jvwazla.static-test-account.isc-</pre>

A 'Download' button (highlighted with a red box) is located at the bottom right of the response body area.



# Access Logs

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

The screenshot shows a web application interface for 'portal.trial.isccloud.io'. The user is logged in as 'ANSSI KAUPPI'. The left sidebar contains navigation options: Deployments, Overview, FHIR, OAuth 2.0, Credentials, API Development, Access Logs (selected), Data Management, Backup, and Settings. The main content area is titled 'Access Logs' and shows a table of request logs. The table has columns for Request Time, Endpoint, Source IP, HTTP Method, Request Path, Status, and APIKey. The logs show various requests to the 'fhir.jvzwazla.static-test-account.isccloud.io' endpoint, including GET and OPTIONS methods, with status codes like 200, 403, and 404. At the bottom right, there are controls for 'Rows per page' (set to 10) and '1-10 of 15' records.

Request Time	Endpoint	Source IP	HTTP Method	Request Path	Status	APIKey
05/May/2021:10:15:01	fhir.jvzwazla.static-test-account.isccloud.io	91.157.42.205	GET	/Patient/1	200 / 200	*****coBPJ6
05/May/2021:10:15:01	fhir.jvzwazla.static-test-account.isccloud.io	91.157.42.205	OPTIONS	/Patient/1	200 / 200	-
05/May/2021:10:14:54	fhir.jvzwazla.static-test-account.isccloud.io	91.157.42.205	GET	/Patient/2	404 / 200	*****coBPJ6
05/May/2021:10:14:54	fhir.jvzwazla.static-test-account.isccloud.io	91.157.42.205	OPTIONS	/Patient/2	200 / 200	-
05/May/2021:10:14:45	fhir.jvzwazla.static-test-account.isccloud.io	91.157.42.205	GET	/Patient/24	404 / 200	*****coBPJ6
05/May/2021:10:14:45	fhir.jvzwazla.static-test-account.isccloud.io	91.157.42.205	OPTIONS	/Patient/24	200 / 200	-
05/May/2021:10:14:37	fhir.jvzwazla.static-test-account.isccloud.io	91.157.42.205	GET	/Patient/1	200 / 200	*****coBPJ6
05/May/2021:10:14:37	fhir.jvzwazla.static-test-account.isccloud.io	91.157.42.205	OPTIONS	/Patient/1	200 / 200	-
05/May/2021:10:14:21	fhir.jvzwazla.static-test-account.isccloud.io	91.157.42.205	GET	/Patient/1	403 / -	-
05/May/2021:10:14:07	fhir.jvzwazla.static-test-account.isccloud.io	91.157.42.205	GET	/Patient/24	403 / -	-

# Backups

Create and restore backups

The screenshot shows a web browser window at `portal.trial.isccloud.io`. The user is logged in as ANSSI KAUPPI. The left sidebar contains a navigation menu with the following items: Deployments, Overview, FHIR, OAuth 2.0, Credentials, API Development, Access Logs, Data Management, Backup (highlighted), and Settings. The main content area is titled "Backup" and includes a "CREATE BACKUP" button and a "Backups 1" indicator. Below this is a table with the following data:

Backup ID	Creation Date	Status	Actions
eab361bc-8581-4bdf-8154-5a9d32b9f774	05/05/2021, 13:08:45	IN PROGRESS	RESTORE DELETE

At the bottom right of the table, it says "Rows per page: 10" and "1-1 of 1". The footer of the page contains the copyright notice "© 1996-2021 – InterSystems® Corporation, Cambridge, MA" and a "Help" dropdown menu.



# 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:



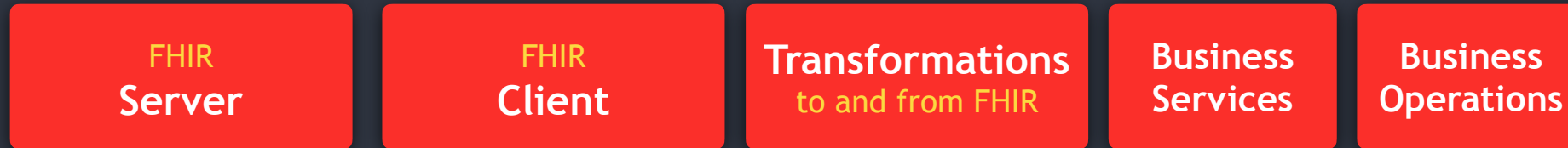
Virtualized  
Environments

Containers

Bare Metal



# 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



# Components of FHIR Server ...

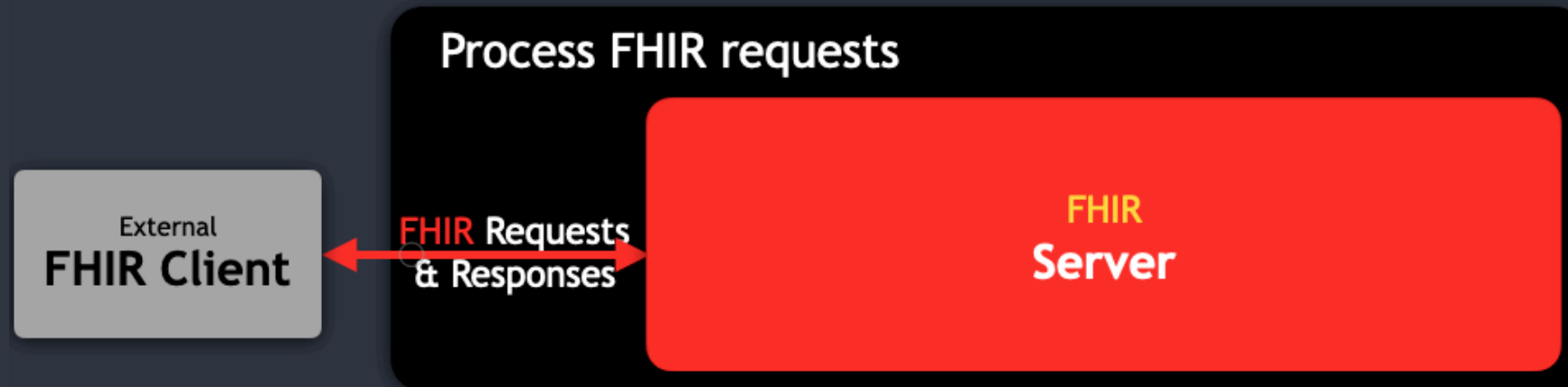
FHIR  
Server

FHIR  
Client

Transformations  
to and from FHIR

Business  
Services

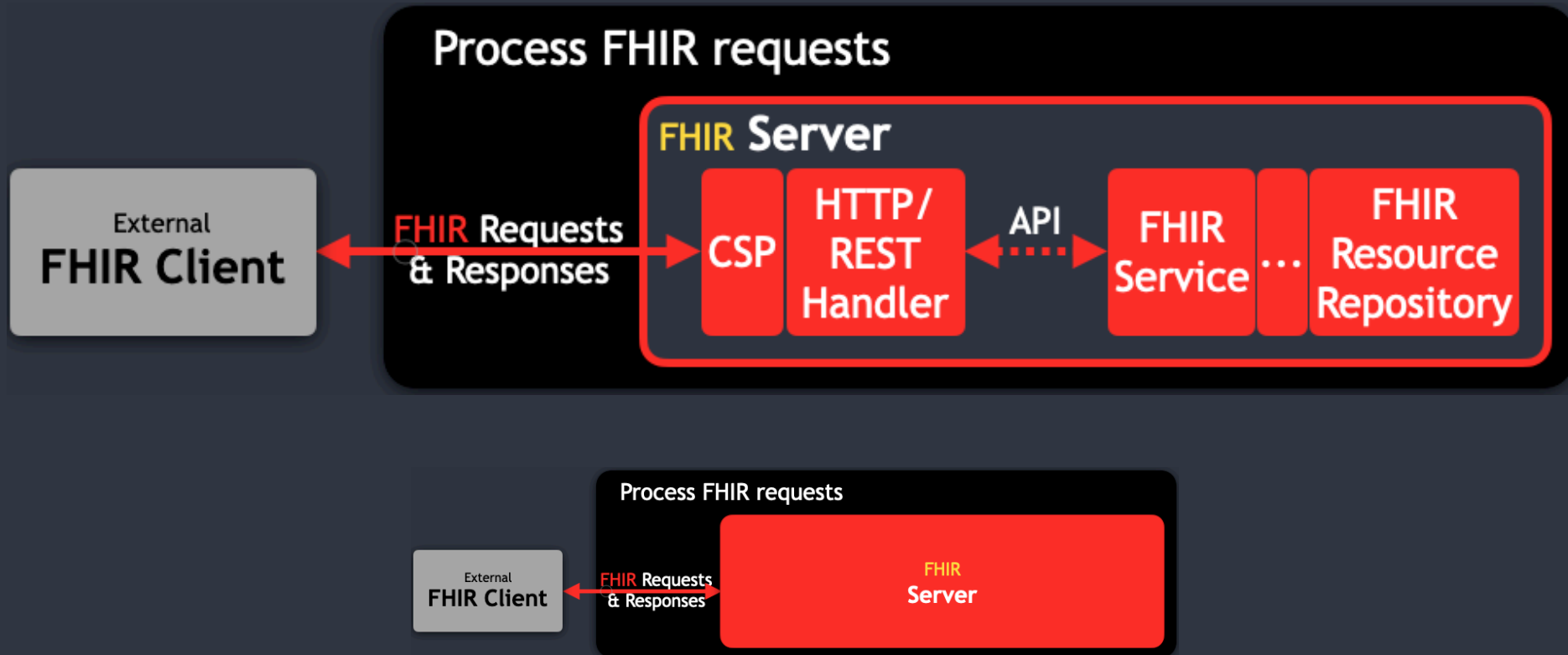
Business  
Operations



# Components of FHIR Server

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

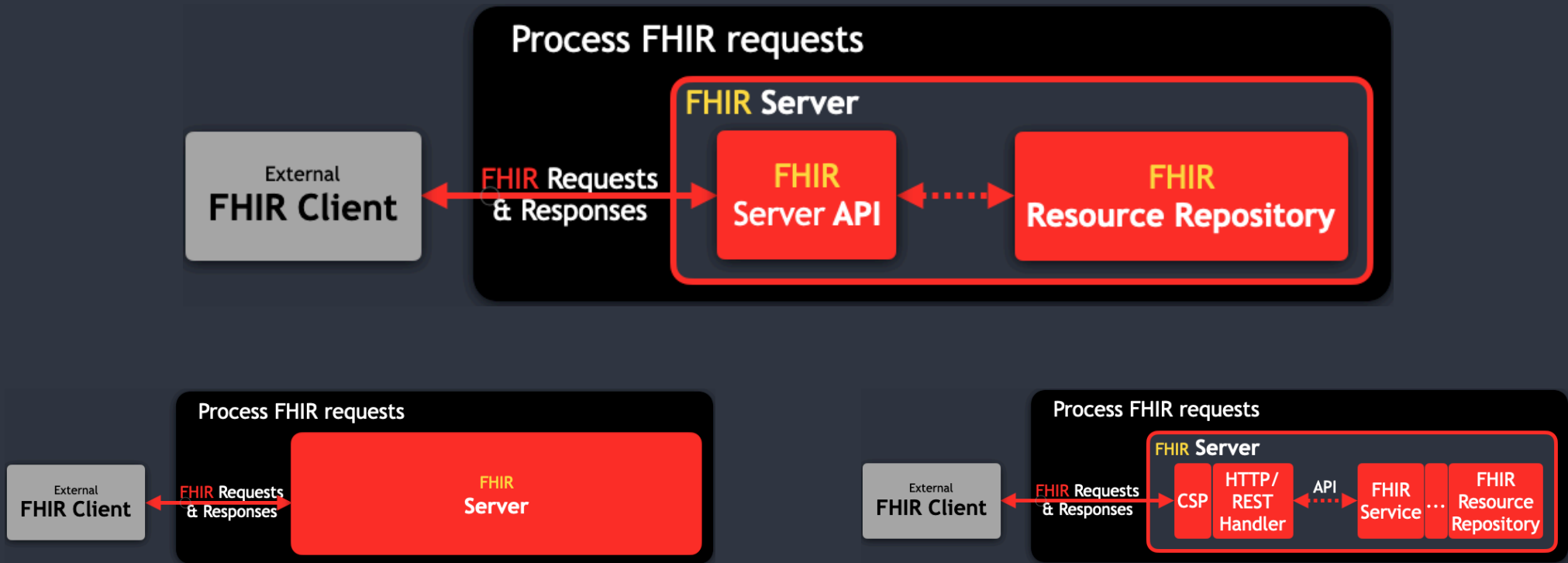
... somewhat granular level:



# Components of FHIR Server

... less granular level:

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

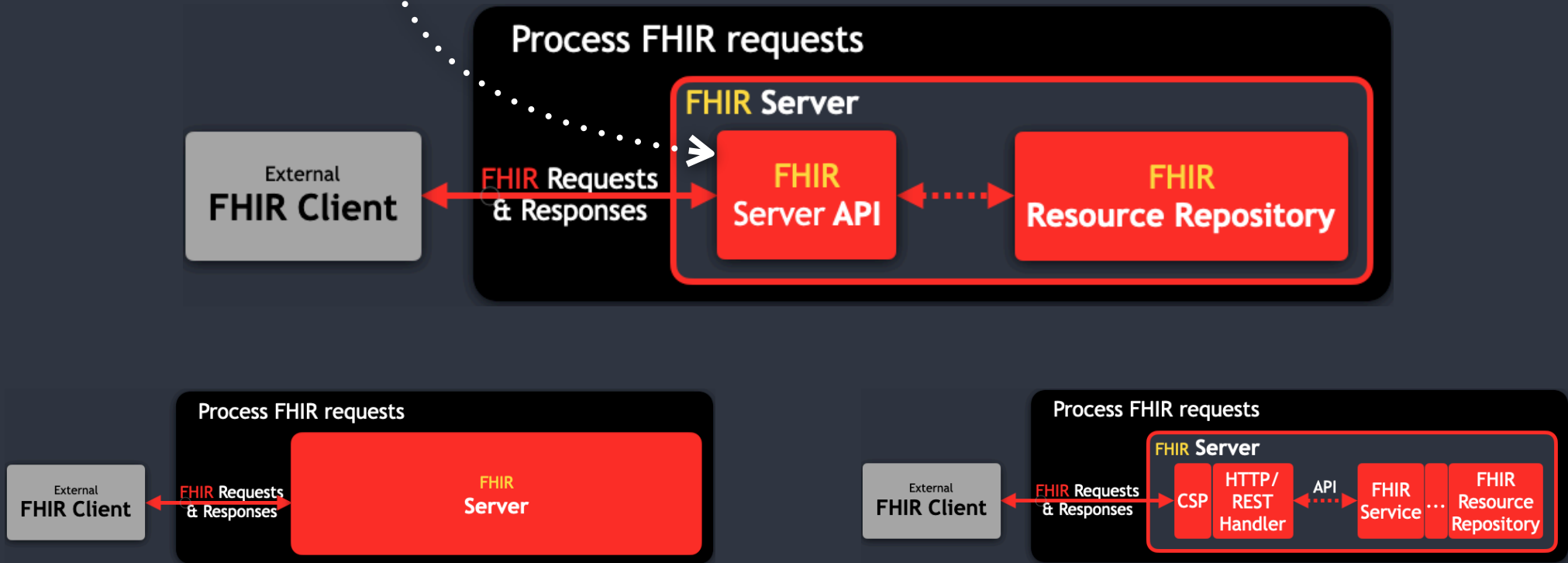


# Components of FHIR Server

- 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>



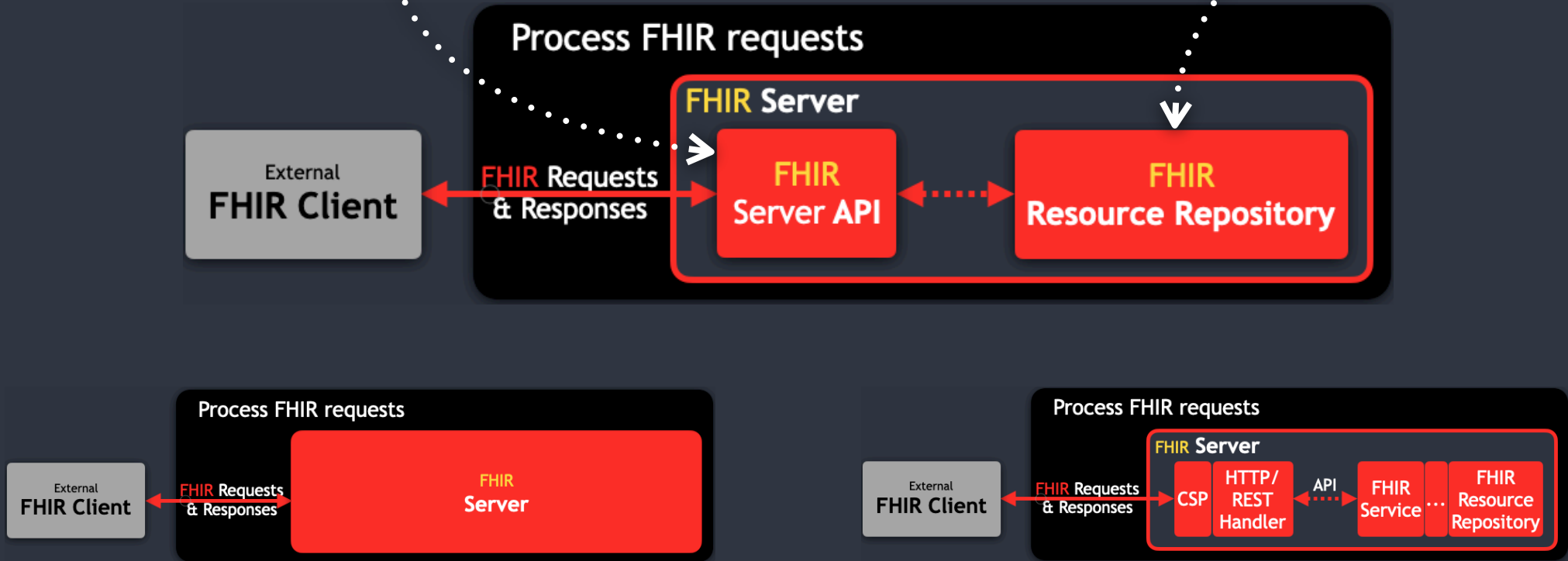
# Components of FHIR Server

- 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



# 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

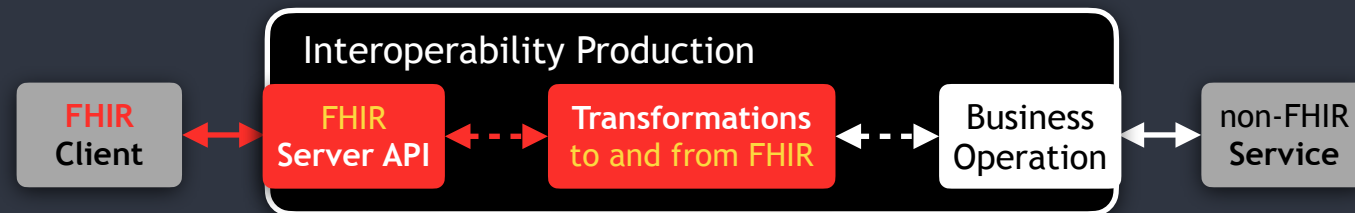


# Map **FHIR Client**(s) to services using other protocols (a very simple case)



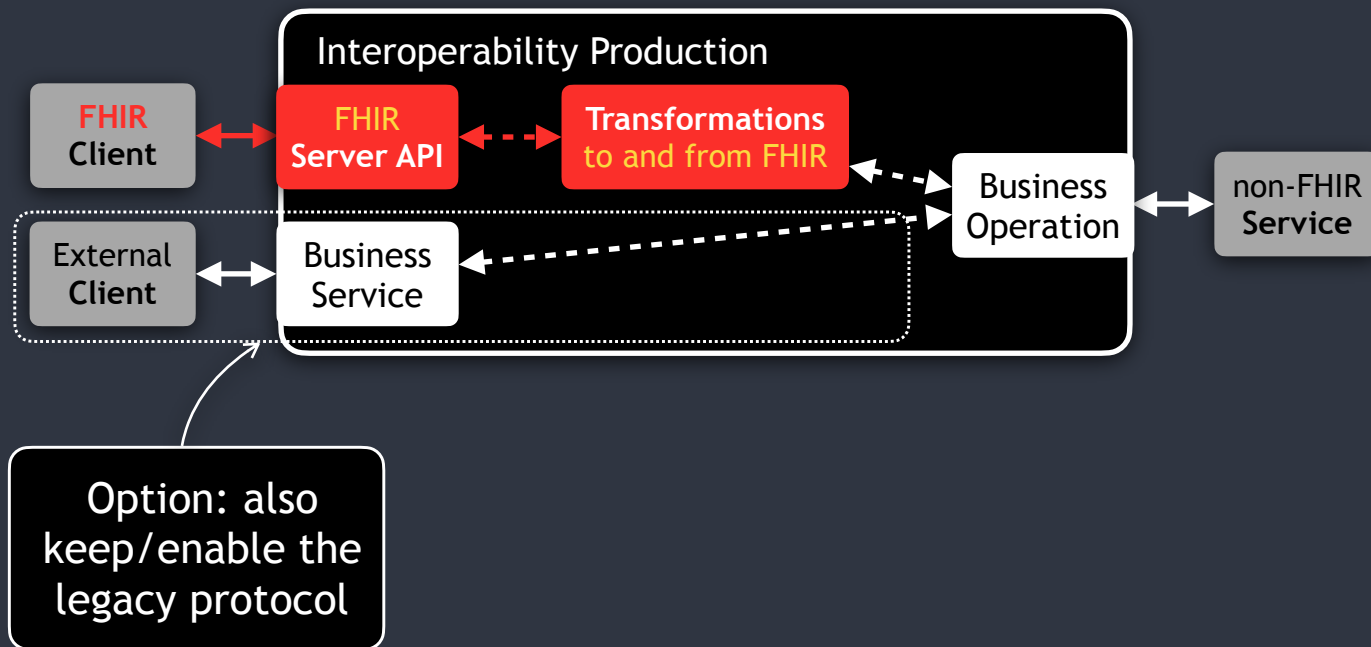
# Map **FHIR Client**(s) to services using other protocols

(a very simple case)

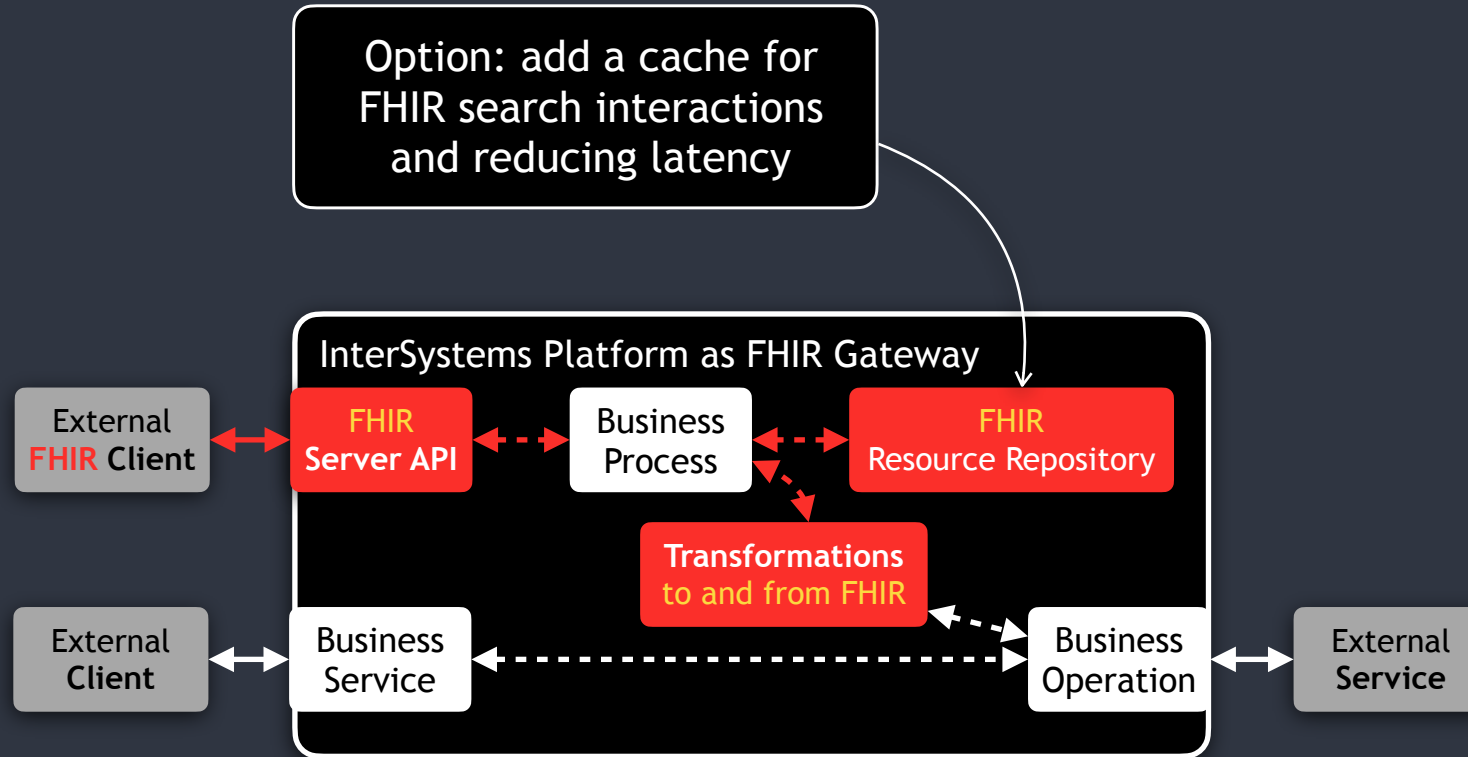


# Map **FHIR Client(s)** to services using other protocols

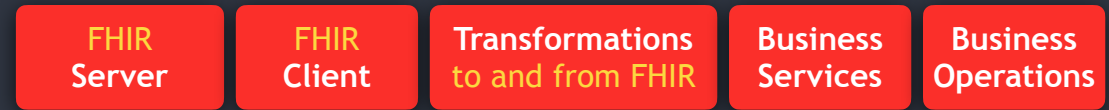
(a very simple case)



