



Amazon HealthLake Adapters

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Table of Contents

1 Introduction to HealthLake Adapters	1
1.1 General AWS Settings	1
2 HealthLake Inbound Adapters	3
2.1 Reading a Single Resource	3
2.2 Searching for Resources	3
3 HealthLake Outbound Adapter	5
3.1 Adapter Details	5
3.2 Built-in Business Operation	5

1

Introduction to HealthLake Adapters

[Amazon HealthLake](#) is an AWS product that provides a way to store healthcare data as FHIR[®] resources. InterSystems products are able to retrieve, create, update, and delete resources in a HealthLake data store using business hosts in an interoperability production. Within a production, a business service can use one of the [inbound adapters](#) to retrieve resources from HealthLake. In addition, a business operation can use the [outbound adapter](#) to interact with HealthLake, for example, to create a new FHIR resource in a data store.

If you are new to interoperability productions, including the use of business services, business operations, and adapters, see [Introduction to Interoperability Productions](#).

1.1 General AWS Settings

The HealthLake adapters extend a common adapter class that includes general AWS properties. When you add a business service or business operation that uses a HealthLake adapter, these AWS properties can be set using the **AWS** settings in the Management Portal.

CredentialsFile — If blank, Amazon uses the [default credential provider chain](#) to obtain the credentials needed to access HealthLake. If you prefer to use an AWS credential file, enter its filepath.

Region — Identifies the AWS region that you want to access. For a list of regions, see [Amazon Regions, Availability Zones, and Local Zones](#)

2

HealthLake Inbound Adapters

InterSystems provides two inbound adapters that can be used to retrieve FHIR[®] resources from HealthLake, one for performing a Read interaction and another for performing a Search interaction. In FHIR, interactions are the actions you can take to work with FHIR resources in a repository like HealthLake. The Read interaction retrieves a single resource based on its ID while the Search interaction retrieves one or more resources that meet certain search criteria. This distinction is important when retrieving a single resource by ID. If you use the adapter that performs a Read interaction, only the resource is returned from Healthlake. However, if you search by ID using the adapter that performs a Search interaction, you receive a bundle that contains the resource, not just the resource by itself. Both inbound adapters are used by a business service to retrieve a FHIR payload from a HealthLake data store and bring it into the production.

2.1 Reading a Single Resource

By incorporating a business service that uses the `EnsLib.AmazonHealthLake.InboundAdapter` adapter, your production can retrieve a resource from a HealthLake data store by specifying its resource type and ID. This inbound adapter performs a FHIR [Read interaction](#). The adapter's properties include the HealthLake data store, the resource type, and the resource ID, along with an option to delete a resource from HealthLake once it has been retrieved. Like most adapter properties, these properties can be set in the Management Portal once the business service has been added to the production.

When a business service calls this inbound adapter, the resource that matches the resource type and ID defined in the adapter is returned in an `EnsLib.AmazonHealthLake.InboundInput` object. The JSON representation of the FHIR resource is placed in the object's `PayLoad` property as a `Stream`, while the data store ID, resource type, and resource ID are stored in the object as `Strings`.

When creating a custom business service that uses the `EnsLib.AmazonHealthLake.InboundAdapter` adapter, be sure that the `OnProcessInput` method accepts the `EnsLib.AmazonHealthLake.InboundInput` object as its first argument. For details on creating a custom business service, see [Defining Business Services](#).

2.2 Searching for Resources

A business service that uses the `EnsLib.AmazonHealthLake.InboundAdapterQuery` adapter retrieves resources from a HealthLake data store by providing a resource type and search criteria. This inbound adapter performs a FHIR [Search interaction](#) with a context limited to the specified resource type.

When defining the adapter's properties, the `SearchType` property sets the resource type of the search, for example, `Patient` or `Observation`. The `SearchParameters` property is a string of valid FHIR search parameters supported by HealthLake.

Like most adapter properties, these properties can be set by viewing the business service in the Management Portal. As an example, if the properties of the adapter are `DatastoreId="12asdf45"`, `SearchType="Patient"` and `SearchParameters="name=Smith&birthdate=1944-08-23"`, then the equivalent search syntax used by the adapter is:

```
GET [base]/datastore/12asdf45/Patient?name=Smith&birthdate=1944-08-23
```

For a list of search parameters supported by HealthLake, see the [HealthLake Documentation](#).

Resources of the specified resource type that match the search criteria defined in the adapter are returned in an `EnsLib.AmazonHealthLake.InboundInputQuery` object, which is consumed by the business service using the adapter. The data store ID, resource type, and search parameters are returned as `String` properties of the object, while the FHIR bundle returned by the search is stored as a `Stream` in the `PayLoad` property.

When creating a custom business service that uses the `EnsLib.AmazonHealthLake.InboundAdapterQuery` adapter, be sure that the `OnProcessInput` method accepts the `EnsLib.AmazonHealthLake.InboundInputQuery` object as its first argument. For details on creating a custom business service, see [Defining Business Services](#).

3

HealthLake Outbound Adapter

By incorporating a business operation that uses the HealthLake outbound adapter, an interoperability production can complete FHIR® interactions with an Amazon HealthLake data store. The adapter provides methods for HTTP verbs that can be used to complete an interaction. For example, you can use the adapter's `MakePOSTRequest` method to perform a FHIR Create interaction.

To simplify implementations, InterSystems provides a built-in business operation that can be used to invoke the HTTP verb methods of the adapter, so you do not have to write a custom business operation unless you have special requirements.

3.1 Adapter Details

The class of the HealthLake outbound adapter is `EnsLib.AmazonHealthLake.OutboundAdapter`. As you can see from the class reference, the adapter includes methods used to perform GET, POST, PUT, and DELETE actions. For example, the adapter's `MakePOSTRequest` method is used to send a POST request to HealthLake. Though the JSON payload of the POST and PUT methods are designed to be passed as a String, the methods can also handle Stream payloads.

The adapter's `MakeGETRequest` method is used to perform a FHIR [Read interaction](#), but is not used to perform a [Search interaction](#). To perform a Search interaction with a context limited to a specified resource type, use the `MakeQueryRequest` method. The adapter executes this search using a GET HTTP verb. The signature of the `MakeQueryRequest` method is:

```
Method MakeQueryRequest(datastoreId As %String, searchType As %String,  
    searchParameters As %String, Output response As %Net.HttpResponse) As %Status
```

Where:

- `datastoreId` is the Amazon HealthLake data store.
- `searchType` sets the resource type of the search, for example, Patient or Observation.
- `searchParameters` is a string of [valid HealthLake search parameters](#).

3.2 Built-in Business Operation

Rather than developing a custom business operation that uses the outbound adapter, you can save time and effort by adding the `EnsLib.AmazonHealthLake.BusinessOperation` business operation to the interoperability production. Once added, the production can send pre-built requests to the business operation, which will use it to execute the appropriate adapter method. For example, if a business host sends an `EnsLib.AmazonHealthLake.POSTRequest` request to the business operation,

the adapter's `MakePOSTRequest` method is invoked to create a new FHIR resource in the HealthLake data store. See [Adapter Details](#) for notes about the methods invoked by the business operation.

For details about adding a business operation to a production, see [Adding Business Hosts](#).