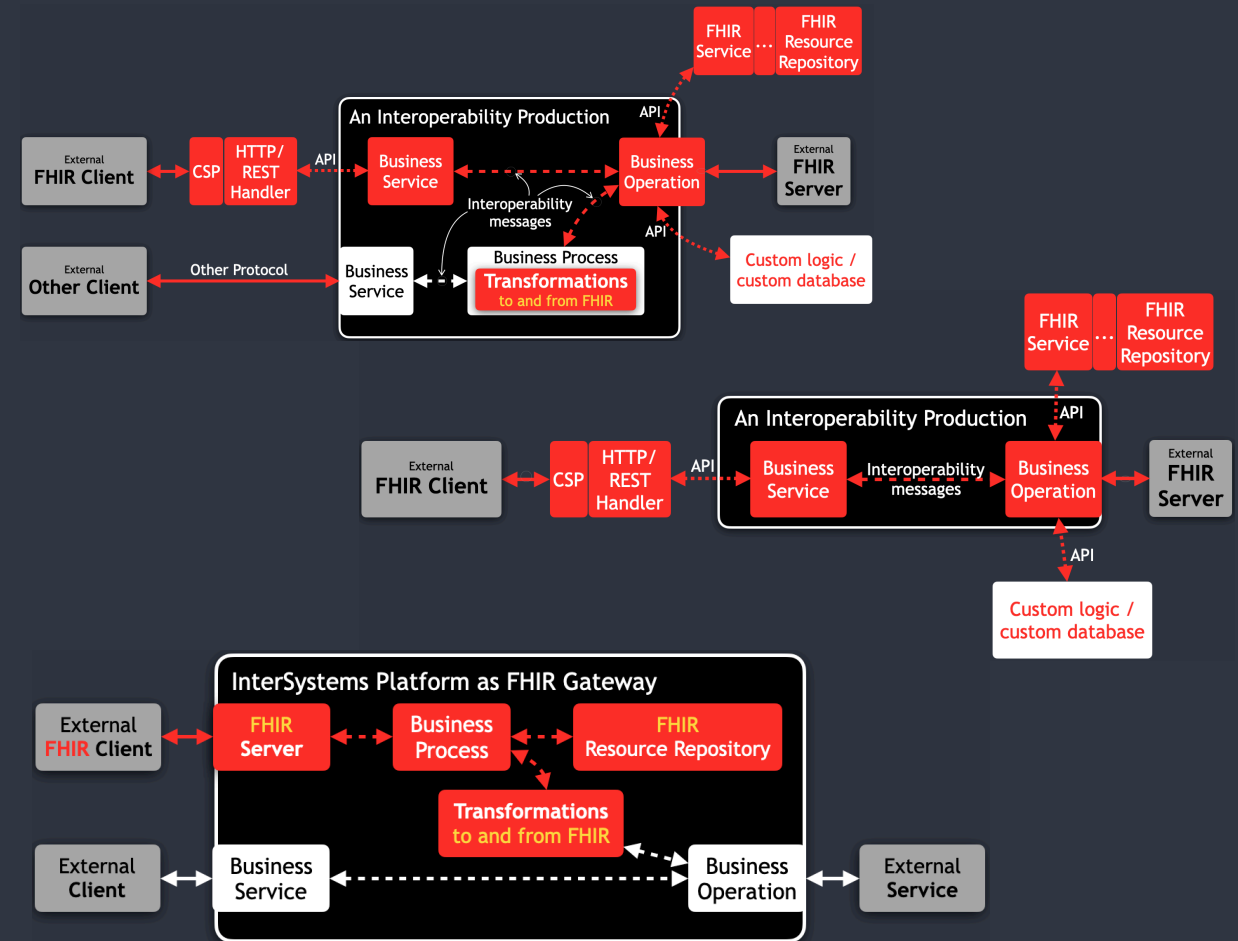
# FHIR Gateways: Read Interactions and Responsiveness



# Summary: Modular components for about anything



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 ...



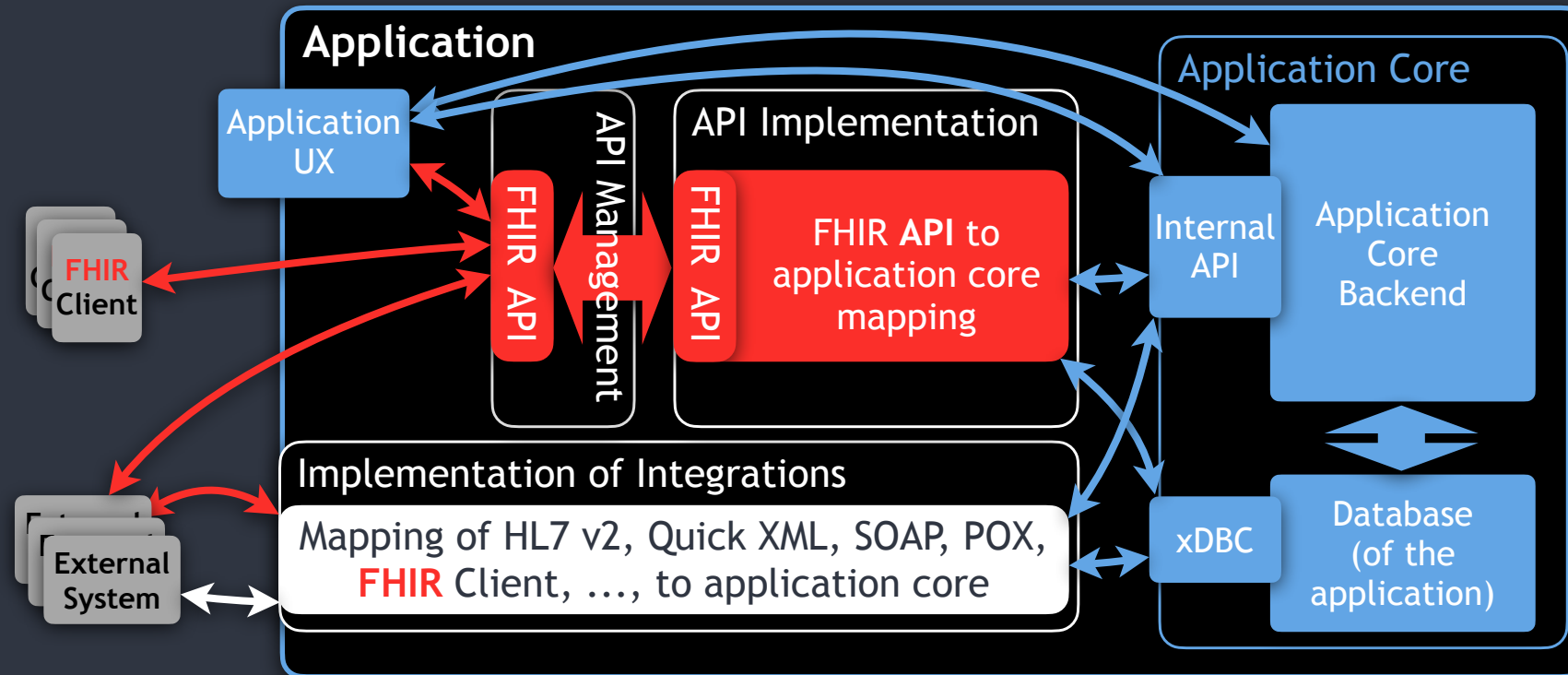
15 min.

Case & Demo

# FHIR Enabling an EHR and Profiling

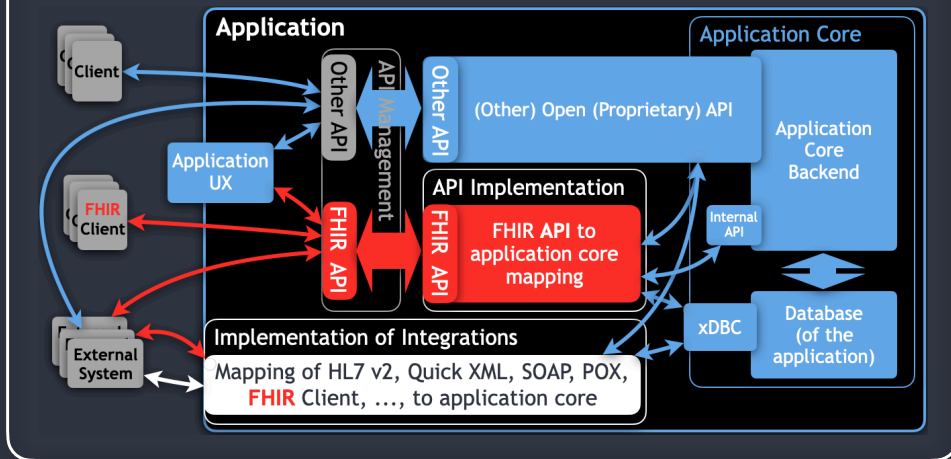


# Task: Implement FHIR RESTful API on top of an internal API

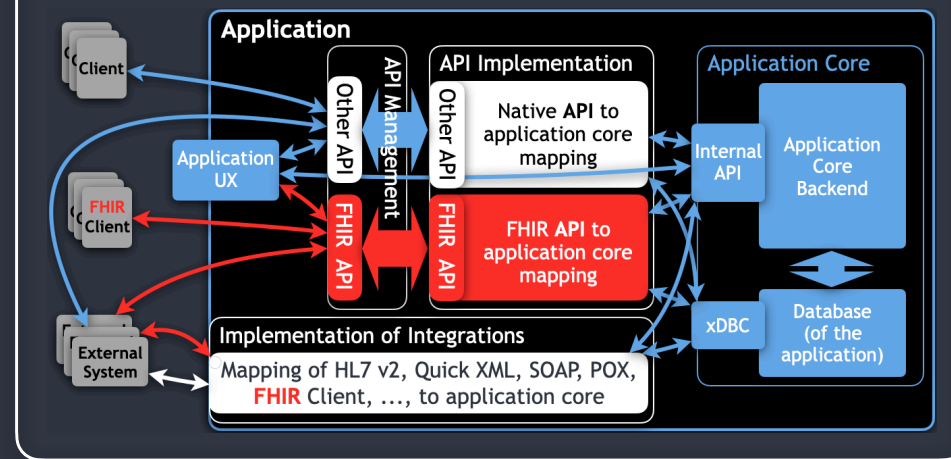


# Task ... at least 4 Different Scenarios to consider ...

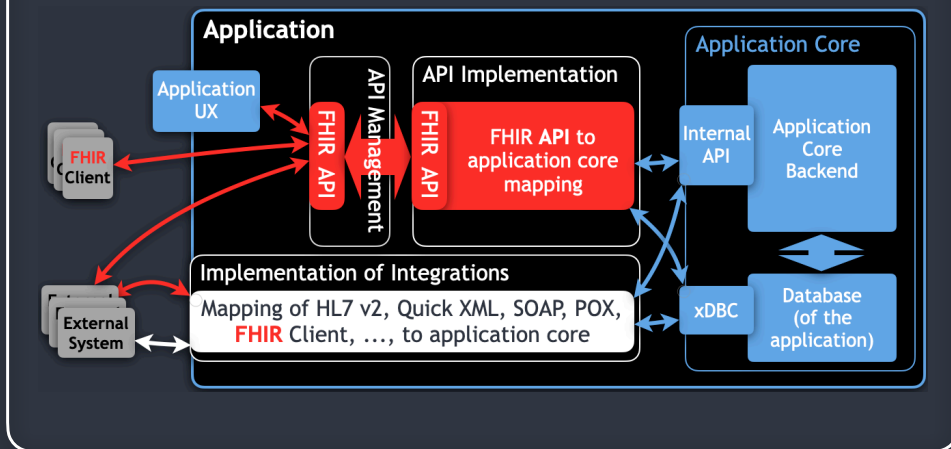
(Proprietary) API first design (two open APIs)



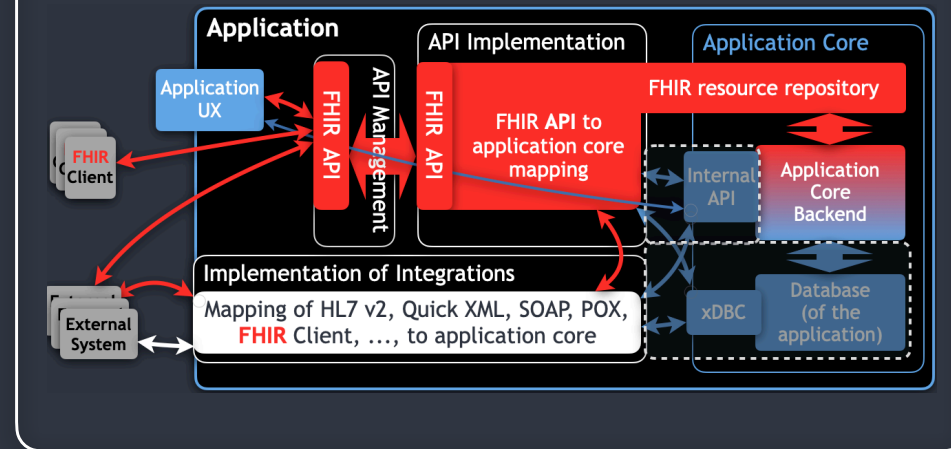
Two open APIs on top of internal API



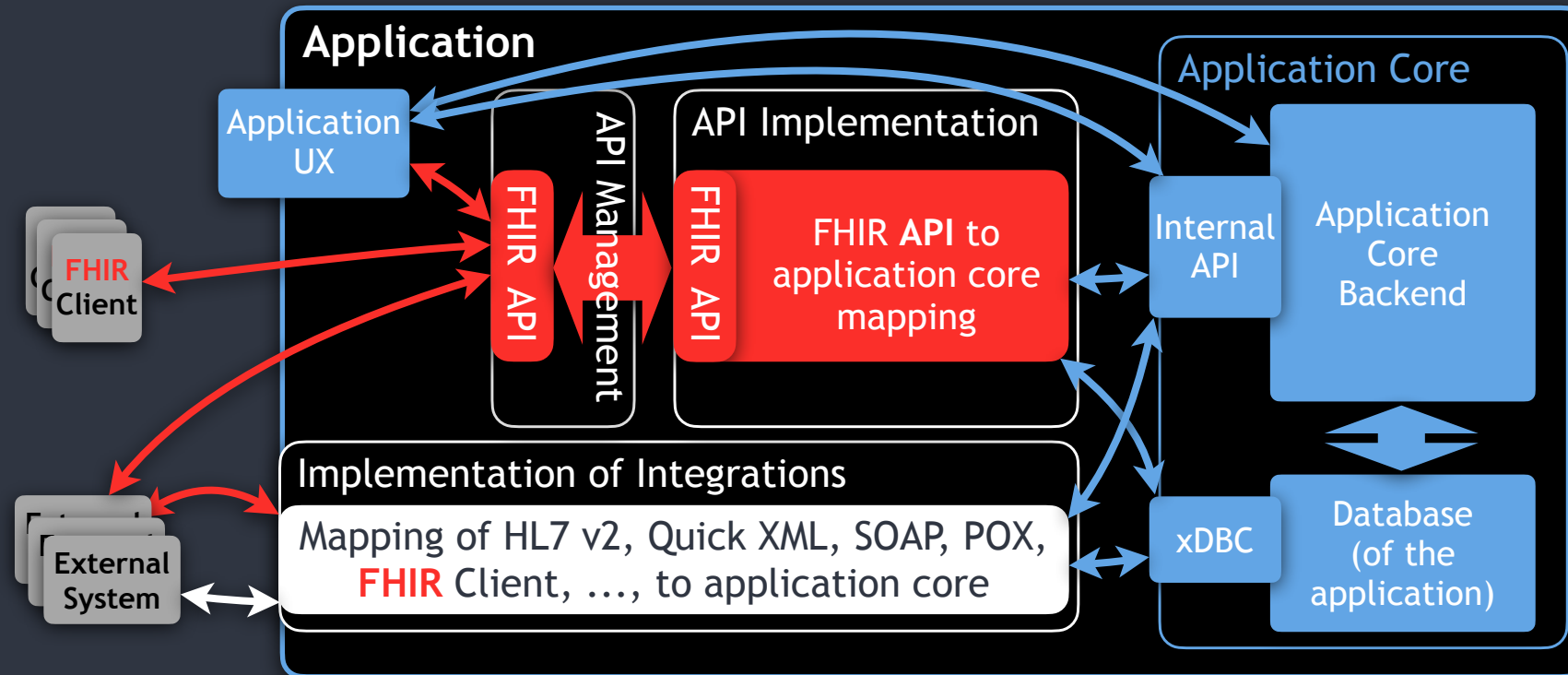
FHIR API on top of internal API



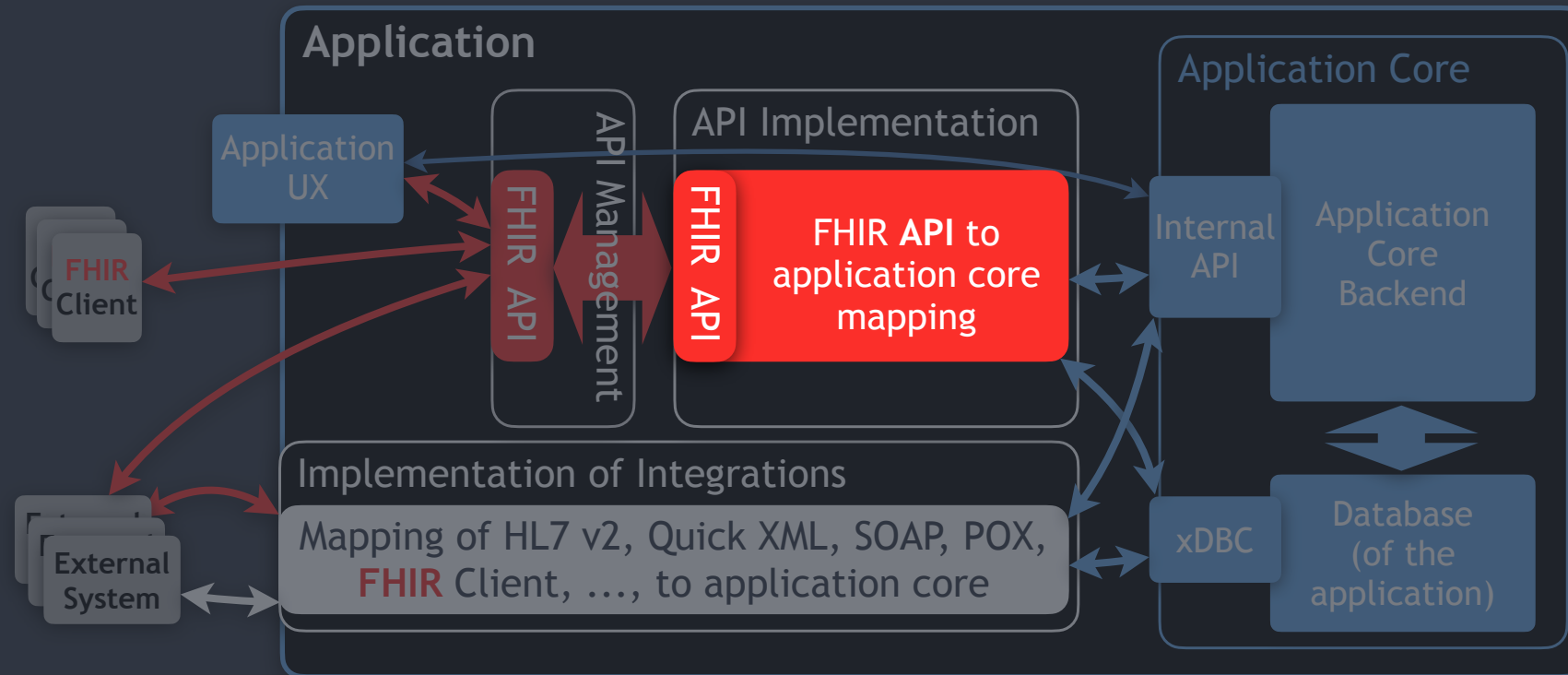
(FHIR) API first design



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

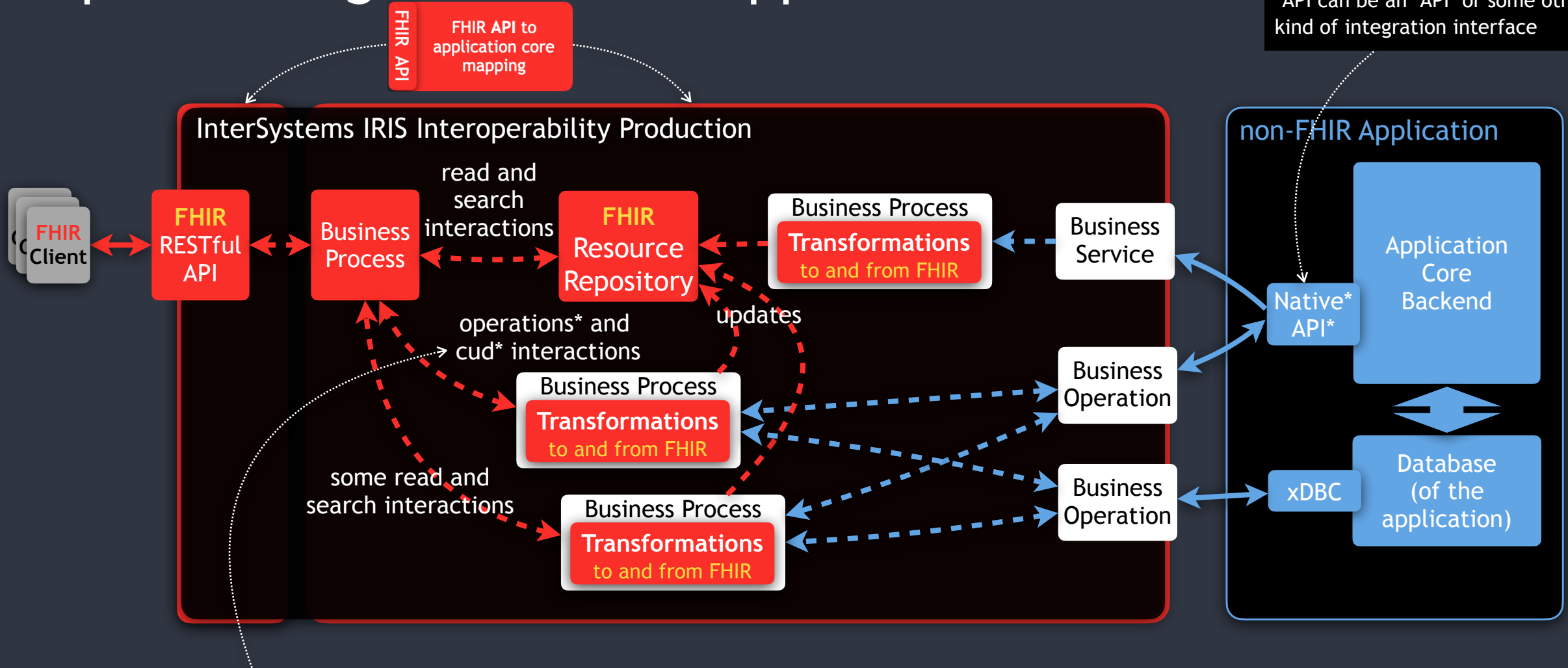


# Task: Implement FHIR RESTful API on top of an internal API

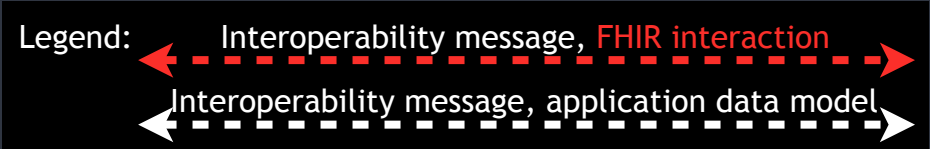


# Implementing FHIR API for application/service

\*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



# Demo

## 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

## 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



# Corollary

Having just  may be enough for some green field projects and restricted use cases ...  
... but is not enough for most real world use cases.



# 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.

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

**FHIR  
Server**

**FHIR  
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**Transformations  
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# Corollary

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

Transform  
ations

...



# Corollary

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



10 min.

Demo

# Apple Health App

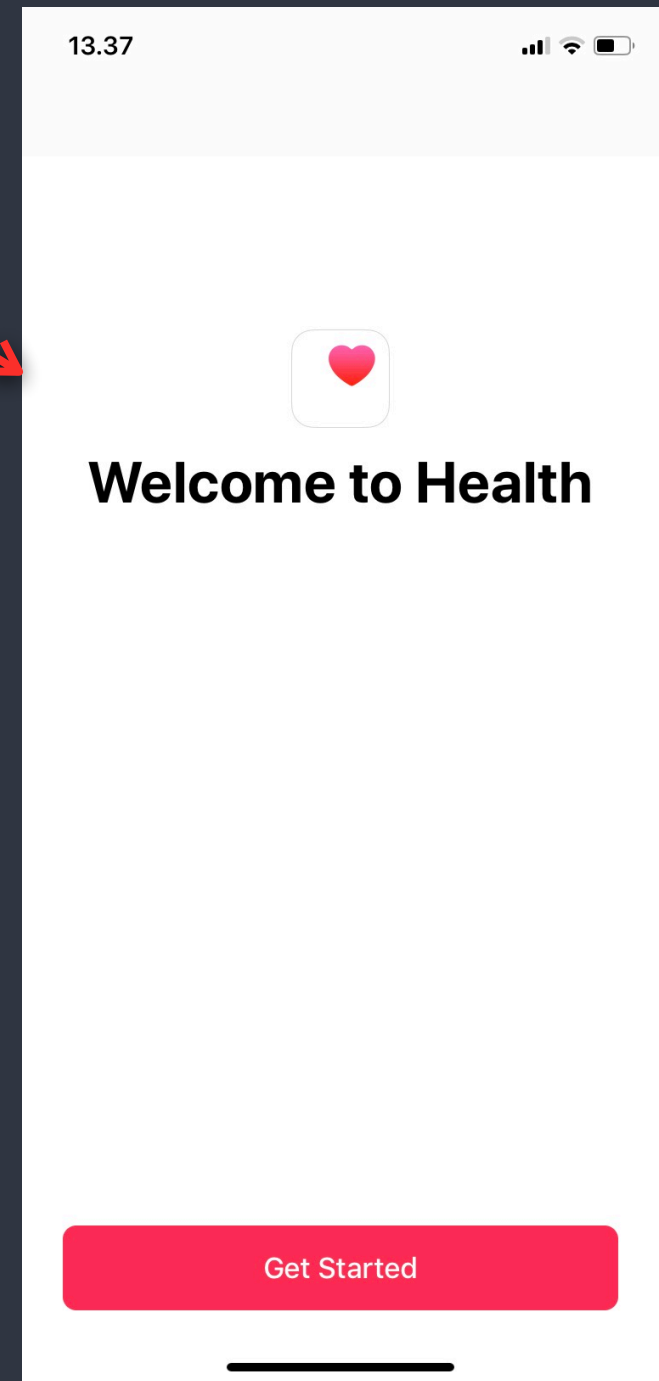
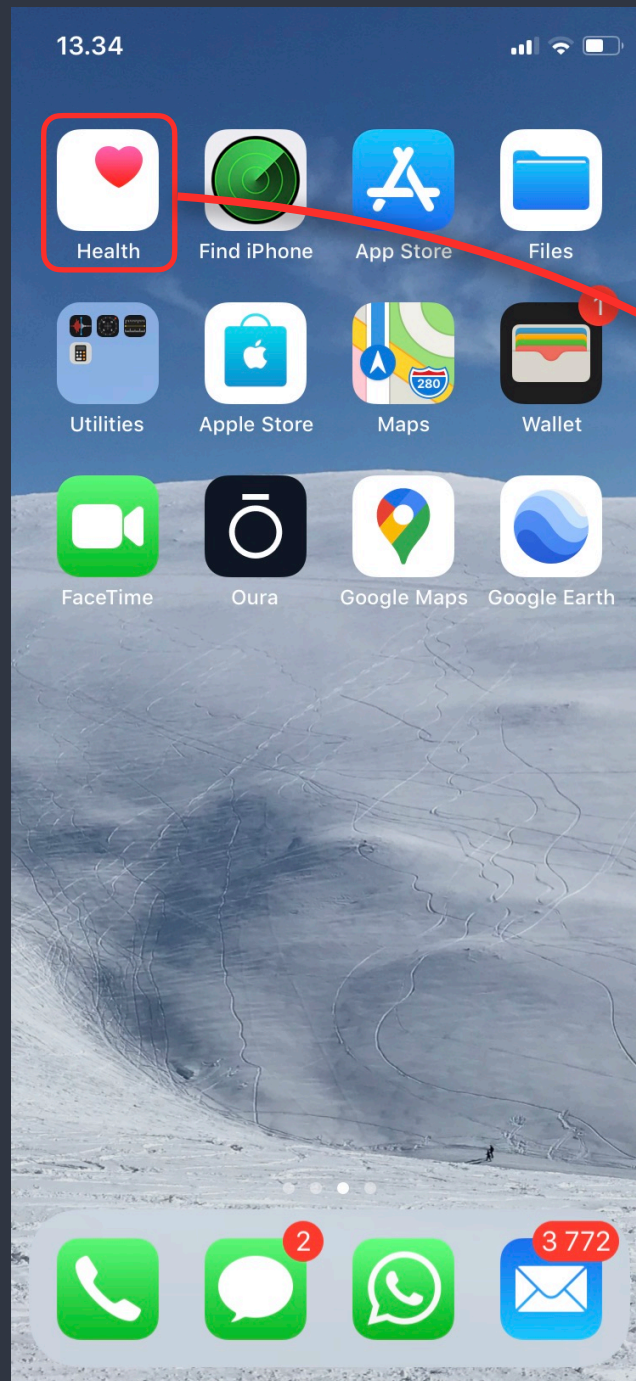


? min.

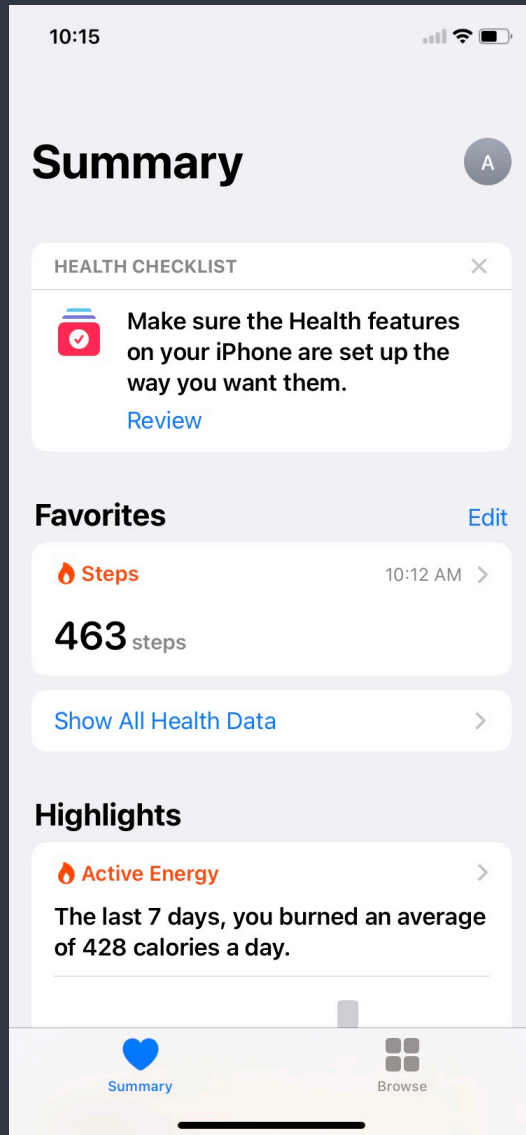
# Connecting to and Authorising an EHR



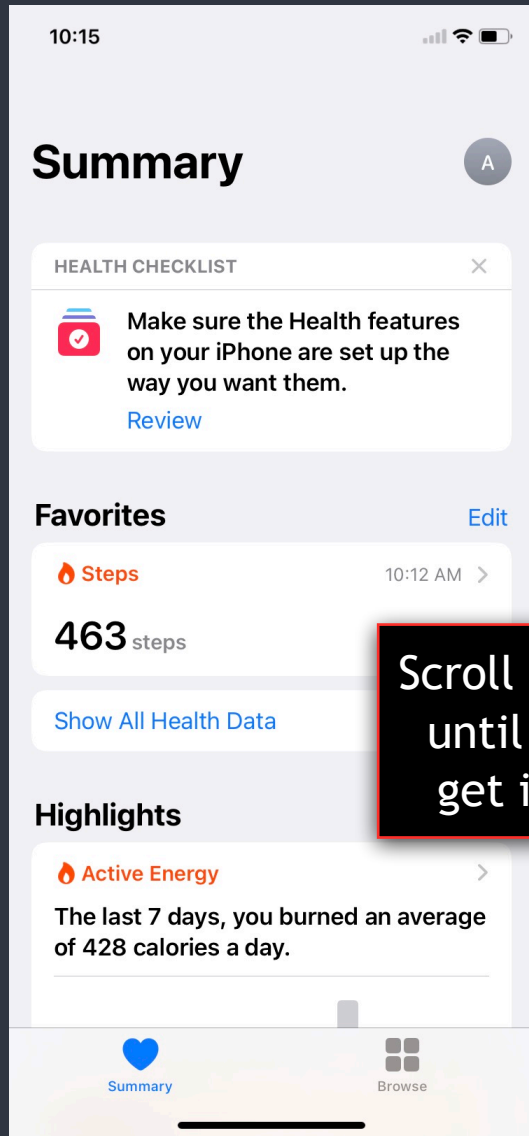
# Apple Health App is Preinstalled on Every iPhone ...



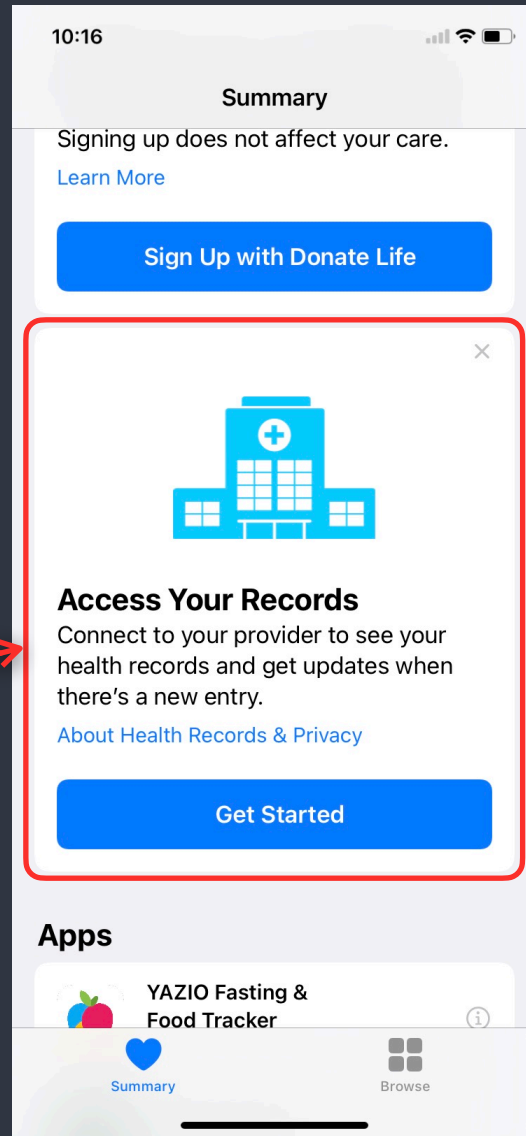
# Search for Providers



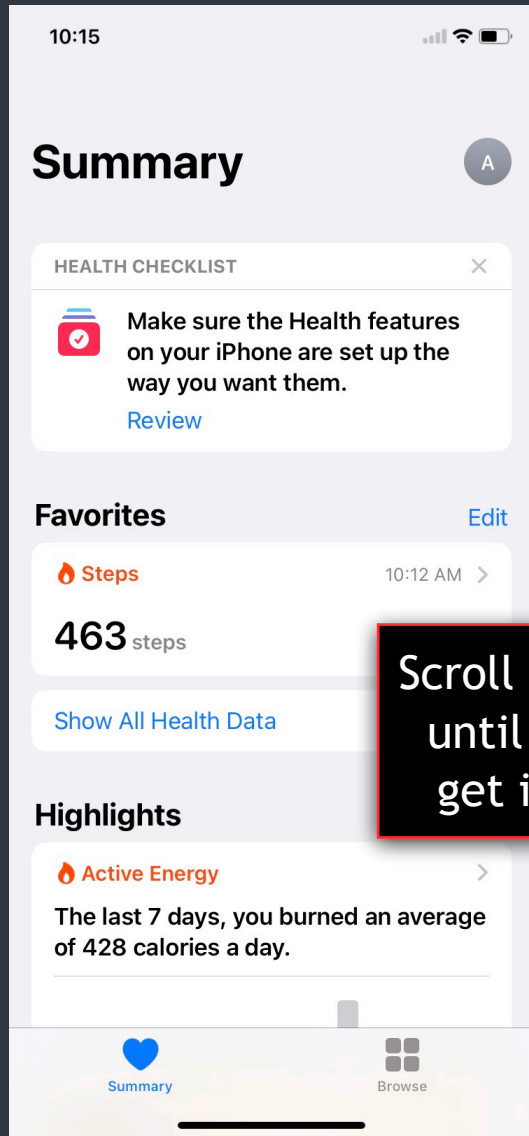
# Search for Providers



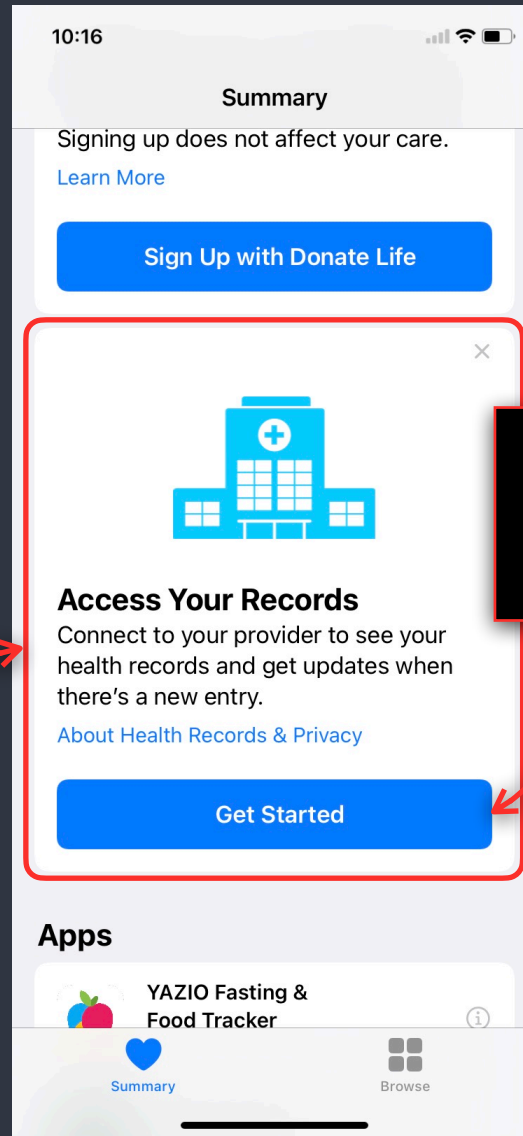
Scroll down until you get into



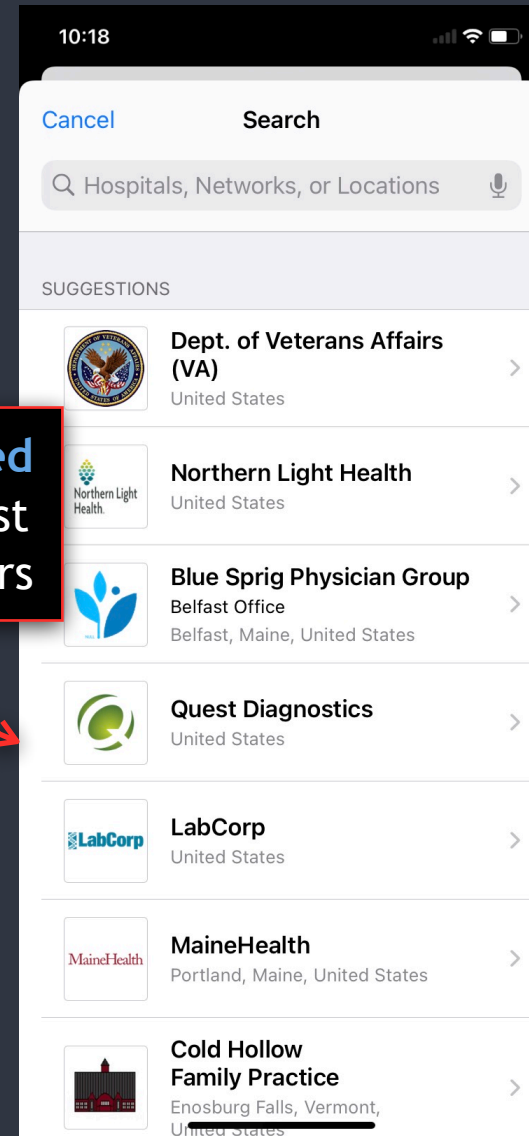
# Search for Providers



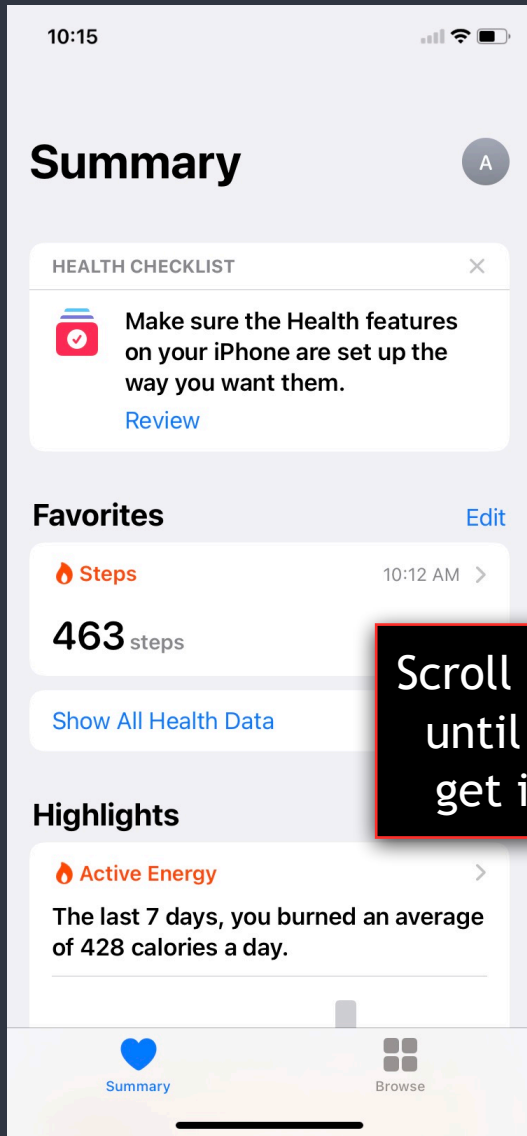
Scroll down until you get into



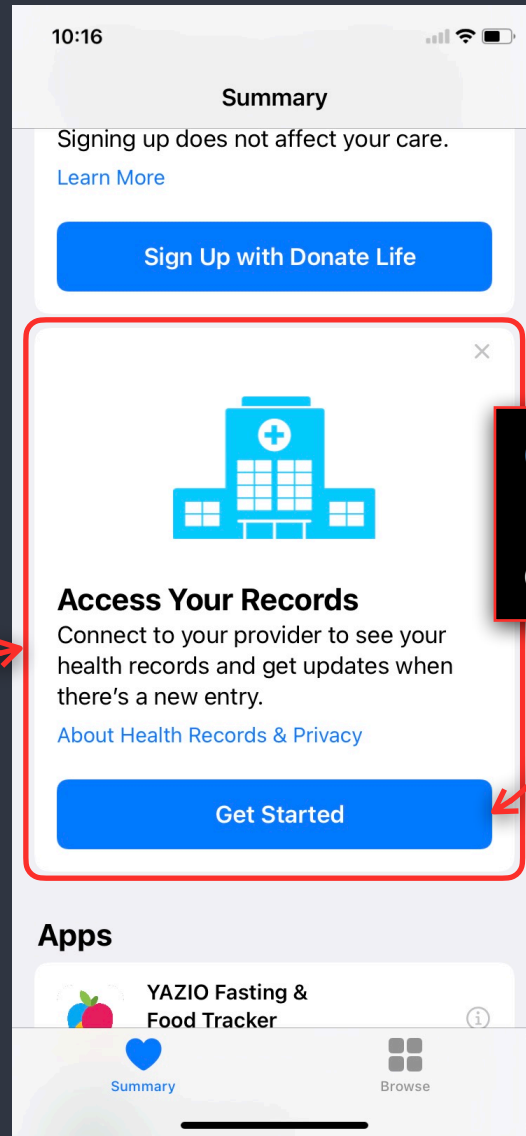
Get Started to get a list of providers



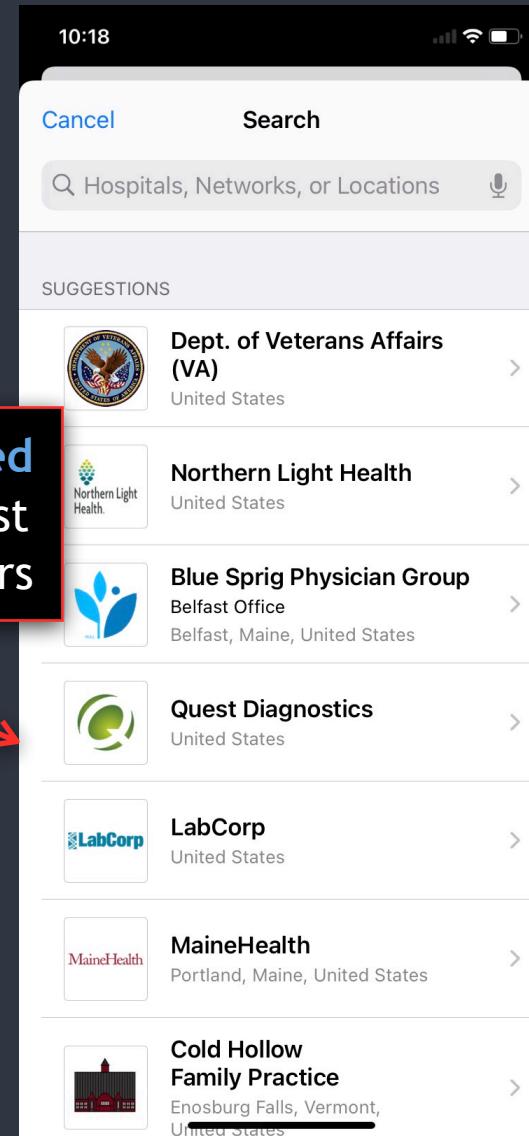
# Search for Providers



Scroll down until you get into



Get Started to get a list of providers

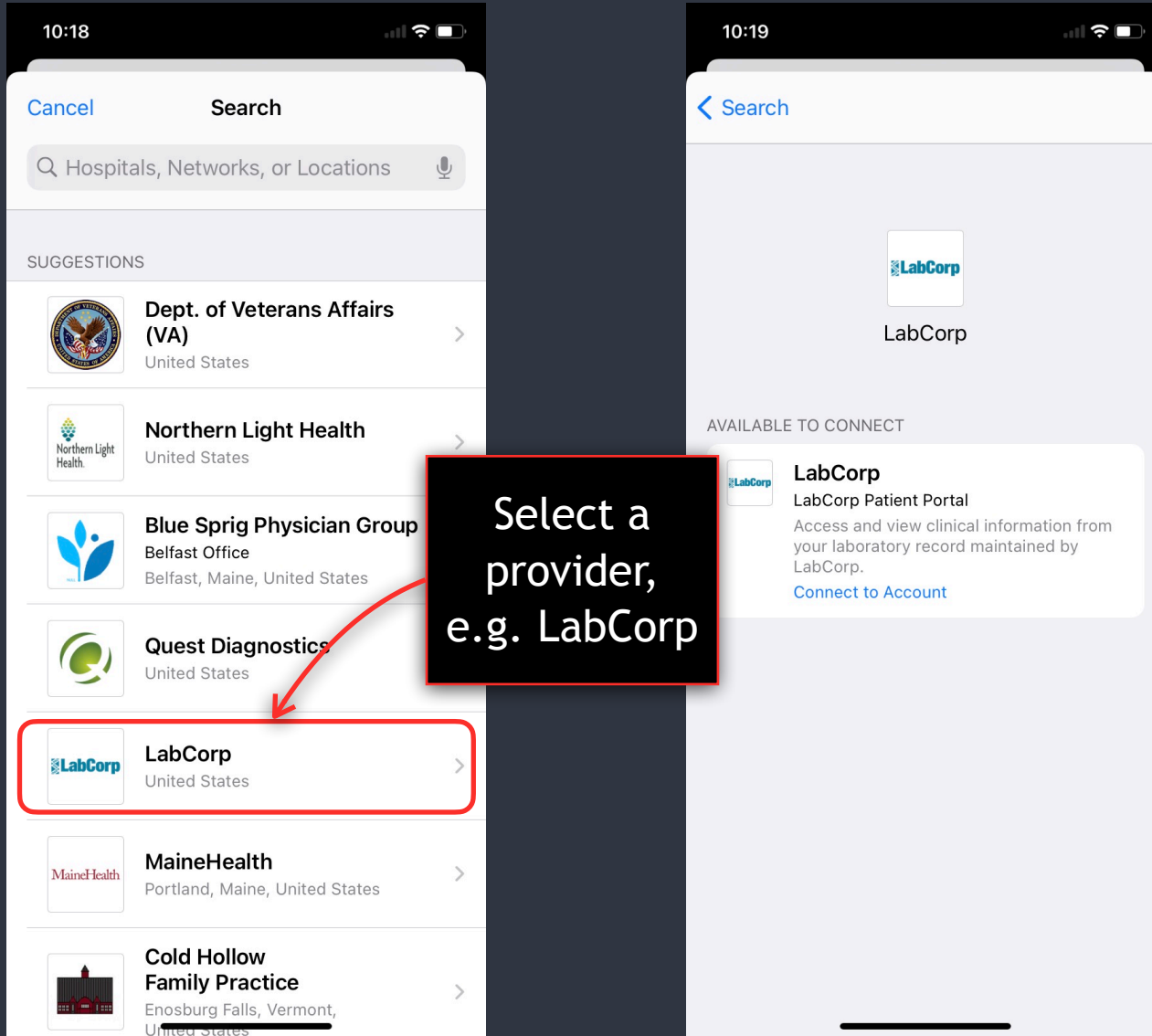


The list of providers is veery loooong ...

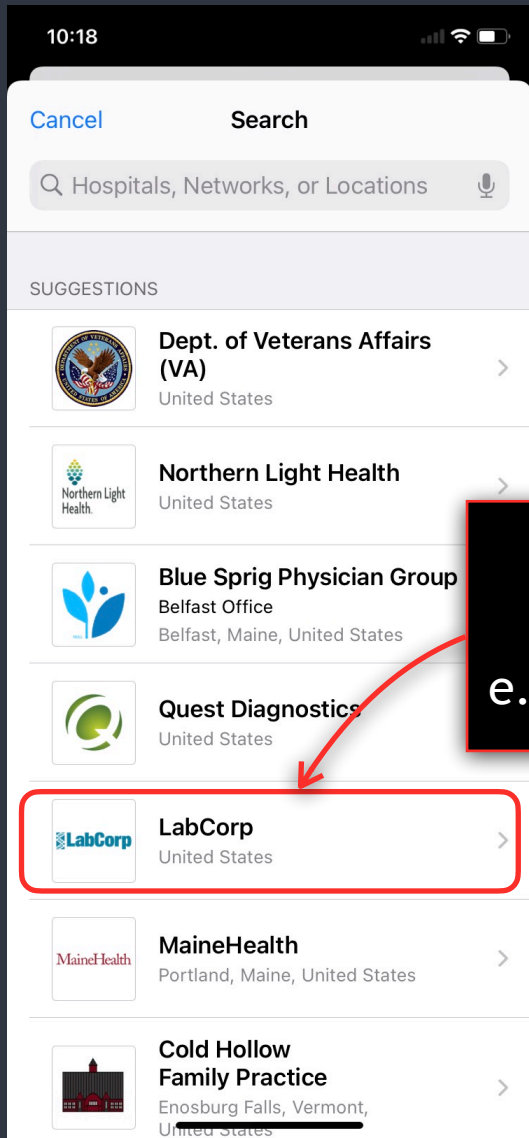
... you can scroll down the list forever.



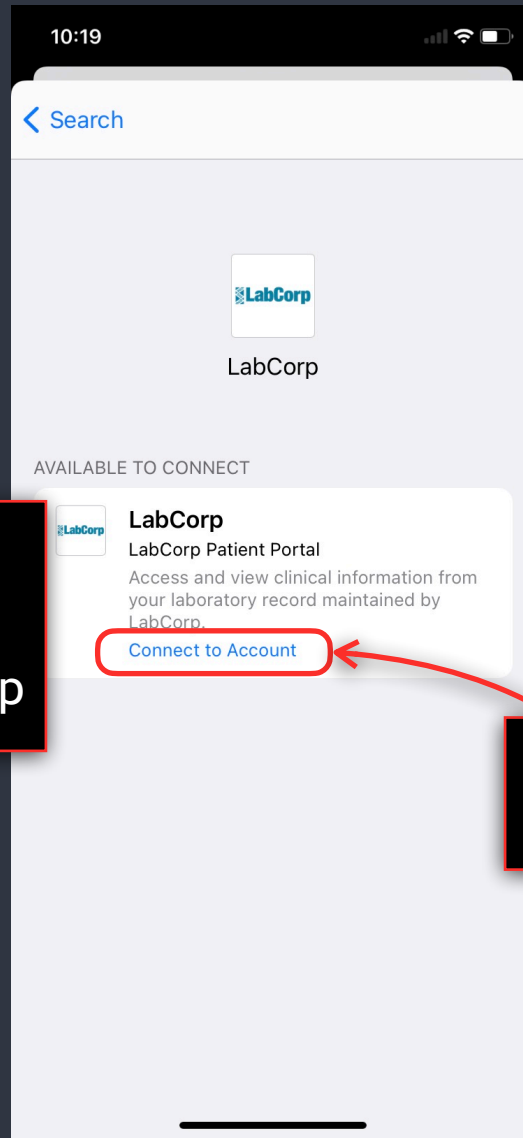
# Search for Providers



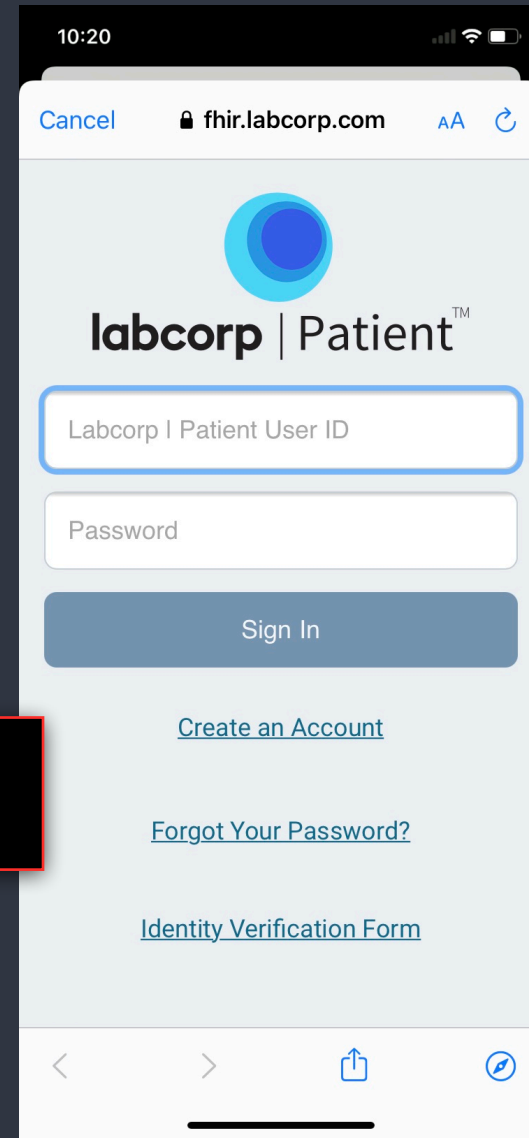
# Search for Providers



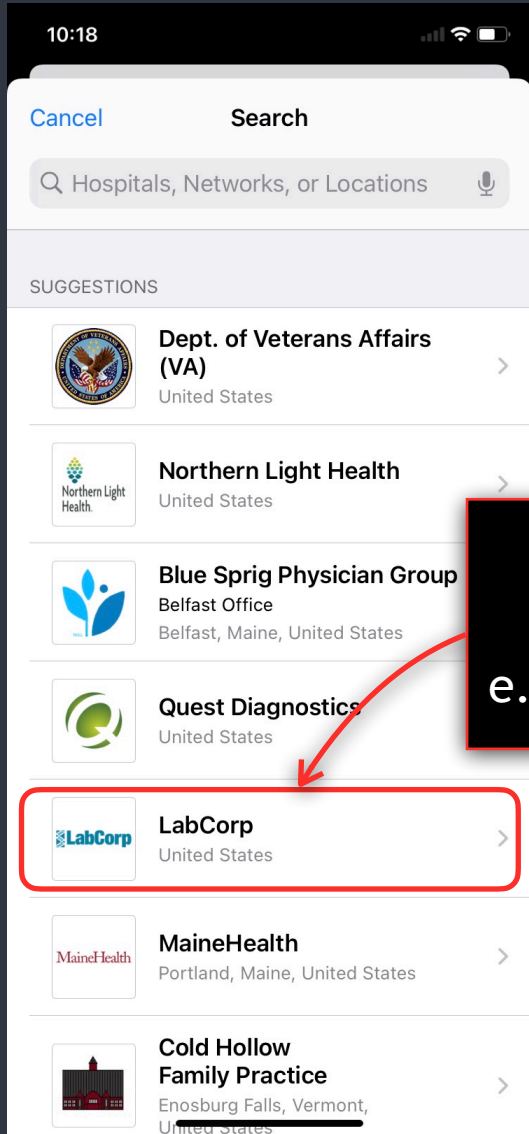
Select a provider, e.g. LabCorp



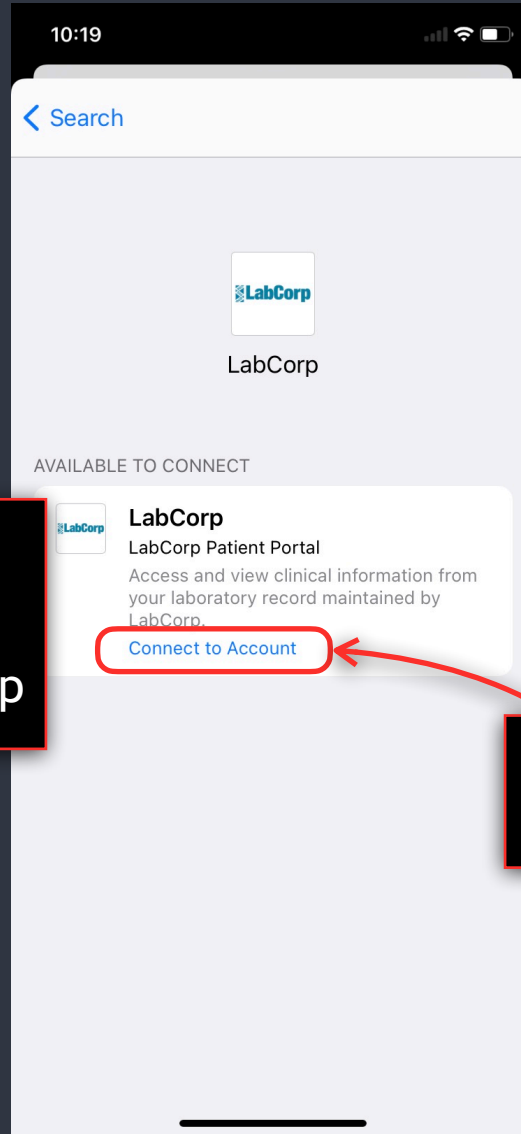
Select to connect



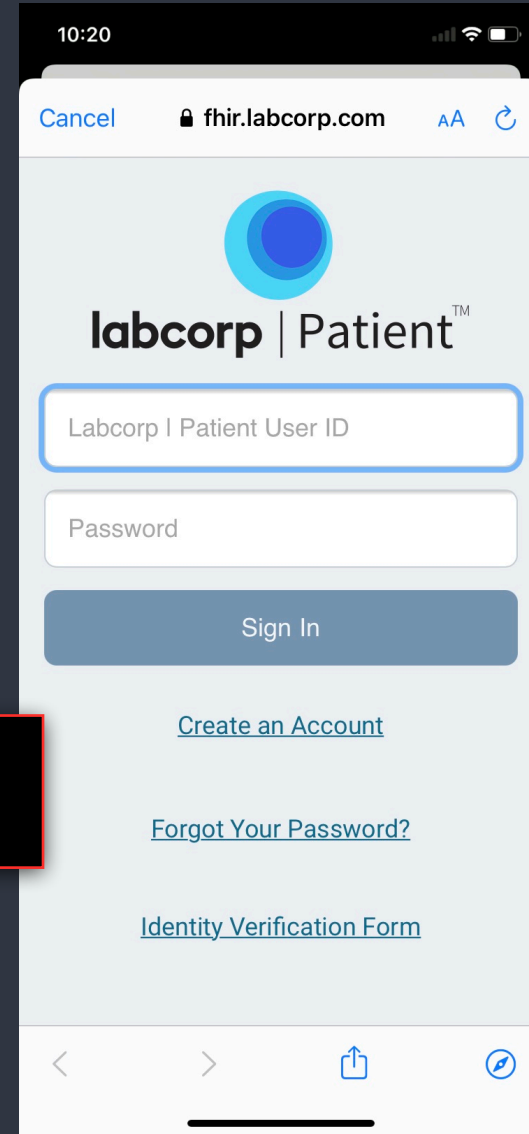
# Search for Providers



Select a provider, e.g. LabCorp



Select to connect



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.

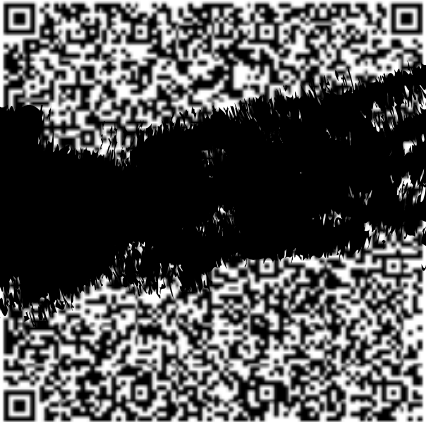
# Connecting to and Authorising Our Demo



# 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: A [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.



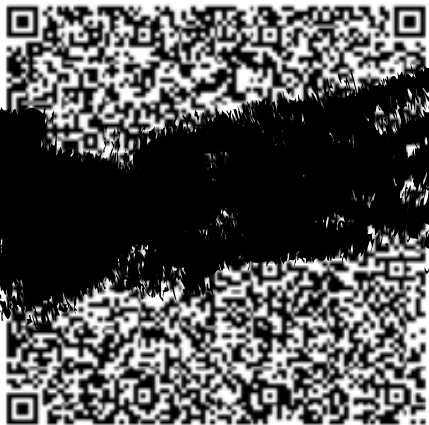
Thanks,



# Start from a QR Code ...

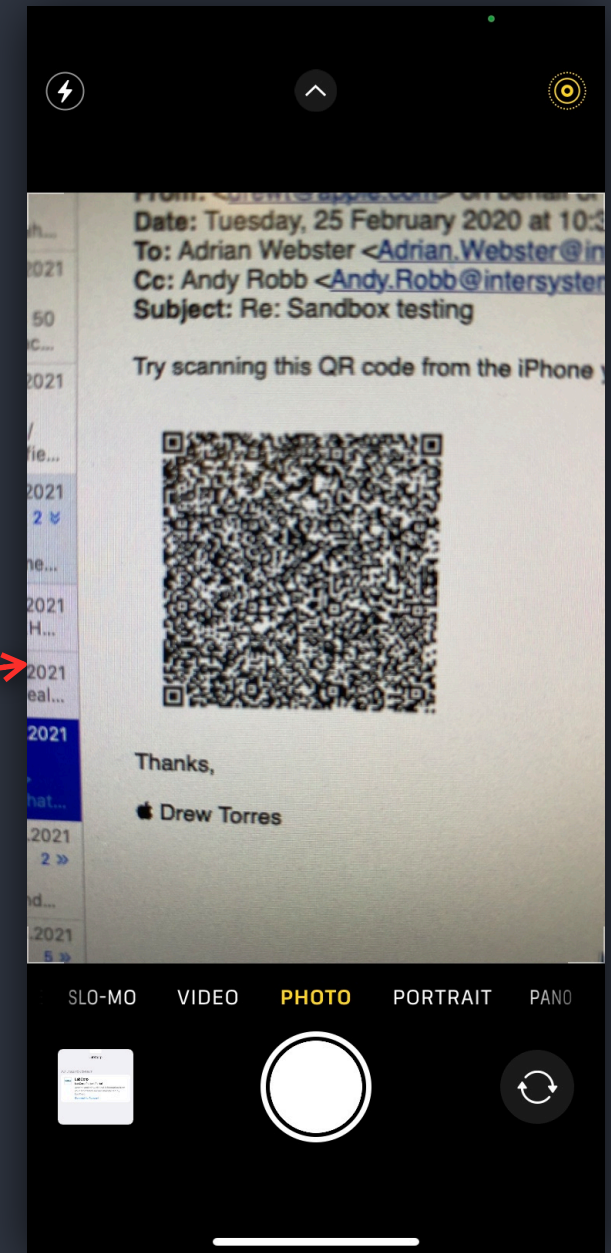
From: <[redacted]@apple.com> on behalf of [redacted]@apple.com>  
Date: Tuesday, 25 February 2020 at 10:32 am  
To: Adrian [redacted]@intersystems.com>  
Cc: [redacted]@intersystems.com> [redacted]@intersystems.com>  
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Try scanning this QR code from the iPhone you want to test with.

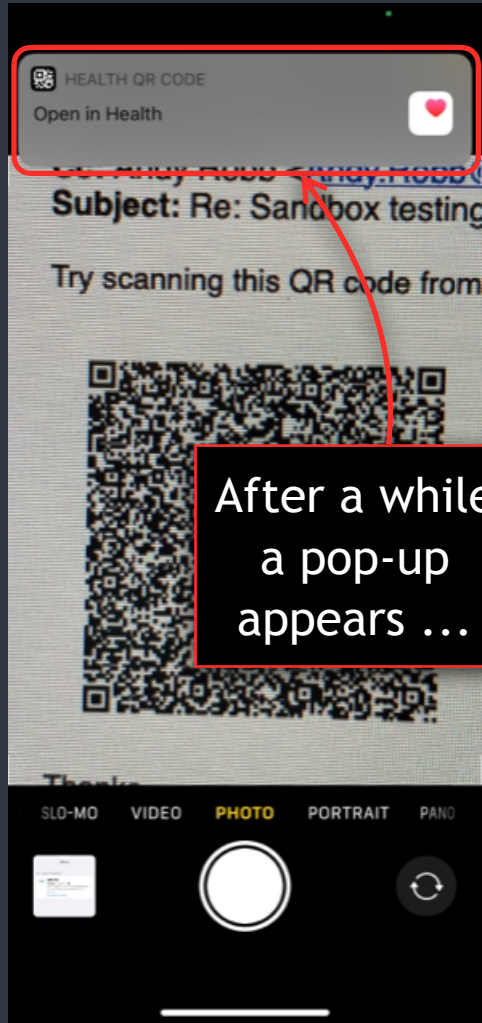


Thanks,  
[redacted]

Use the iPhone camera to scan the QR code



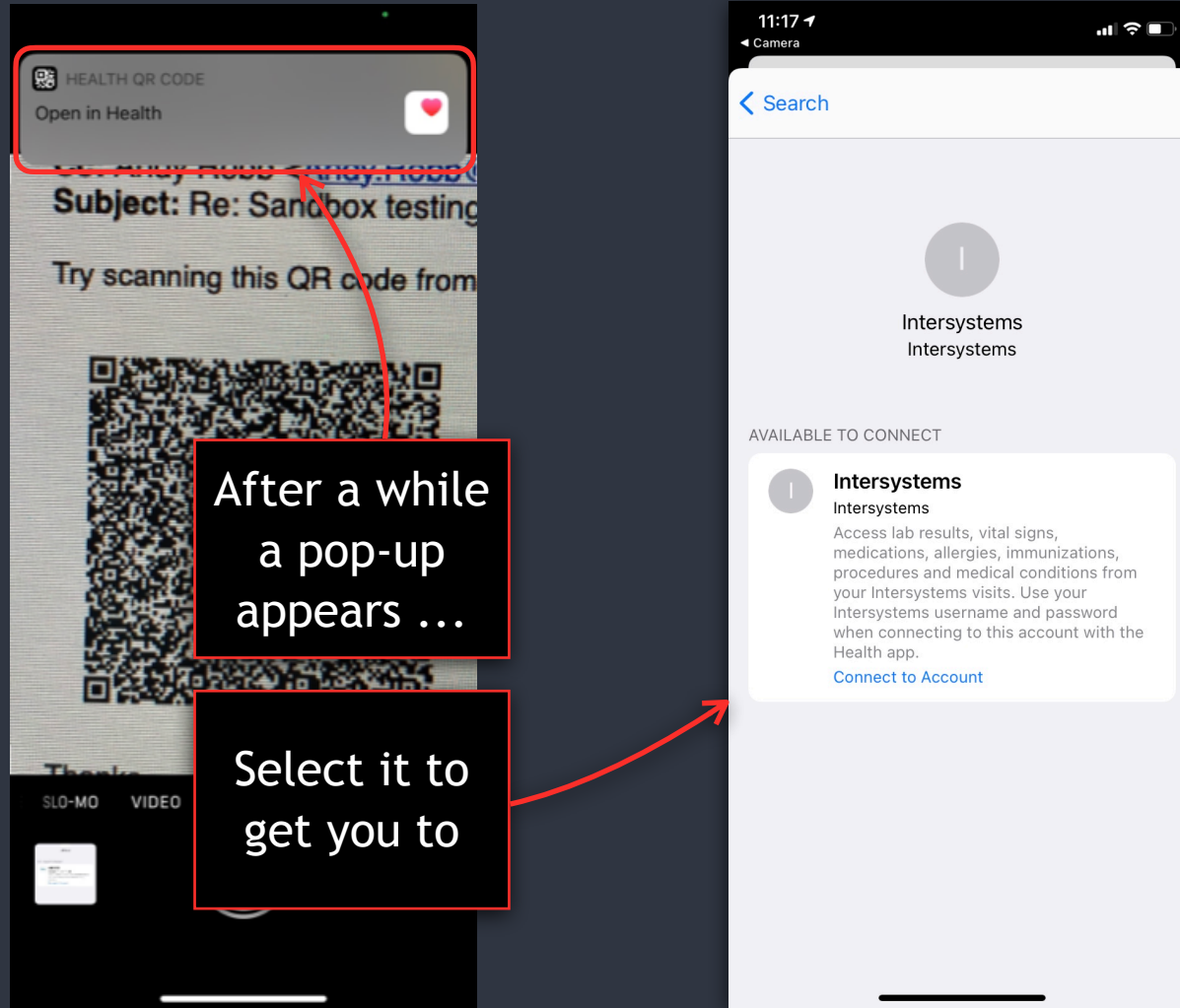
# You Start from a QR Code ...



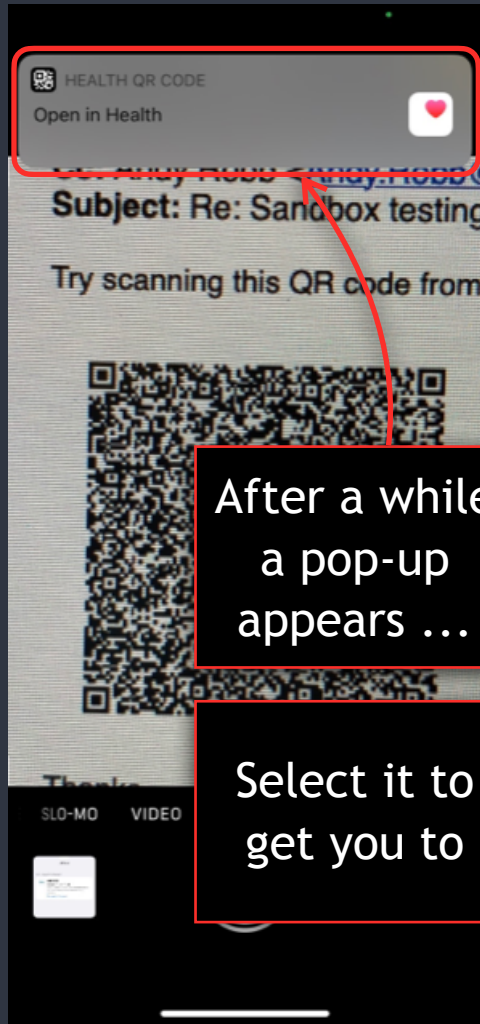
After a while  
a pop-up  
appears ...



# You Start from a QR Code ...

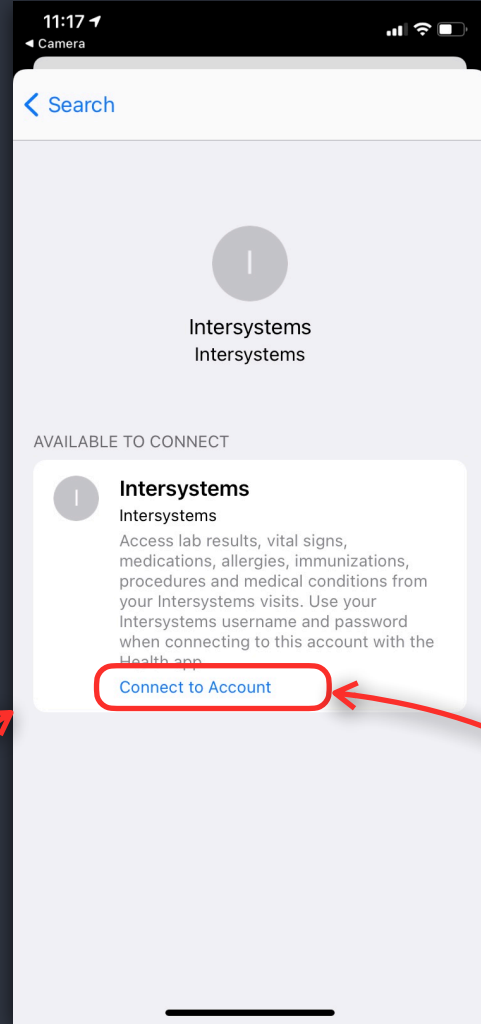


# You Start from a QR Code ...

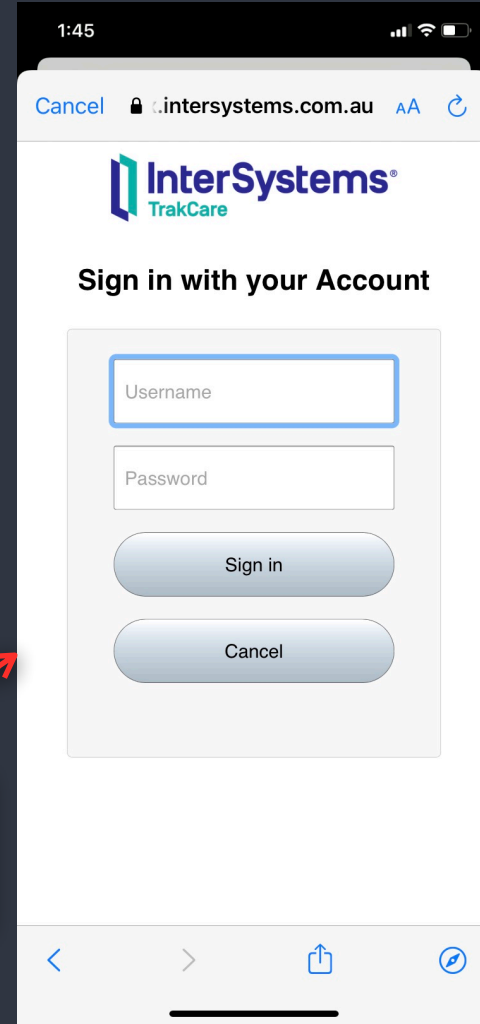


After a while  
a pop-up  
appears ...

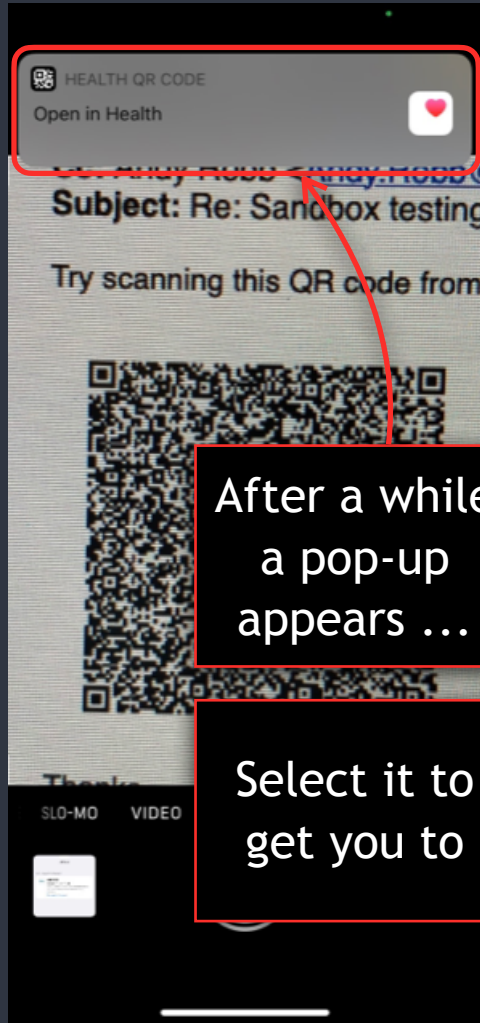
Select it to  
get you to



Select to  
connect

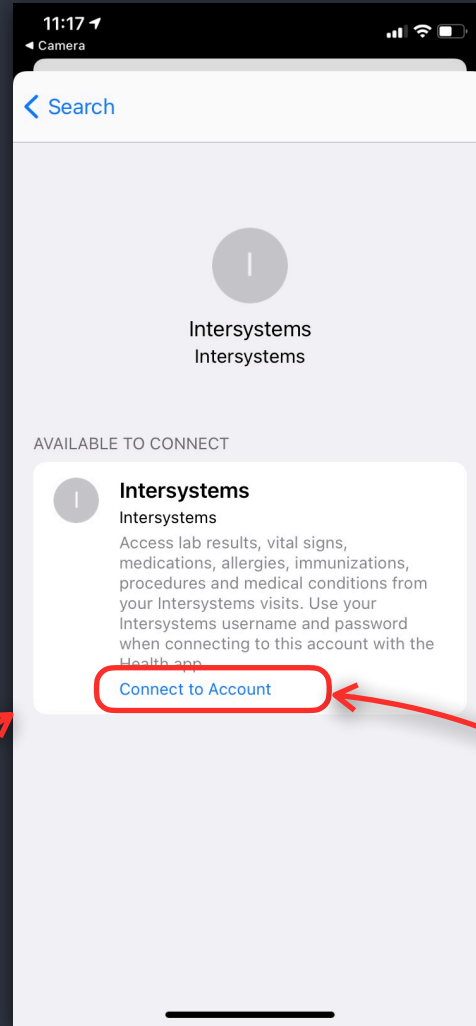


# You Start from a QR Code ...

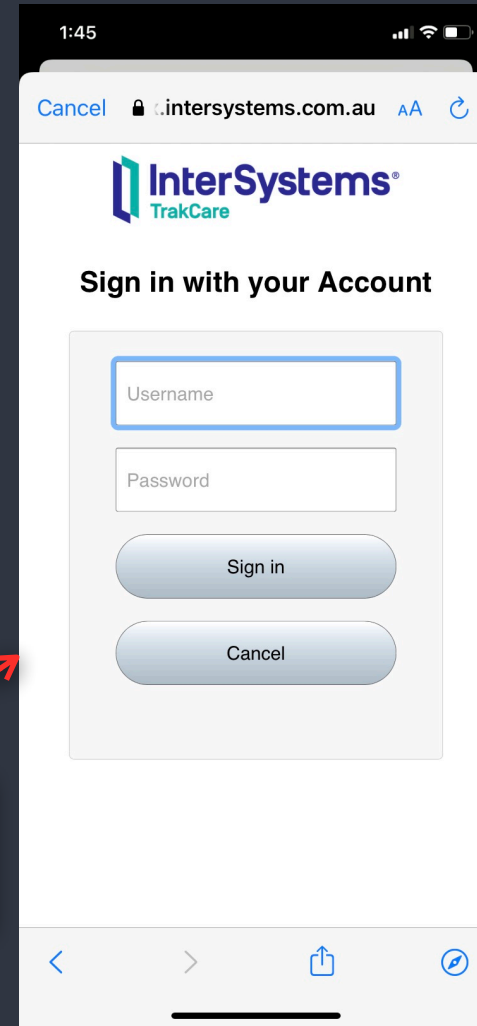


After a while a pop-up appears ...

Select it to get you to



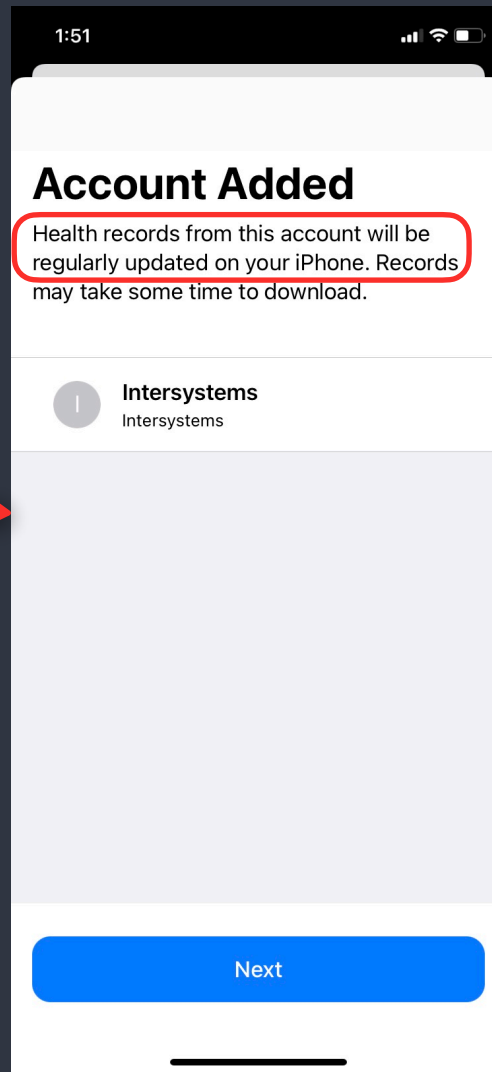
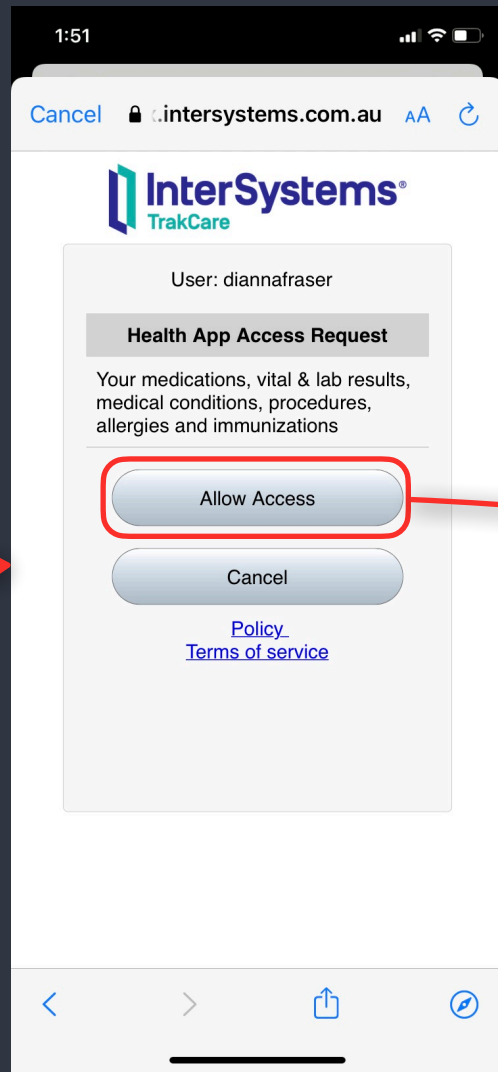
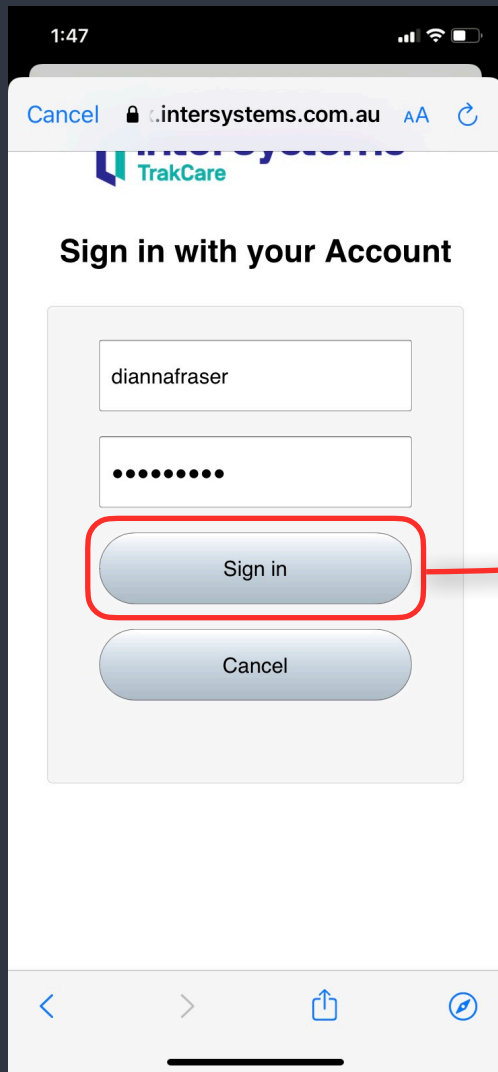
Select to connect



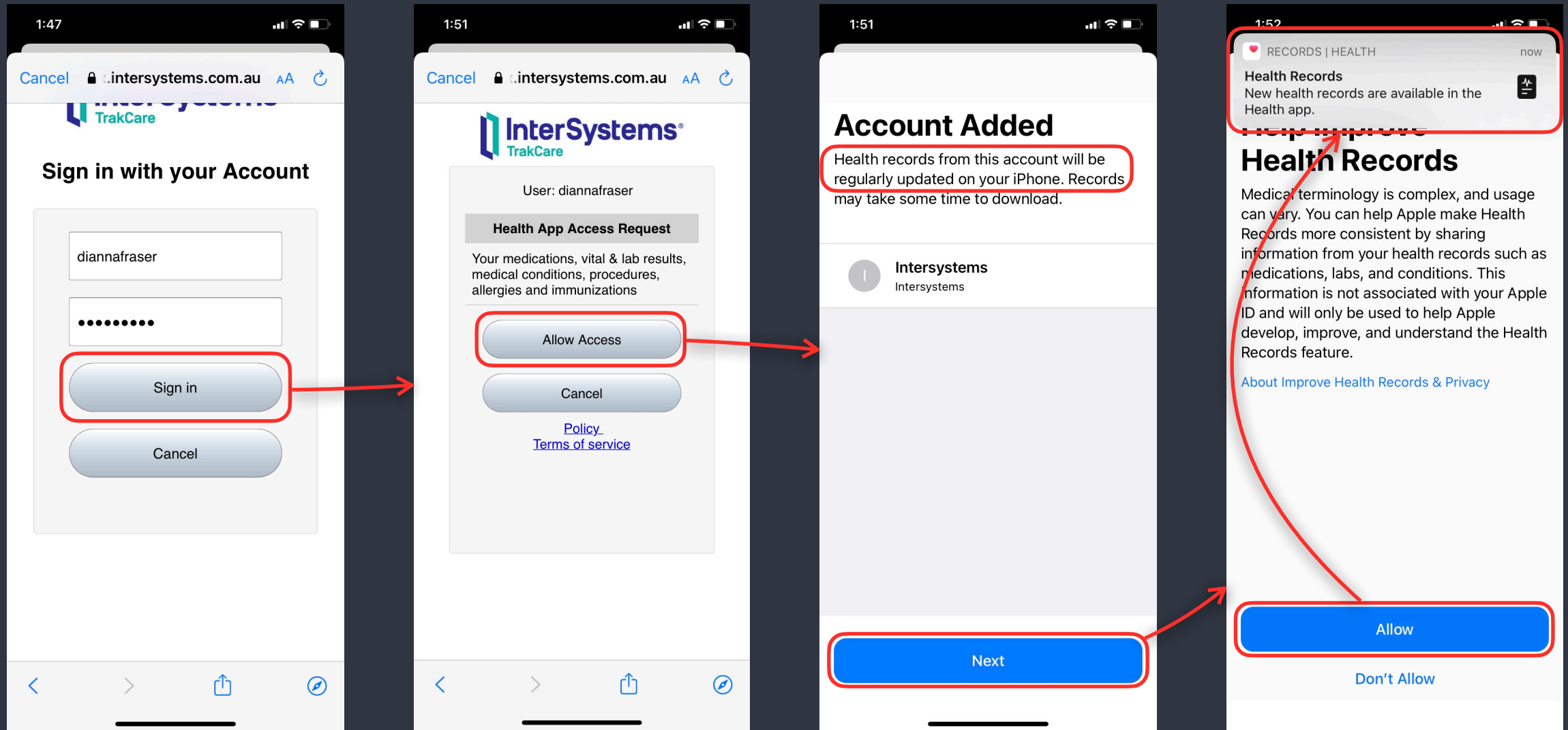
You need to authenticate and authorise the provider to give the app your health records ...



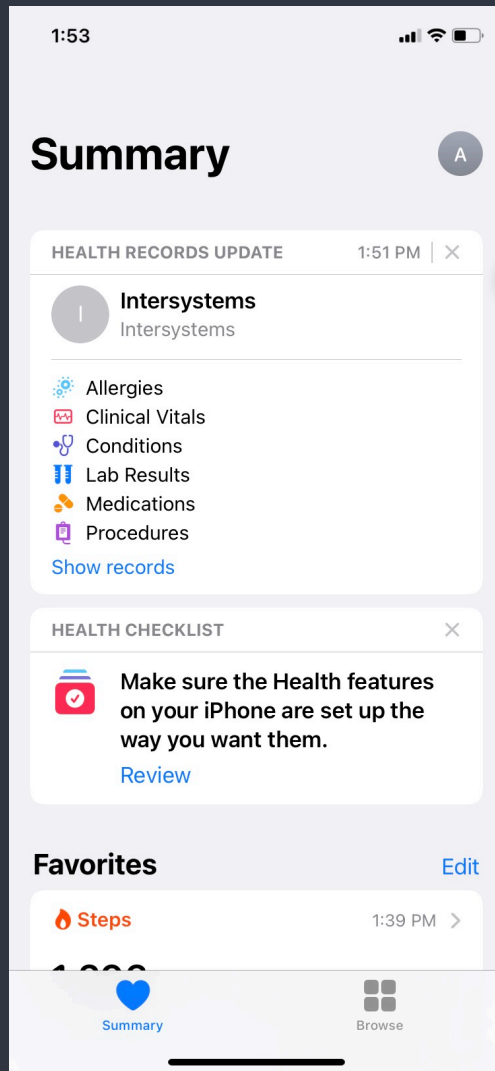
# Authenticate and Authorise ...



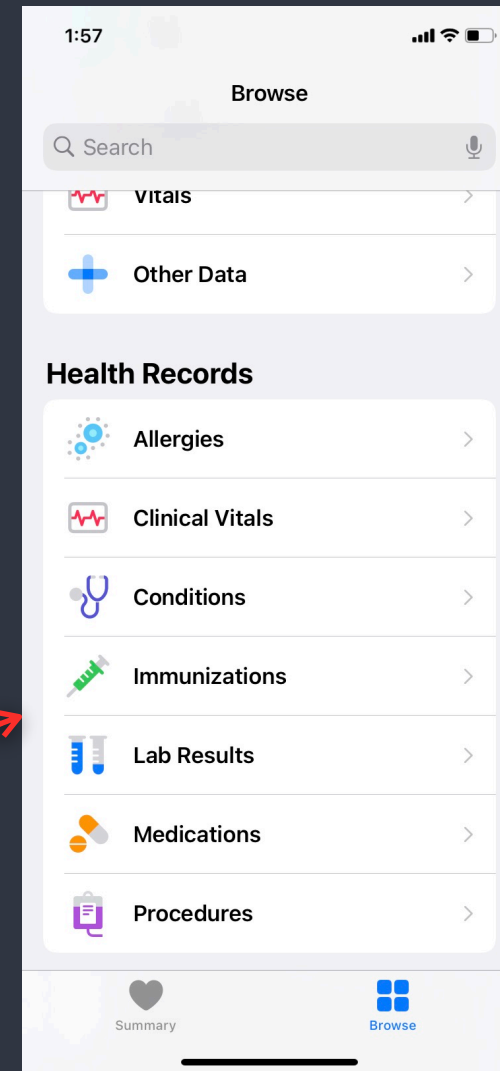
# Authenticate and Authorise ...



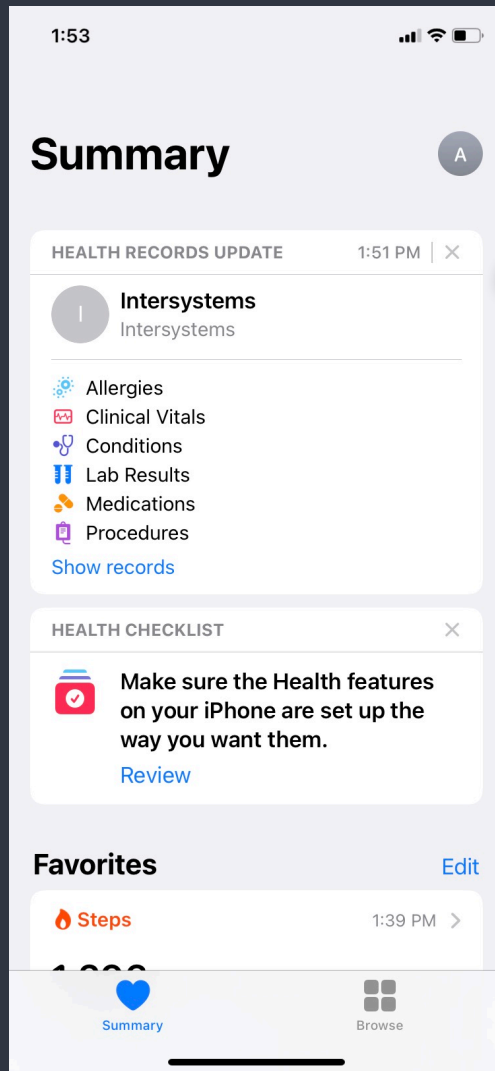
# View the Health Records



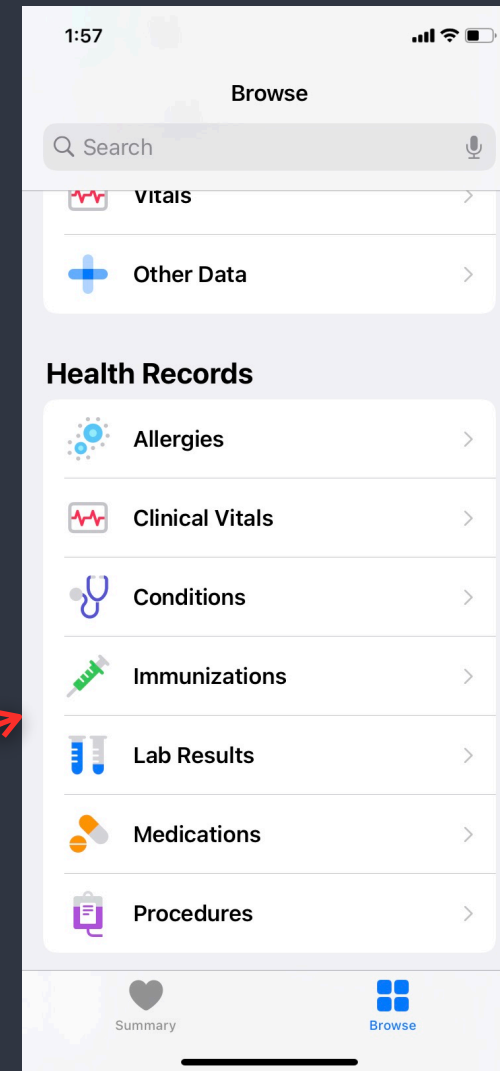
Health Records can be viewed ordered by time or grouped by type



# View the Health Records



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

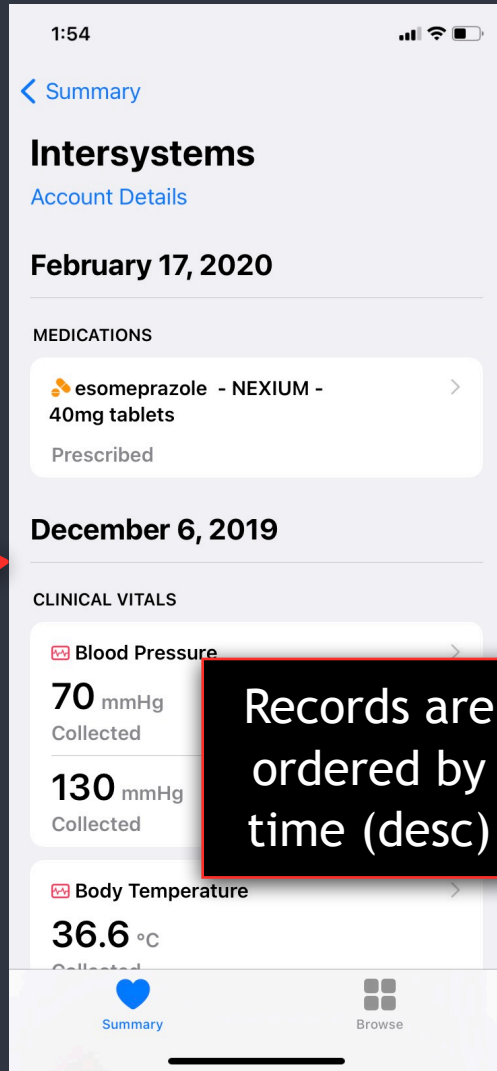
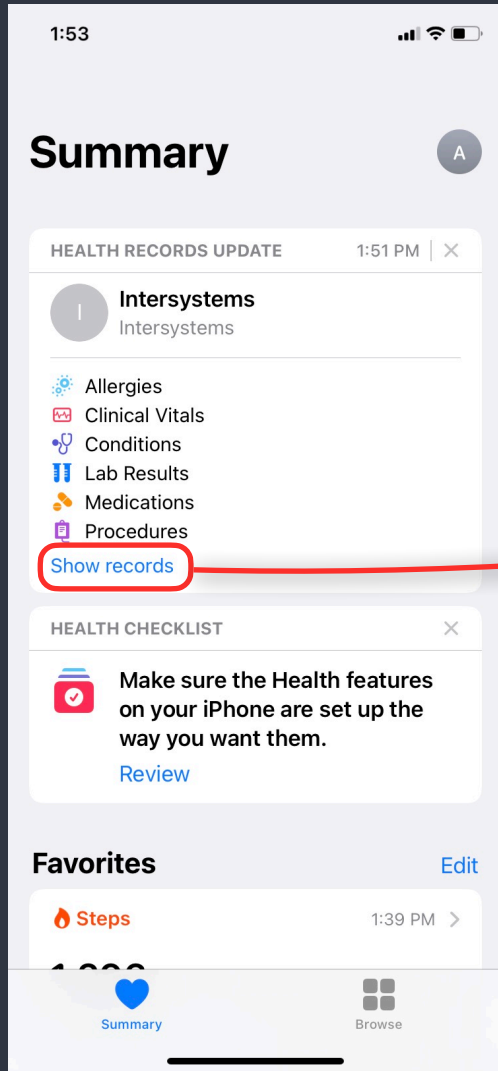


? min.

# Viewing Health Records



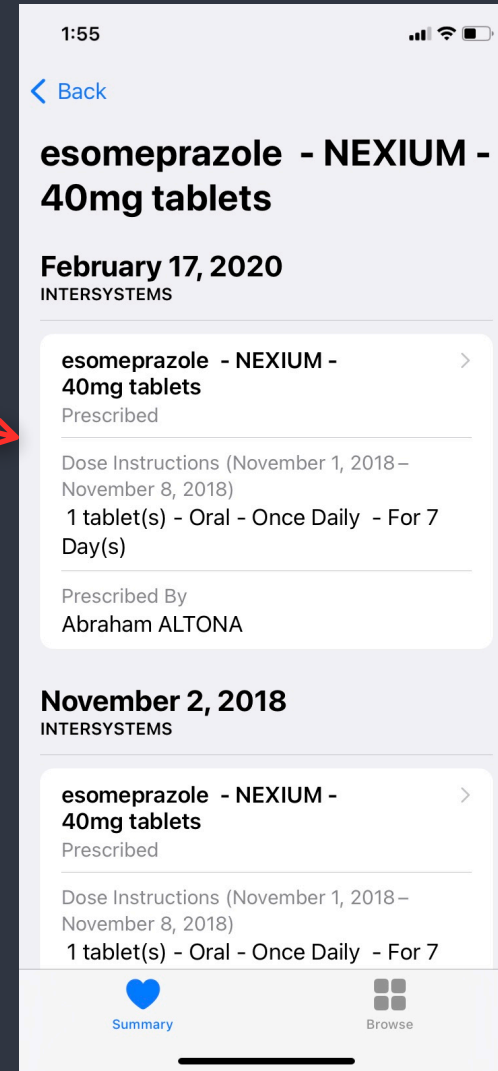
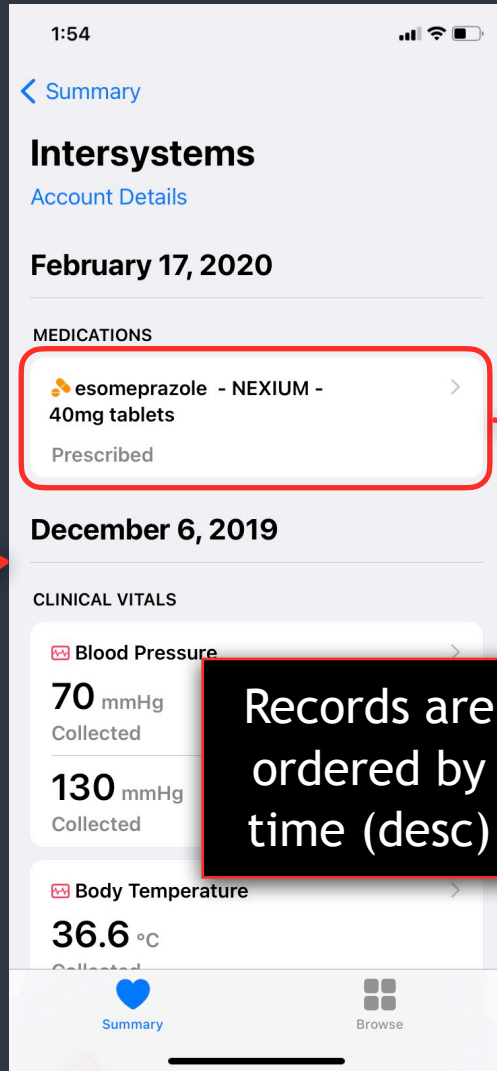
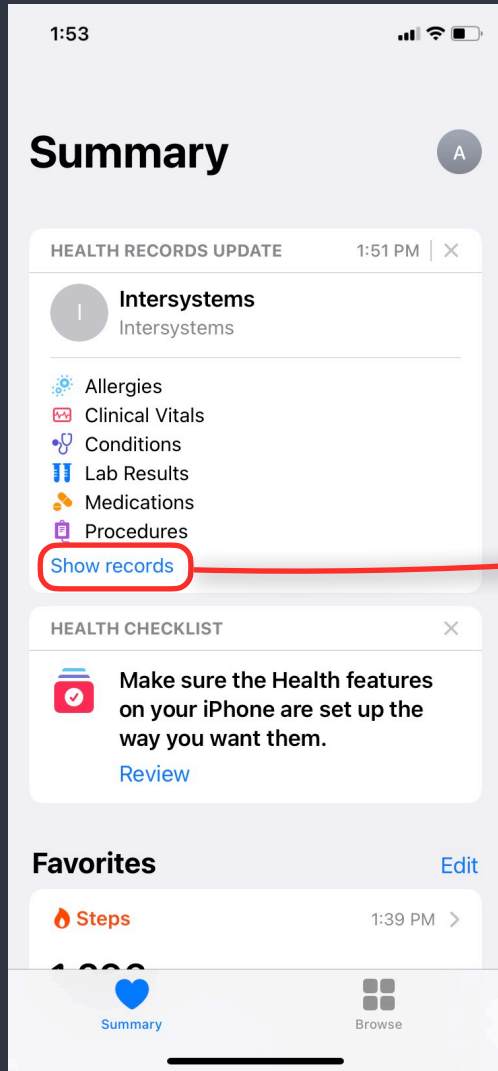
# View the Health Records - Summary



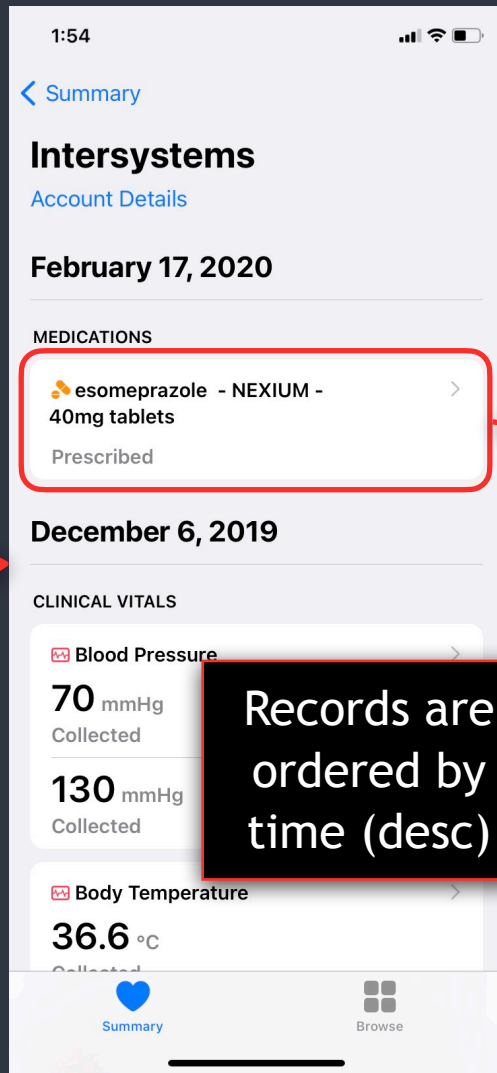
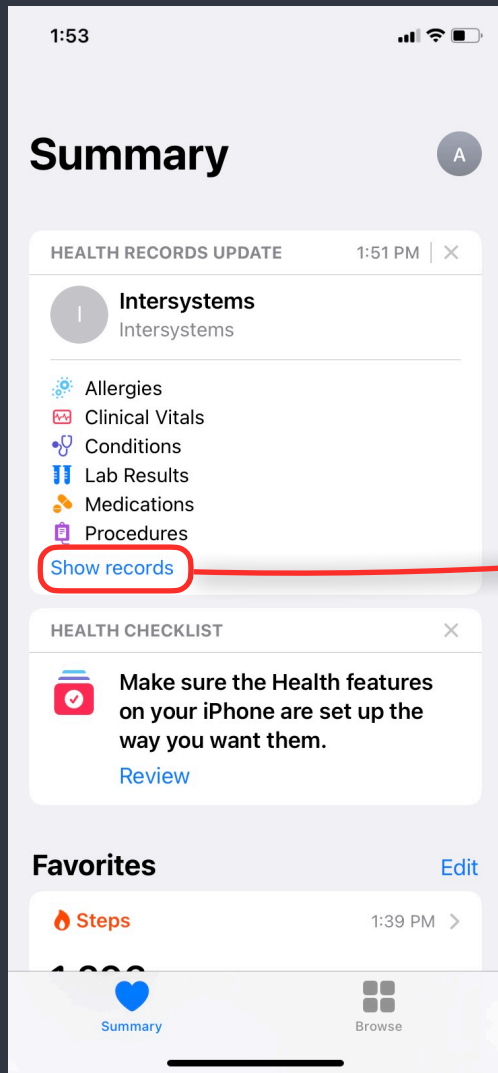
Records are ordered by time (desc)



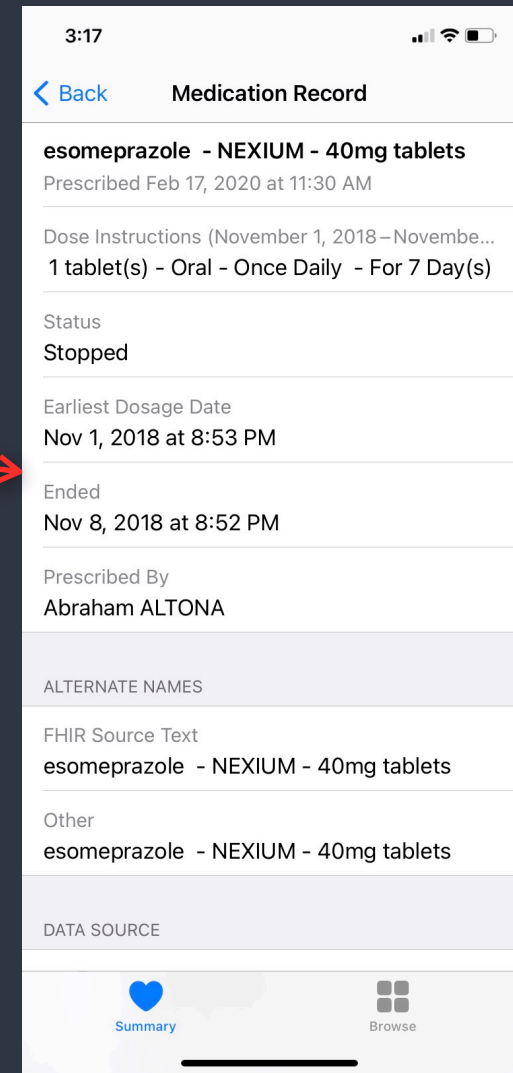
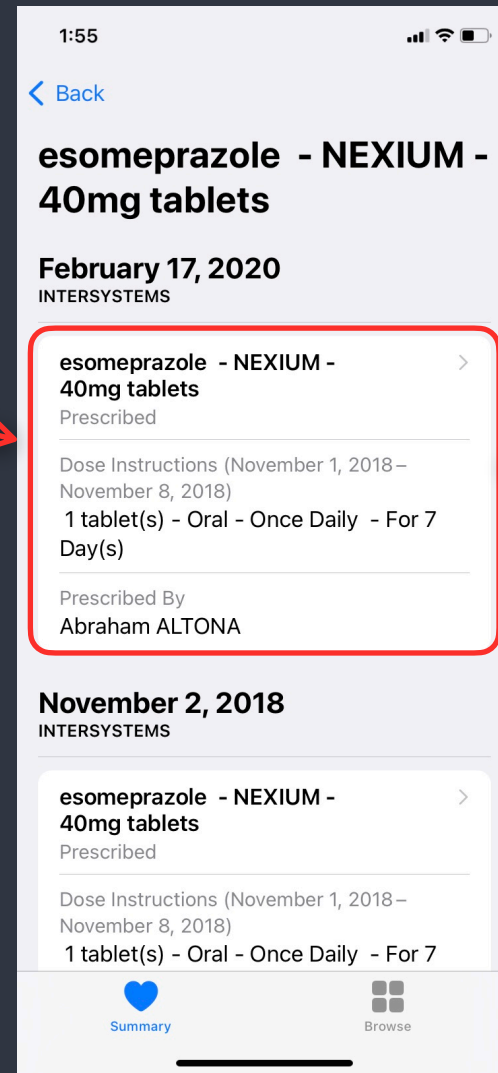
# View the Health Records - Summary



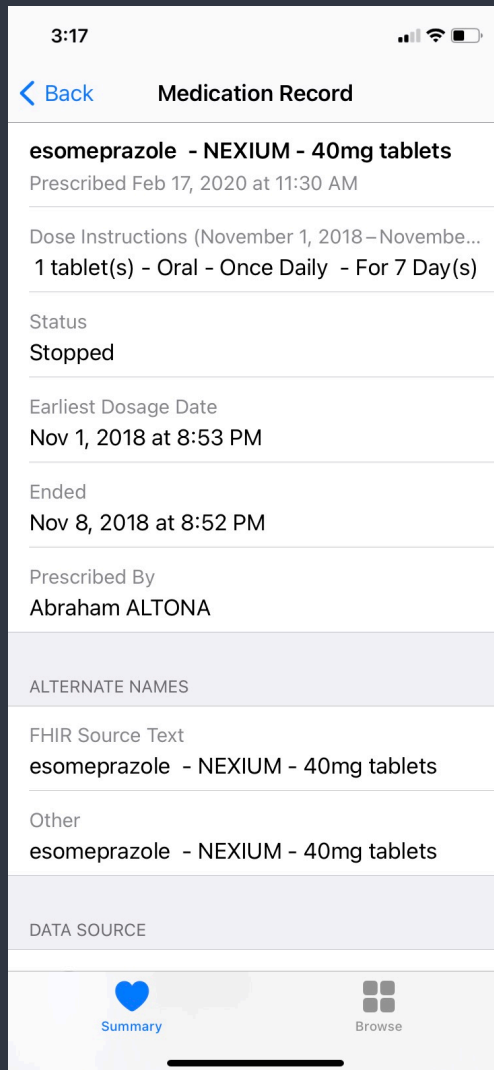
# View the Health Records - Summary



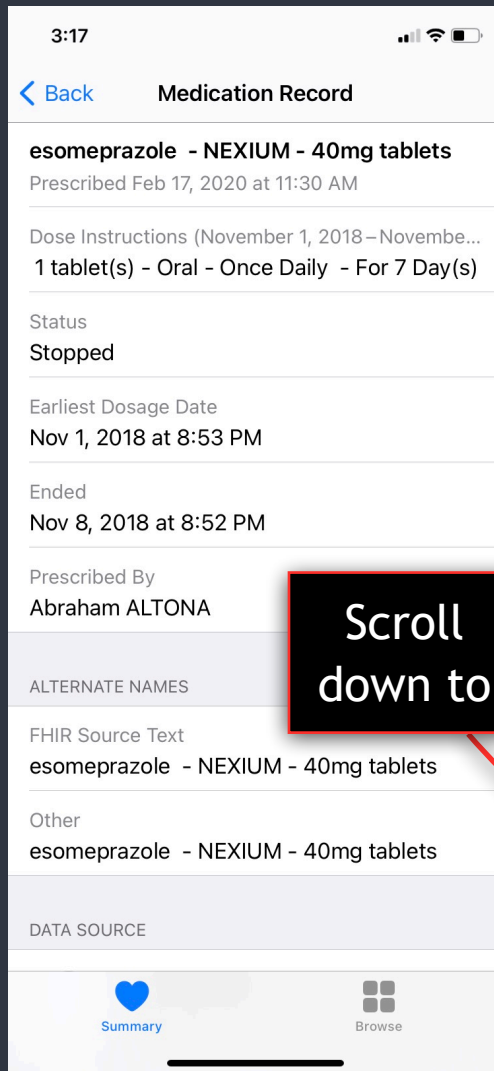
Records are ordered by time (desc)



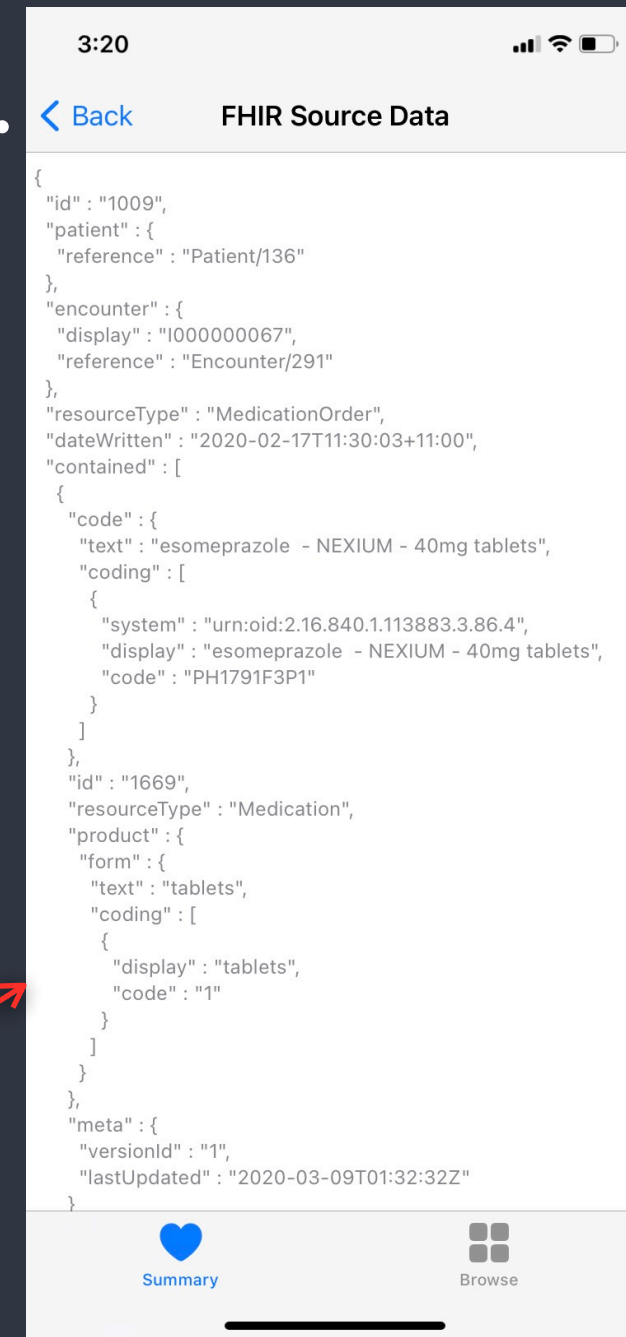
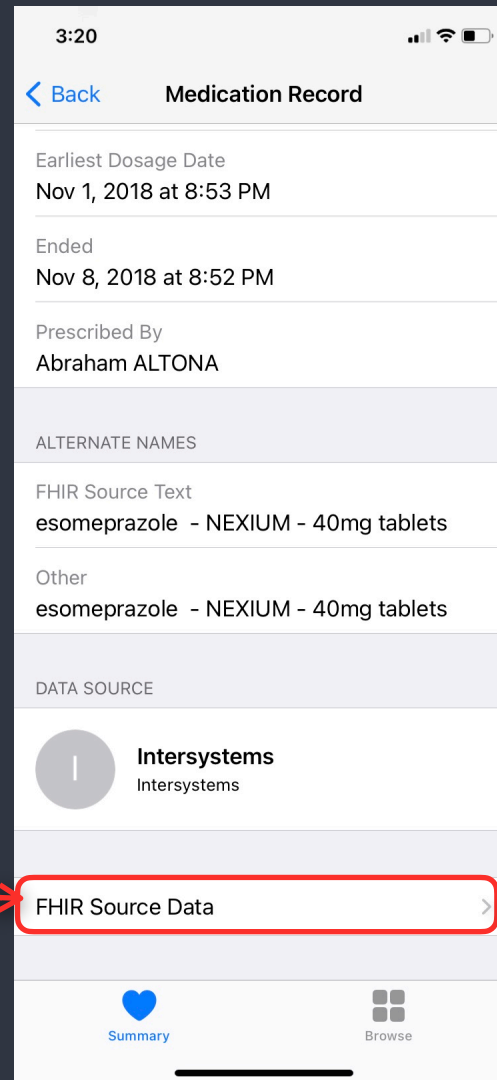
# You Can Even View the Source Data ...



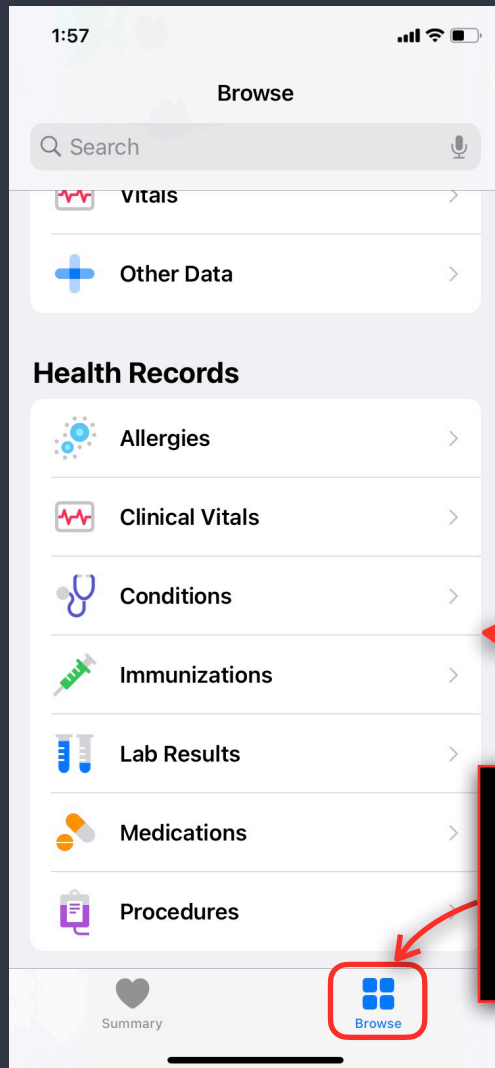
# You Can Even View the Source Data ...



Scroll  
down to



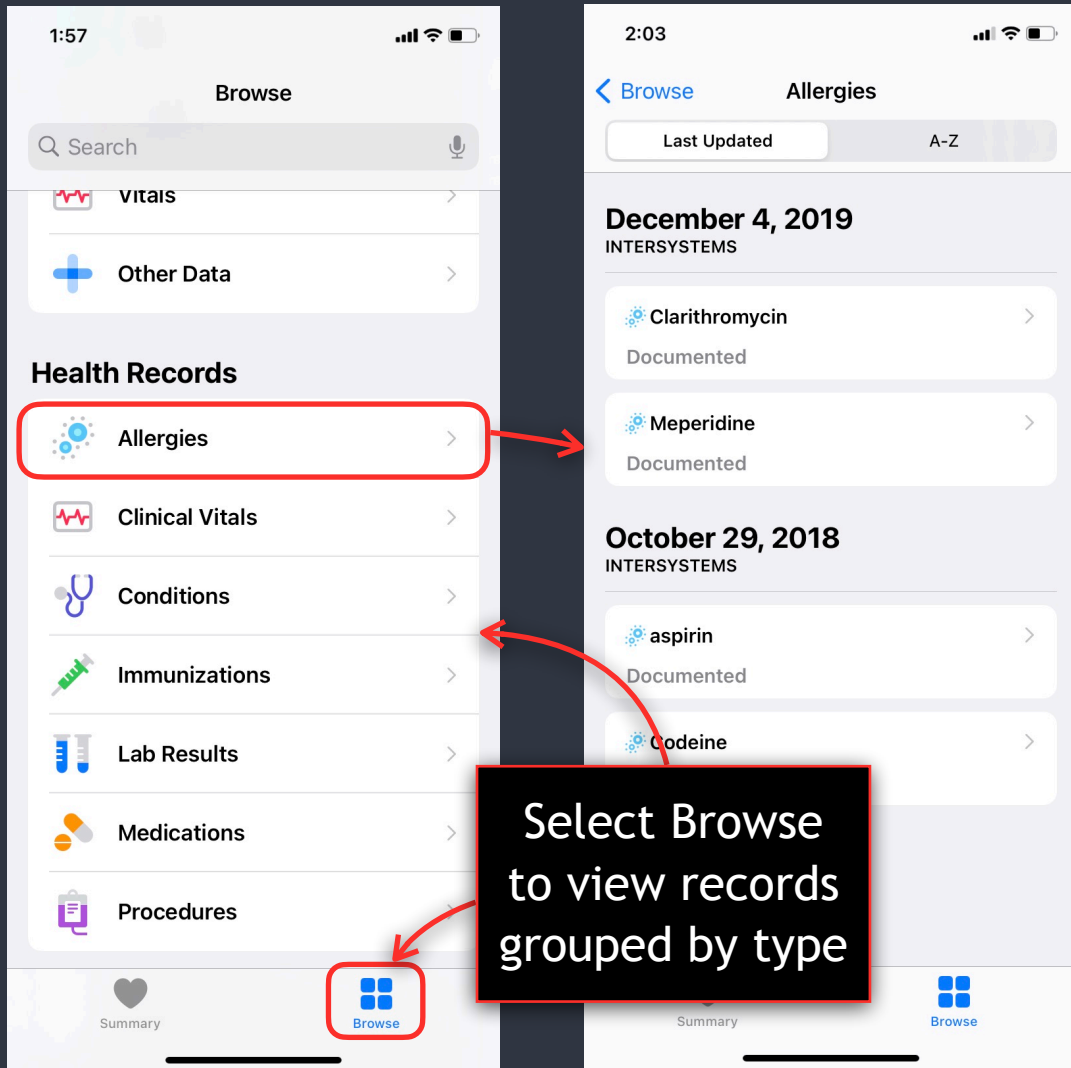
# View the Health Records - Browse - Allergies



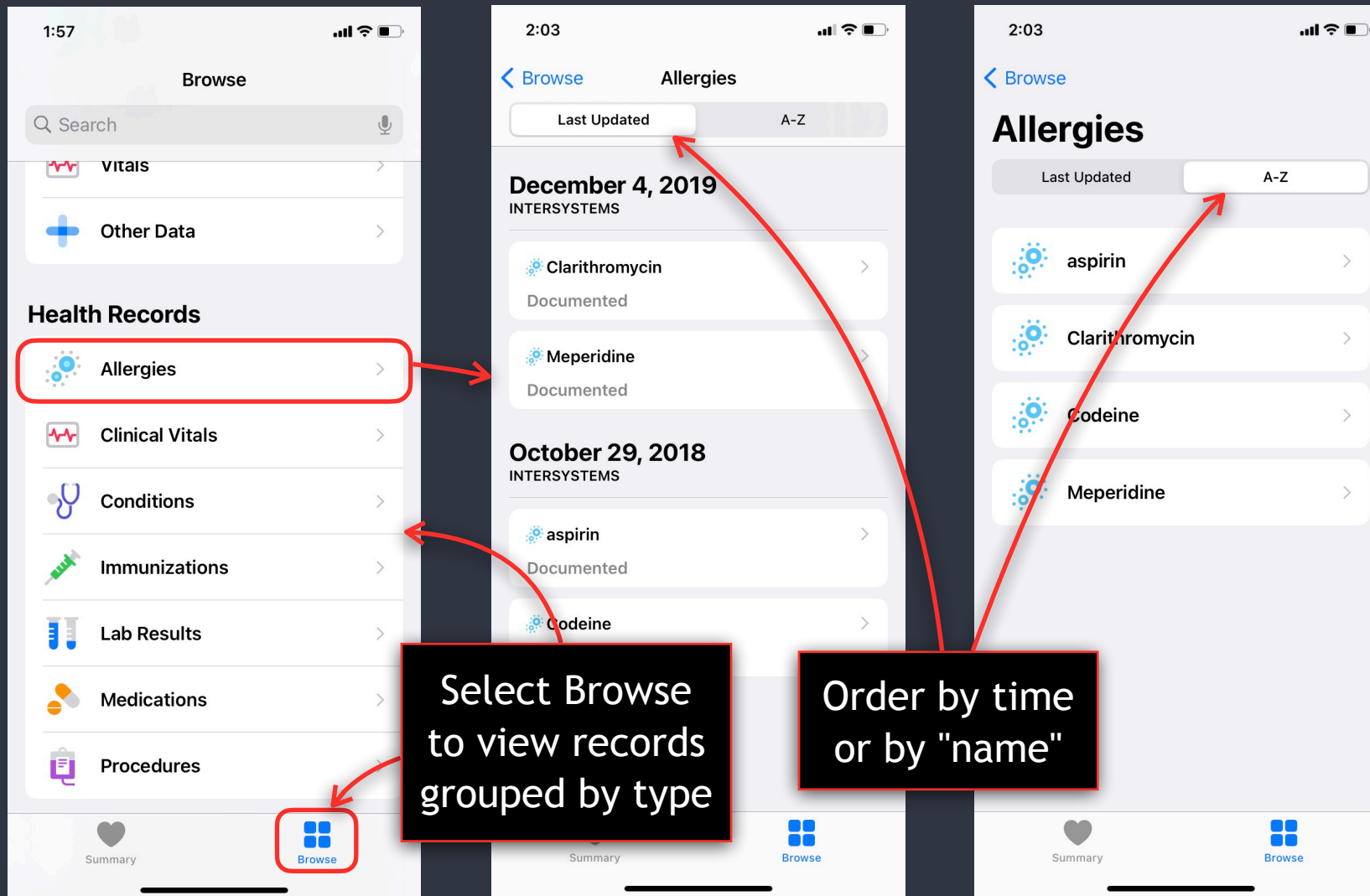
Select Browse to view records grouped by type



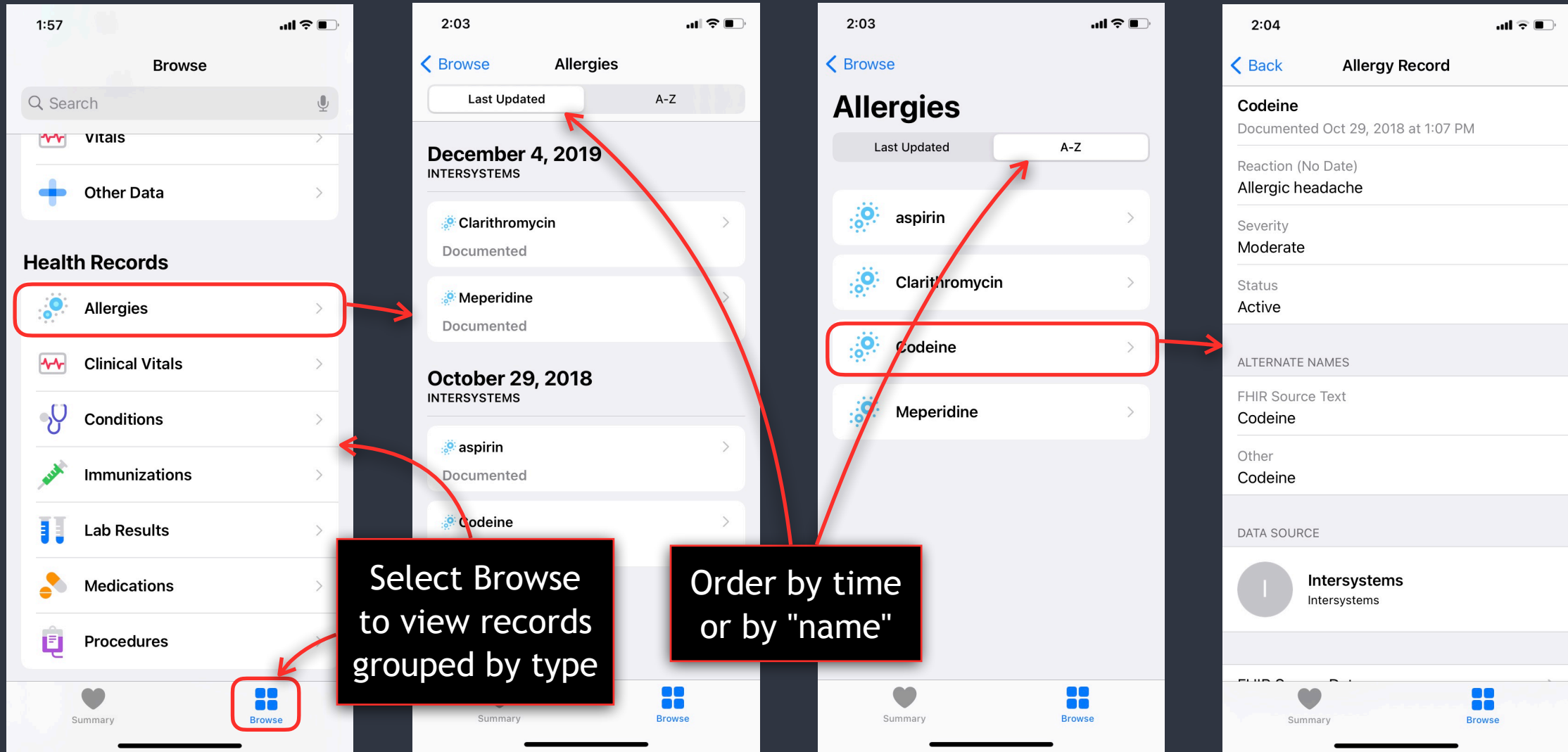
# View the Health Records - Browse - Allergies



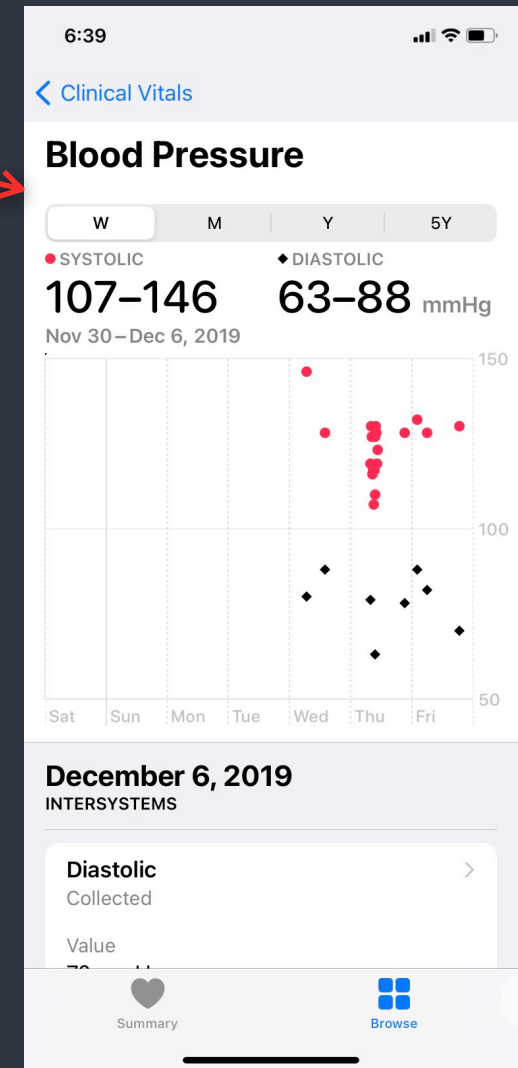
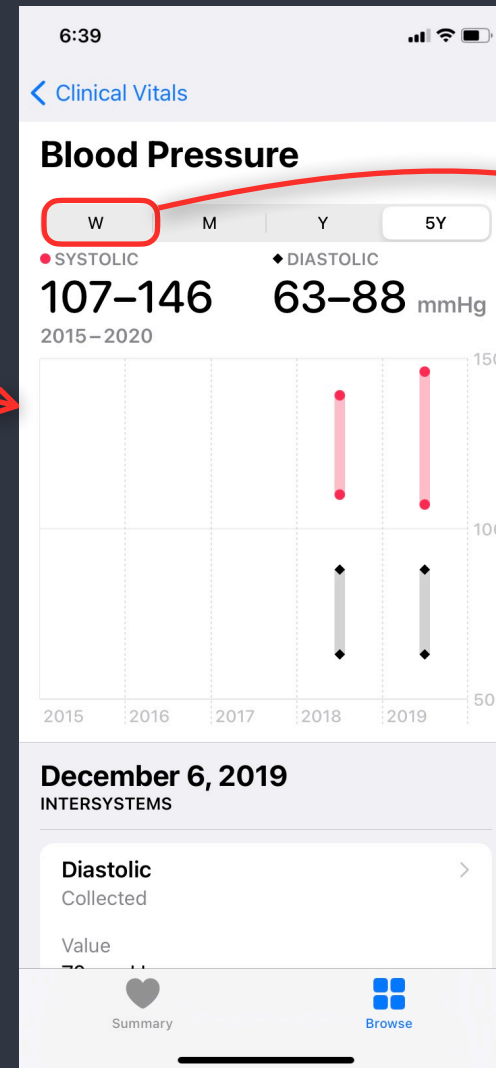
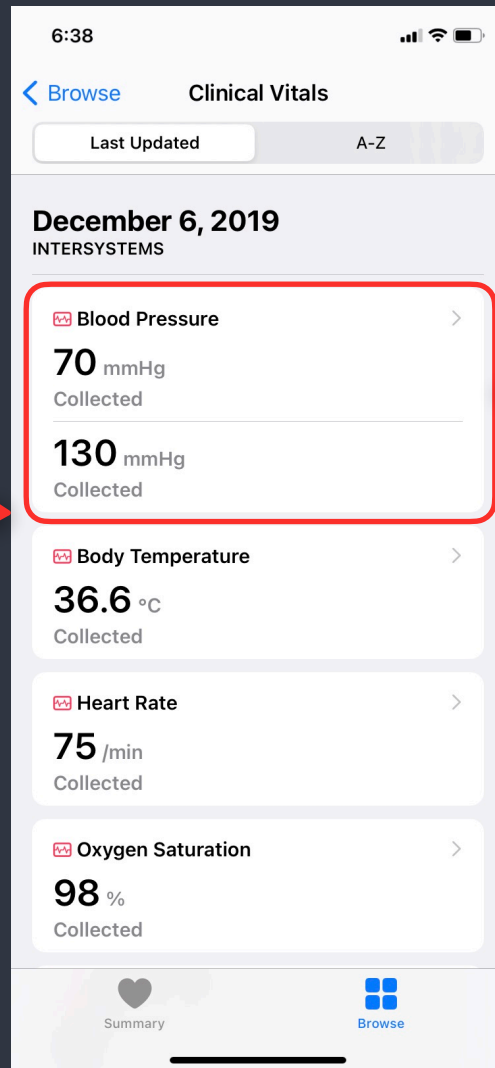
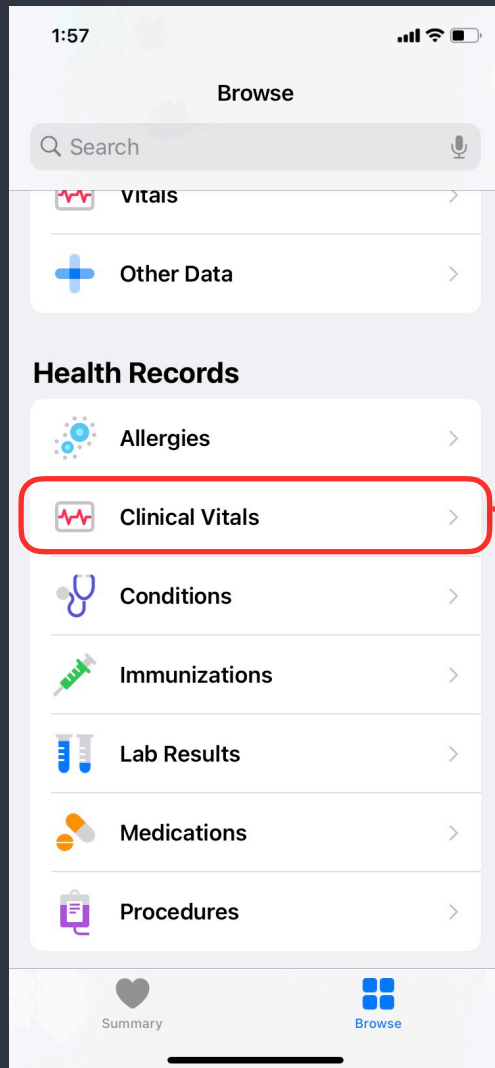
# View the Health Records - Browse - Allergies



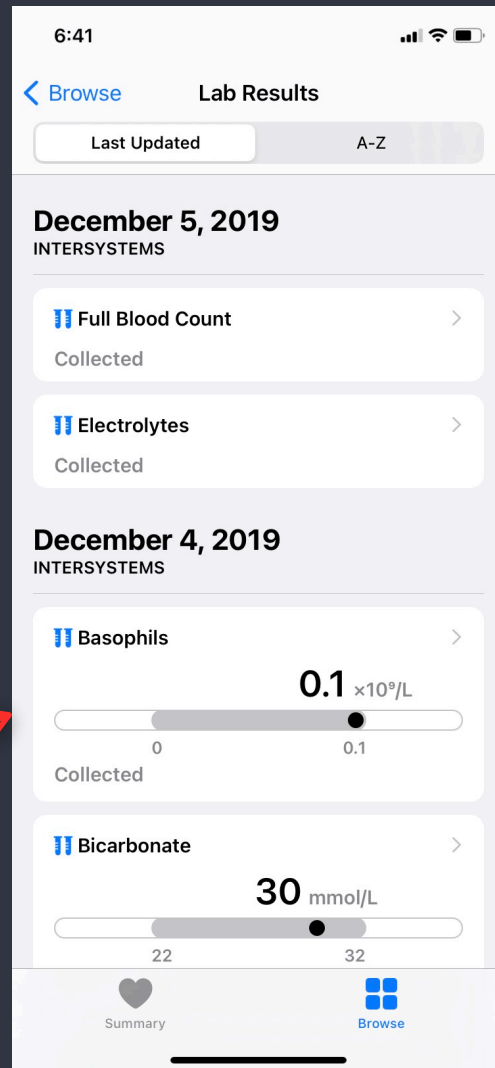
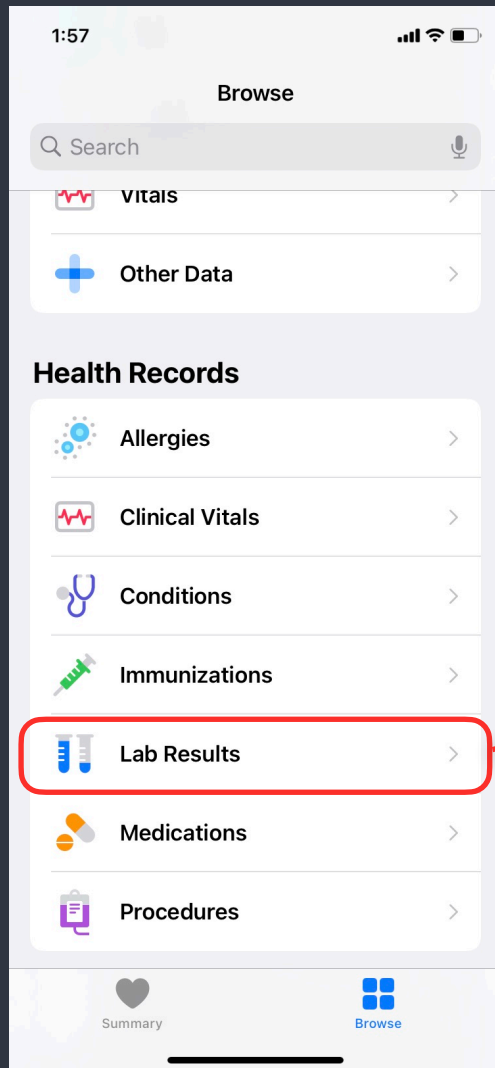
# View the Health Records - Browse - Allergies



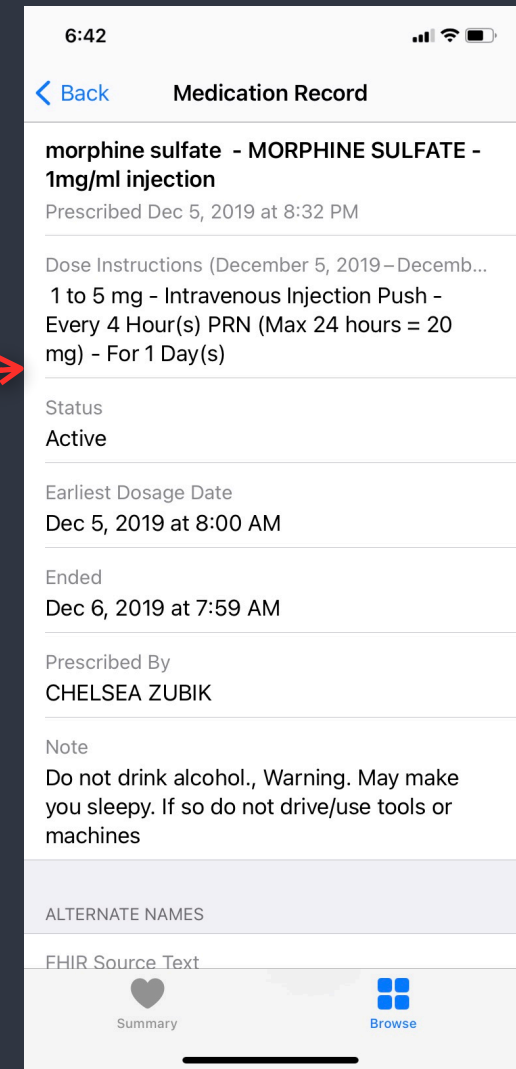
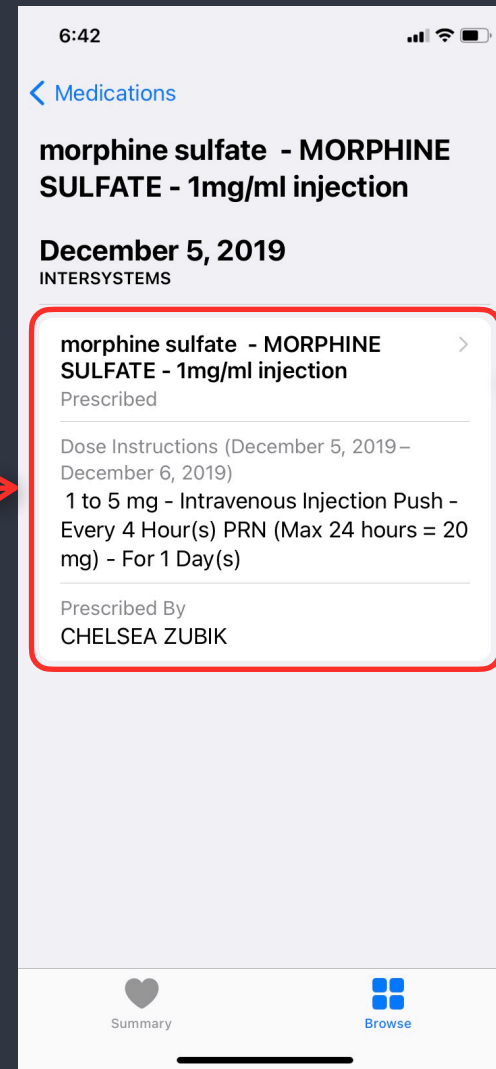
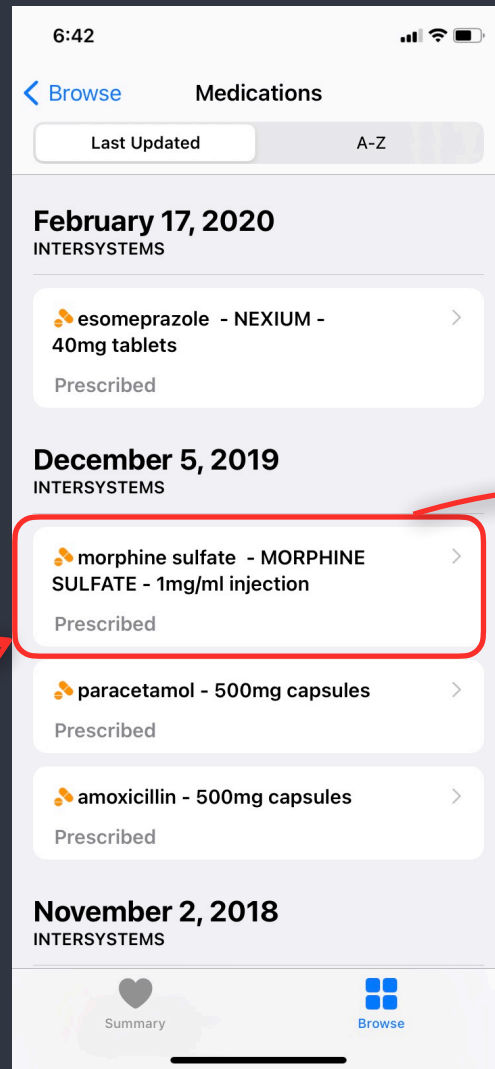
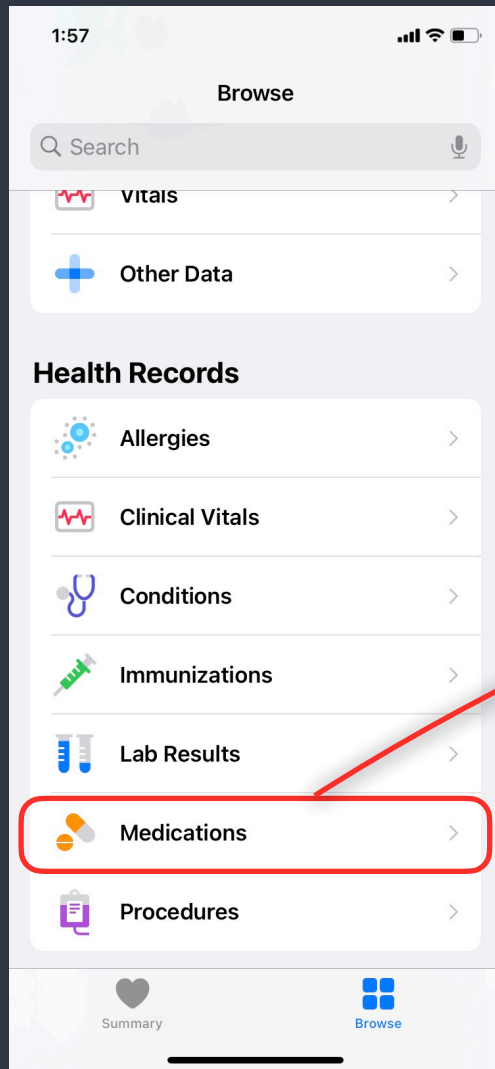
# View the Health Records - Browse - Clinical Vitals



# 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 screenshot displays two browser windows from the InterSystems IRIS HealthShare FHIR RESTful API. The left window shows the 'Home' page with a navigation menu and a 'Welcome to the Management' message. The right window shows the 'About This System' page, which contains a 'System Overview' table with the following data:

System Overview	
Version:	IRIS for Windows (x86-64) 2019.1.1 (Build 612U) Mon Oct 28 2019 11:29:24 EDT [Health:1.1.2]
Configuration:	C:\InterSystems\IRISHealth\iris.cpf
Database Cache (MB):	1024
Routine Cache (MB):	299
Journal file:	c:\intersystems\irishealth\mgr\journal\20210429.001
Superserver Port:	51773
Web Server Port:	52773
License Server Address/Port:	127.0.0.1/4002
Licensed to:	ISC TrakCare Development
Cluster support:	This system is not part of a cluster
Mirroring:	This system is not a mirror member
Time System Started:	2021-04-27 08:11:00
Encryption Key Identifier:	Not available. Encryption is not activated.
NLS Locale:	ENUW
Preferred language for this session:	English (United States) <input type="button" value="v"/>

Below the table, the copyright information is displayed:

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Cambridge, Massachusetts, U.S.A. All rights reserved.  
Confidential property of InterSystems Corporation.



# The Production

The image displays two overlapping screenshots of the InterSystems IRIS Health web interface. The left screenshot shows the 'Home' page with a navigation menu and a 'Production' configuration table. The right screenshot shows the 'Production Configuration' page with a list of services and processes, and a detailed configuration panel for 'HS.FHIR.Service.DSTU2'.

**Left Screenshot: Home Page**

URL: <https://tcfhirsandbox.intersystems.com.au/csp/sys/%25CSP.Portal.Home>

Server: FHIRSANDBOX, User: SuperUser, Namespace: TCFHIR, Switch, Licensed to: ISC TrakCare Development

View: [Grid Icon] [Table Icon] [List Icon]

Search: [Search Box]

Navigation Menu:

- Home
- Health
- Analytics
- Interoperability
- System Operation
- System Explorer
- System Administration

**Production Configuration Table:**

Configure »	Production
Build »	Business Partners
View »	Credentials
List »	Schedule Specs
Monitor »	Data Lookup Tables
Manage »	System Default Settings
Interoperate »	Enterprise Systems
Test »	Public-Service Registry
	External-Service Registry
	Message Bank Link

**Right Screenshot: Production Configuration**

URL: <https://tcfhirsandbox.intersystems.com.au/csp/healthshare/tcfhir/EnsPortal.ProductionConfig.z>

Server: FHIRSANDBOX, User: SuperUser, Namespace: TCFHIR, Switch, Licensed to: ISC TrakCare Development, Instance: IRISHEALTH

View: [Table Icon] [List Icon] [Start] [Stop]

Sort: Name Status Number

Production Configuration

Production Running

Category: All Legend Production Settings

Services:

- EnsLib.File.PassthroughService
- HS.FHIR.Service.DSTU2
- HS.Test.Service

Processes:

- HS.FHIR.FromSDA.DTL.Transaction.F
- HS.FHIR.Server.Process.DSTU2
- TC.FHIR.Server.Process

Operations:

- Ens.Activity.Operation.Local
- HS.FHIR.Repository.Operations.DSTU2
- HS.FHIR.REST.Operation
- HS.Util.Trace.Operations
- TC.hmf.FHIR.Operation.Inbound.Query

HS.FHIR.Service.DSTU2

Settings Queue Log Messages Jobs Actions

Apply Search: [Search Box]

Informational Settings

Basic Settings

Enabled

TargetConfigName: HS.FHIR.Server.Process.DSTU2

PatientHost: [Dropdown]

Timeout: 25

FHIRVersion: [Text Box]

FormatFHIROutput:

SessionMode: NoSession

ParameterModeTimeout: 300

SessionClass: HS.FHIR.SessionData.FHIRSession

SessionStartClass: [Text Box]



# The FHIR Requests from Apple Health App

The screenshot displays the InterSystems Message Viewer application. The top navigation bar includes a menu, home, health, about, help, and logout options. The main header shows the server name 'FHIRSANDBOX', user 'SuperUser', namespace 'TCFHIR', and instance 'IRISHEALTH'. The interface features a search bar and several filter buttons: Search, Cancel, Reset, Resend, Previous, Next, and Export. On the left, there are filter settings for 'Basic Criteria' (Status: All, Type: Session Start) and 'Extended Criteria'. The central table lists 26 FHIR messages, all with a status of 'Completed' and an error of 'OK'. The source for most messages is 'HS.FHIR.Service.DSTU2', while the last two (IDs 25 and 26) are from 'Ens.ScheduleService'. A details pane on the right is titled 'Details for selected item' and is currently empty.

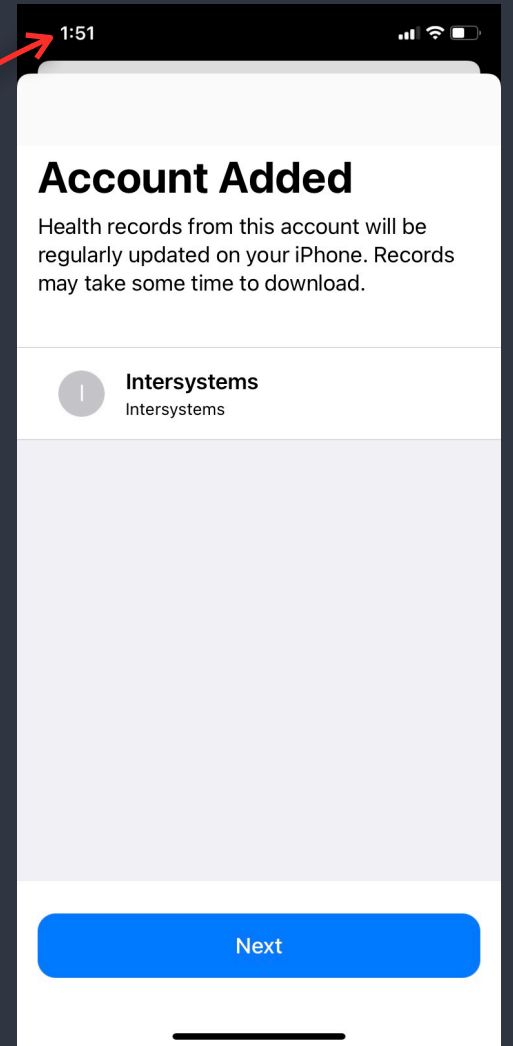
#	ID	Time Created	Session	Status	Error	Source
1	89126	2021-04-29 20:51:53.025	89126	Completed	OK	HS.FHIR.Service.DSTU2
2	89118	2021-04-29 20:51:52.503	89118	Completed	OK	HS.FHIR.Service.DSTU2
3	89110	2021-04-29 20:51:51.972	89110	Completed	OK	HS.FHIR.Service.DSTU2
4	89102	2021-04-29 20:51:51.131	89102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



# The FHIR Requests from Apple Health App

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

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



# Request for Medication Orders from Apple Health App

Message Viewer

Server: FHIRSandbox Namespace: TCFHIR Switch  
User: SuperUser Licensed to: ISC TrakCare Development Instance: IRISHEALTH

InterSystems  
IRIS Data Platform

Search Cancel Reset Resend Previous Next Export

#	ID	Time Created	Session	Status	Error	Source	Target
1	89134	2021-04-29 23:29:13.618	89134	Completed	OK	Ens.ScheduleService	Ens.ScheduleService
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.ScheduleService
27	88940	2021-04-24 02:50:07.812	88940	Completed	OK	Ens.ScheduleService	Ens.ScheduleService
28	88939	2021-04-24 02:18:26.336	88939	Completed	OK	Ens.ScheduleService	Ens.ScheduleService
29	88938	2021-04-20 08:15:37.759	88938	Completed	OK	Ens.ScheduleService	Ens.ScheduleService

Header Body Contents Trace

View Full Contents View Raw Contents

Expand All

NOTE: XML namespace information not available in your browser. XML namespace declarations will not be displayed in output.

```

<?xml version="1.0" ?>
<!-- type: HS.Util.Trace.Request id: 68750 -->
<Request>
  <CurrentClass>HS.FHIR.Service</CurrentClass>
  <CurrentMethod>OnProcessInput</CurrentMethod>
  <Comment>Input message</Comment>
  <Items>
    <Item>
      <ItemName>pInput</ItemName>
      <ItemValue>
        <Request>
          <TimestampUTC>2021-04-29T10:51:45Z</TimestampUTC>
          <BaseUrl>/fhir/dstu2</BaseUrl>
          <Type>MedicationOrder</Type>
          <ContentType>application/json</ContentType>
          <Headers>
            <HeadersItem
              HeadersKey="ACCEPT">application/json</HeadersItem>
            <HeadersItem HeadersKey="ACCEPT_ENCODING">gzip,
              deflate, br</HeadersItem>
            <HeadersItem HeadersKey="ACCEPT_LANGUAGE">en-
              us</HeadersItem>
            <HeadersItem HeadersKey="AUTHORIZATION">Bearer
              FzVtc4tZ0bgGzIo1NUBdGEBAS8K0ymobQmZSS5TNA1ocYUMf
              yGTg</HeadersItem>
            <HeadersItem
              HeadersKey="CONNECTION">c<close</HeadersItem>
            <HeadersItem
              HeadersKey="COOKIE">CacheBrowserId=TjRKVqXfKaG4:
            <HeadersItem
              HeadersKey="HOST">tcfhirsandbox.intersystems.com

```



# Request for Medication Orders from Apple Health App

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

Visual Trace
Session ID: 88969
Go to items 1 - 8
Items per page 200
Show events 
Show internal items 
Apply Filter None
Previous Page
Next Page
Previous Session
Next Session

Services	Processes	Operations
HS.FHIR.Service DSTU2	HS.FHIR.Server.Process DSTU2	HS.Util.Trace Operations
		HS.FHIR.Repository.Operations DSTU2

View Full Contents
View Raw Contents

NOTE: XML namespace information not available in your browser. XML namespace declarations will not be displayed in output.

```

<?xml version="1.0" ?>
<!-- type: HS.Message.FHIR.Request id: 10034 -->
<Request>
  <TimestampUTC>2021-04-29T10:51:45Z</TimestampUTC>
  <BaseUrl>/fhir/dstu2</BaseUrl>
  <Type>MedicationOrder</Type>
  <ContentType>application/json</ContentType>
  <Headers>
    <HeadersItem
      HeadersKey="ACCEPT">application/json</HeadersItem>
    <HeadersItem HeadersKey="ACCEPT_ENCODING">gzip, deflate, br</HeadersItem>
    <HeadersItem HeadersKey="ACCEPT_LANGUAGE">en-us</HeadersItem>
    <HeadersItem HeadersKey="AUTHORIZATION">Bearer FzVtc4tZ0bgGzIoLNUBdGEBAS8K0ymobQmZS5TNA1ocyYUM6qUy4Bx2Q: yGTg</HeadersItem>
    <HeadersItem HeadersKey="CONNECTION">close</HeadersItem>
    <HeadersItem
      HeadersKey="COOKIE">CacheBrowserId=TjRKVqXfKaG43EvWt$q8nQ<
    <HeadersItem
      HeadersKey="HOST">tcfhirsandbox.intersystems.com.au</Head
    <HeadersItem HeadersKey="URL">/fhir/dstu2 /MedicationOrder?patient=136</HeadersItem>
    <HeadersItem
      HeadersKey="USER_AGENT">AppleHealth/1.0</HeadersItem>
    <HeadersItem HeadersKey="VERSION">HTTP/1.1</HeadersItem>
  </Headers>
  <FHIRVersion>DSTU2</FHIRVersion>
          
```

# Response for Medication Orders Request

Message Viewer Visual Trace

https://tcfhirsandbox.intersystems.com.au/csp/healthshare/tcfhir/EnsPortal.VisualTrace.zen?SESSIONID=88969

Visual Trace

Session ID: 88969 Legend Printable Version Go to items 1 - 8 Items per page 200 Show events Show internal items Apply Filter None Previous Page Next Page Previous Session Next Session

Services	Processes	Operations
HS.FHIR.Service DSTU2	HS.FHIR.Server.Process DSTU2	HS.Util.Trace Operations IS.FHIR.Repository.Operations DSTU2

Time ↓

[1] 2021-04-29 20:51:45.360 Request

[2] 2021-04-29 20:51:45.360 Request

[3] 2021-04-29 20:51:45.379 Request

[4] 2021-04-29 20:51:45.404 Request

[5] 2021-04-29 20:51:45.404 Response

[6] 2021-04-29 20:51:45.408 Request

[7] 2021-04-29 20:51:45.409 Response

[8] 2021-04-29 20:51:45.414 Request

View Full Contents View Raw Contents

Expand All

NOTE: XML namespace information not available in your browser. XML namespace declarations will not be displayed in output.

```

<?xml version="1.0" ?>
<!-- type: HS.Util.Trace.Request id: 68757 -->
<Request>
  <CurrentClass>HS.FHIR.Service</CurrentClass>
  <CurrentMethod>OnProcessInput</CurrentMethod>
  <Comment>FHIR response message to be returned</Comment>
  <Items>
    <Item>
      <ItemName>pOutput</ItemName>
      <ItemValue>
        <Response>
          <TimestampUTC>2021-04-29T10:51:45Z</TimestampUTC>
          <Type>MedicationOrder</Type>
          <ContentType>application/json</ContentType>
          <QuickStreamId>T5</QuickStreamId>
          <Status>200</Status>
        </Response>
      </ItemValue>
      <ItemClass>105@HS.Message.FHIR.Response</ItemClass>
    </Item>
    <Item>
      <ItemName>tQuickStream</ItemName>
      <ItemValue>{"resourceType":"Bundle","id":"c49c0112-c7c1-43ec-83ba-8bb194e342ba","type":"searchset","total":17,"links":[{"relation":"self","url":"https://tcfhirsandbox.intersystems.com.au/fhir/dstu2/MedicationOrder?patient=136"}],"entry":[{"fullUrl":"https://tcfhirsandbox.intersystems.com.au/fhir/dstu2
  
```



# Response for Medication Orders Request

The screenshot displays the Visual Trace interface for Session ID: 88969. The interface is divided into three columns: Services, Processes, and Operations. The Services column shows HS.FHIR.Service DSTU2, the Processes column shows HS.FHIR.Server.Process DSTU2, and the Operations column shows HS.Util.Trace Operations. A vertical timeline on the left indicates the sequence of messages. Message 8 is a Request from HS.FHIR.Service to HS.FHIR.Server.Process at 2021-04-29 20:51:45.414. Message 7 is a Response from HS.FHIR.Server.Process to HS.FHIR.Service at 2021-04-29 20:51:45.409. A red arrow points from message 8 to message 7, indicating the response to the request.

The right pane shows the raw contents of the selected message (Item 8). The JSON payload is as follows:

```

<Item>
<ItemName>tQuickStream</ItemName>
<ItemValue>{"resourceType":"Bundle","id":"c49c0112-c7c1-43ec-83ba-8bb194e342ba","type":"searchset","total":17,"link":
[{"relation":"self","url":"https://tcfhirsandbox.intersystems.com.au/fhir/dstu2/MedicationOrder?patient=136"},"entry":
[{"fullUrl":"https://tcfhirsandbox.intersystems.com.au/fhir/dstu2/MedicationOrder/1003","resource":
{"resourceType":"MedicationOrder","id":"1003","identifier":{"use":"official","type":
{"text":"ExternalId","value":"1083|12~GRXX~GRXX"},"use":"official","type":{"coding":[{"system":"http://hl7.org/fhir/identifier-
type","code":"PLAC","display":"Placer
Identifier"},"text":"PlacerId"},"value":"P0000000435"},"dateWritten":"2019-12-05T20:32:55+11:00","status":"active","dateEnded":"2019-
{"reference":"Patient/136"},"prescriber":{"reference":"Practitioner/646","display":"CHELSEA ZUBIK"},"note":"Do not drink alcohol.,
Warning. May make you sleepy. If so do not drive/use tools or machines ","medicationReference":
{"reference":"Medication/1658"},"dosageInstruction":[{"text":" 1 to 5 mg - Intravenous Injection Push - Every 4 Hour(s) PRN (Max 24
hours = 20 mg) - For 1 Day(s)","timing":{"repeat":{"boundsPeriod":
{"start":"2019-12-05T08:00:00+11:00","end":"2019-12-06T07:59:00+11:00"},"route":{"coding":[{"system":"http://snomed.info
/sct","code":"72","display":"Intravenous Injection"},"text":"Intravenous Injection":
{"value":5,"unit":"mg","code":"MG"},"dispenseRequest":{"medicationReference":{"reference":"Medication/1658"},"quantity":
{"value":30},"meta":{"versionId":"1","lastUpdated":"2020-03-09T01:32:32Z"},"search":{"mode":"match"},"fullUrl":"https:
//tcfhirsandbox.intersystems.com.au/fhir/dstu2/MedicationOrder/1004","resource":
{"resourceType":"MedicationOrder","id":"1004","identifier":{"use":"official","type":
{"text":"ExternalId","value":"1083|11~GRXX~GRXX"},"dateWritten":"2019-12-05T20:32:27+11:00","status":"active","dateEnded":"2019-12-1
{"reference":"Patient/136"},"prescriber":{"reference":"Practitioner/646","display":"CHELSEA ZUBIK"},"note":"Do not take more than 2 at
any one time, or more than 8 in 24 hours., Contains paracetamol. Do not take anything else containing paracetamol., Talk to a doctor
at once if you take too much, even if you feel well ","medicationReference":{"reference":"Medication/1660"},"dosageInstruction":
[{"text":" 2 capsule(s) - Oral - Every Six Hours - For 14 Day(s)","timing":{"repeat":{"boundsPeriod":
{"start":"2019-12-05T08:00:00+11:00","end":"2019-12-19T07:59:00+11:00"},"frequency":1,"period":6,"periodUnits":"h"},"code":{"coding":
[{"system":"http://hl7.org/fhir/timing-abbreviation","code":"Q6H","display":"every 6 hours"},"text":"every 6 hours"},"route":
{"coding":[{"system":"http://snomed.info/sct","code":"82","display":"Oral"},"text":"Oral"},"doseQuantity":
{"value":2,"unit":"capsule(s)","code":"capsule(s)"},"dispenseRequest":{"medicationReference":{"reference":"Medication
/1660"},"quantity":{"value":112},"meta":{"versionId":"1","lastUpdated":"2020-03-09T01:32:32Z"},"search":{"mode":"match"},"
fullUrl":"https://tcfhirsandbox.intersystems.com.au/fhir/dstu2/MedicationOrder/1005","resource":
{"resourceType":"MedicationOrder","id":"1005","identifier":{"use":"official","type":
{"text":"ExternalId","value":"1083|4~GRXX~GRXX"},"dateWritten":"2019-12-05T18:38:02+11:00","status":"completed","dateEnded":"2019-12
{"reference":"Patient/136"},"prescriber":{"reference":"Practitioner/646","display":"CHELSEA ZUBIK"},"note":"Space doses evenly through
day until course finished, unless told to stop. Should be administered 30-60 minutes preoperatively.","medicationReference":
{"reference":"Medication/1662"},"dosageInstruction":[{"text":" 2000 mg - Oral - STAT","timing":{"repeat":{"boundsPeriod":
{"start":"2019-12-05T07:30:00+11:00","end":"2019-12-05T07:30:00+11:00"},"code":{"coding":
[{"code":"STAT","display":"STAT"},"text":"STAT"},"route":{"coding":[{"system":"http://snomed.info
/sct","code":"82","display":"Oral"},"text":"Oral"},"doseQuantity":{"value":2000,"unit":"mg","code":"MG"},"dispenseRequest":

```

# First 97/1513 Rows of the Response Pretty Printed

```
{
  "resourceType": "Bundle",
  "id": "c49c0112-c7c1-43ec-83ba-8bb194e342ba",
  "type": "searchset",
  "total": 17,
  "link": [
    {
      "relation": "self",
      "url": "https://tcfhirsandbox.intersystems.com.au/fhir/dstu2/MedicationOrder?patient=136"
    }
  ],
  "entry": [
    {
      "fullUrl": "https://tcfhirsandbox.intersystems.com.au/fhir/dstu2/MedicationOrder/1003",
      "resource": {
        "resourceType": "MedicationOrder",
        "id": "1003",
        "identifier": [
          {
            "use": "official",
            "type": {
              "text": "ExternalId"
            },
            "value": "1083||12~GRXX~GRXX"
          },
          {
            "use": "official",
            "type": {
              "coding": [
                {
                  "system": "http://hl7.org/fhir/identifier-type",
                  "code": "PLAC",
                  "display": "Placer Identifier"
                }
              ],
              "text": "PlacerId"
            },
            "value": "P0000000435"
          }
        ],
        "dateWritten": "2019-12-05T20:32:55+11:00",
        "status": "active",
        "dateEnded": "2019-12-06T07:59:00+11:00",
        "patient": {
          "reference": "Patient/136"
        },
        "prescriber": {
          "reference": "Practitioner/646",
          "display": "CHELSEA ZUBIK"
        },
        "note": "Do not drink alcohol., Warning. May make you sleepy. If so do not drive/use tools or machines ",
        "medicationReference": {
          "reference": "Medication/1658"
        },
        "dosageInstruction": [
          {
            "text": " 1 to 5 mg - Intravenous Injection Push - Every 4 Hour(s) PRN (Max 24 hours = 20 mg) - For 1 Day(s)",
            "timing": {
              "repeat": {
                "boundsPeriod": {
                  "start": "2019-12-05T08:00:00+11:00",
                  "end": "2019-12-06T07:59:00+11:00"
                }
              }
            },
            "route": {
              "coding": [
                {
                  "system": "http://snomed.info/sct",
                  "code": "72",
                  "display": "Intravenous Injection"
                }
              ],
              "text": "Intravenous Injection"
            },
            "doseQuantity": {
              "value": 5,
              "unit": "mg",
              "code": "MG"
            }
          }
        ],
        "dispenseRequest": {
          "medicationReference": {
            "reference": "Medication/1658"
          },
          "quantity": {
            "value": 30
          }
        },
        "meta": {
          "versionId": "1",
          "lastUpdated": "2020-03-09T01:32:32Z"
        }
      }
    }
  ]
}
```

```
"resourceType": "MedicationOrder",
"id": "1003",
"identifier": [
  {
    "use": "official",
    "type": {
      "text": "ExternalId"
    },
    "value": "1083||12~GRXX~GRXX"
  },
  {
    "use": "official",
    "type": {
      "coding": [
        {
          "system": "http://hl7.org/fhir/identifier-type",
          "code": "PLAC",
          "display": "Placer Identifier"
        }
      ],
      "text": "PlacerId"
    },
    "value": "P0000000435"
  }
],
"dateWritten": "2019-12-05T20:32:55+11:00",
"status": "active",
"dateEnded": "2019-12-06T07:59:00+11:00",
"patient": {
  "reference": "Patient/136"
},
"prescriber": {
  "reference": "Practitioner/646",
  "display": "CHELSEA ZUBIK"
},
"note": "Do not drink alcohol., Warning. May make you sleepy. If so do not drive/use tools or machines ",
"medicationReference": {
  "reference": "Medication/1658"
},
"dosageInstruction": [
  {
    "text": " 1 to 5 mg - Intravenous Injection Push - Every 4 Hour(s) PRN (Max 24 hours = 20 mg) - For 1 Day(s)",
    "timing": {
      "repeat": {
        "boundsPeriod": {
          "start": "2019-12-05T08:00:00+11:00",
          "end": "2019-12-06T07:59:00+11:00"
        }
      }
    },
    "route": {
      "coding": [
        {
          "system": "http://snomed.info/sct",
          "code": "72",
          "display": "Intravenous Injection"
        }
      ],
      "text": "Intravenous Injection"
    },
    "doseQuantity": {
      "value": 5,
      "unit": "mg",
      "code": "MG"
    }
  }
],
"dispenseRequest": {
  "medicationReference": {
    "reference": "Medication/1658"
  },
  "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](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

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**



# Summary

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

**FHIR  
Server**

**FHIR  
Client**

**Transformations  
to and from FHIR**

**Business  
Services**

**Business  
Operations**

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

**Business  
Service**

**Business  
Operation**

**Business  
Process**

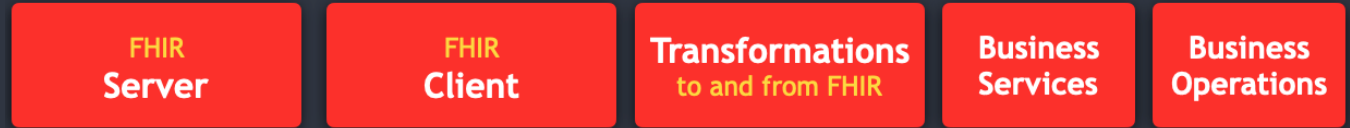
**Business  
Rules**

**Transform  
ations**

...

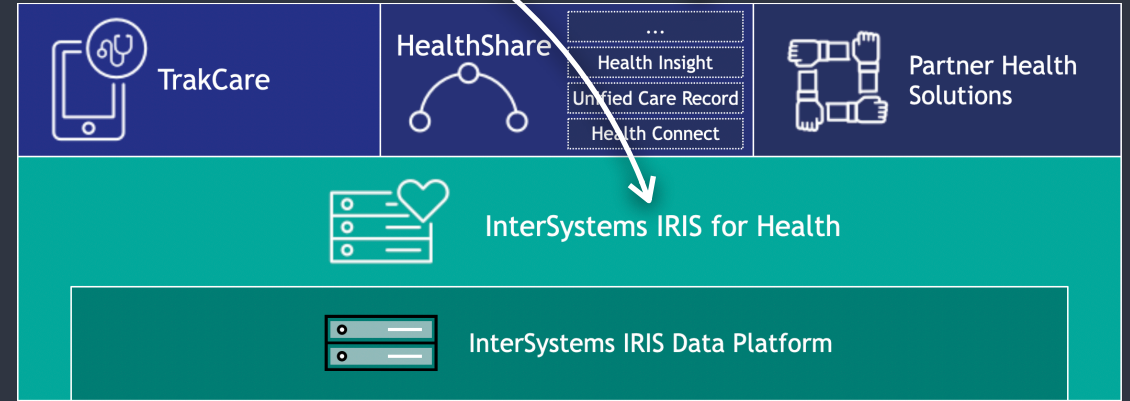
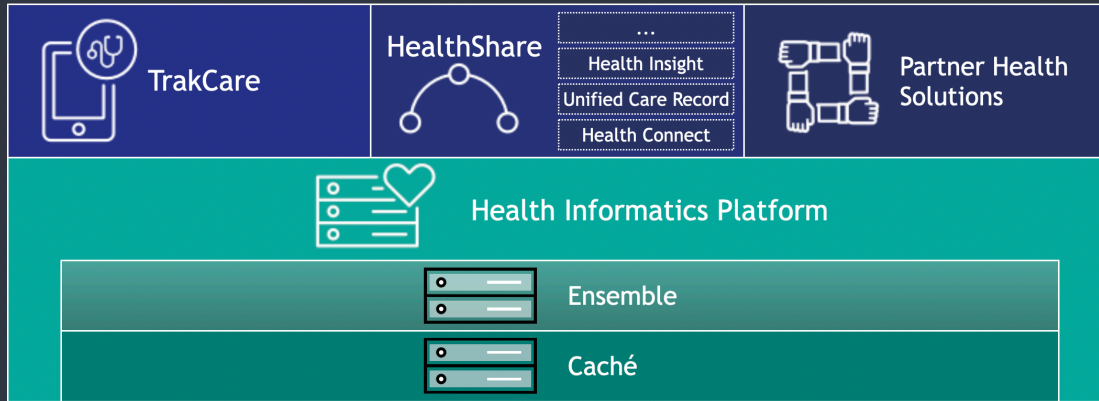


# Summary



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

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



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.



*Thank you.*

