

PROVIDER DIRECTORY IMPLEMENTATION GUIDE

FOR

OREGON HEALTH INFORMATION TECHNOLOGY (HIT) PORTFOLIO

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1.0 INTRODUCTION

The purpose of this implementation guide is to describe how end-users and data contributors connect, contribute to and access the Oregon Provider Directory (PD). This document is best for technical analysts and onboarding coordinators representing data sources which are contributing data to the PD through the user interface or a recurring electronic transport method.

Basic end users: End-users will login through [OneHealthPort](#) and be granted permissions based on roles as specified by OHA and assigned by [OneHealthPort](#). The user interface displays the provider and organization data content in an easy to navigate web interface. End users can contribute data on individual records in PD through data attestation. Any data contributed as an individual end user will display that individual's name as the record's data source.

Batch data contributor: Batch data contributors are critical for populating the solution with provider and organization information. This guide explains details on how end users may become batch data contributors which allows for large amounts of data to be submitted to the PD through one of the transport mechanisms. End users connect to the PD and then if appropriate, request the additional permission to become a batch data contributor through the MiHIN onboarding process. Any data contributed as a batch data contributor will display that organization's name as the record's data source.

2.0 END USER ONBOARDING

2.1 ONEHEALTHPORT SINGLE SIGN-ON

User registration and role-based access to the PD is provided via OneHealthPort (OHP). OHP provides Identity Verification and Multi Factor Authentication (MFA) options to end-users. OHP does not provide any additional PD features or functions beyond user authorization and access to the PD solution. Once the user has accessed the PD, they have access to data and functionality based on the assigned role(s) specified by OneHealthPort. OneHealthPort provides Single Sign-on (SSO) capability to all end-users, including those that already have an account for OneHealthPort's other services.

The Provider Directory "splash screen" within OneHealthPort provides registration instructions, useful links, and access to the PD Login interface at the following link:

<http://onehealthportdev.prod.acquia-sites.com/payer/oregon-provider-directory>

2.2 LEGAL ONBOARDING

All end users will enter the PD user interface through the OneHealthPort Single Sign-on. Before an end user can access the PD, OHA will determine if their organization qualifies as a Medicaid entity, and execute all legal agreements with the organization. OHA will then confirm in writing

that the appropriate legal agreements have been established by requesting the organization’s TIN be added to the PD login workflow approved TIN list via the PD help desk.

Once MiHIN receives this confirmation, the organization’s TIN will be added to the approved TIN list which allows end users associated with that TIN in OneHealthPort to enter the PD user interface.

2.3 PERMISSION SETS

PD solution access is granted by OneHealthPort, and permission sets are assigned within the PD to each role. The PD roles are mapped to OneHealthPort roles and OHA functions.

The basic end-user role has permission sets that include basic view rights and basic data contributor. This is the standard role and a pre-requisite for all other roles. The basic end-user role allows the end-user to create tickets, view and create and edit organization and provider data, and view reports.

Figure 1: Basic View Rights Permission Set Workflow

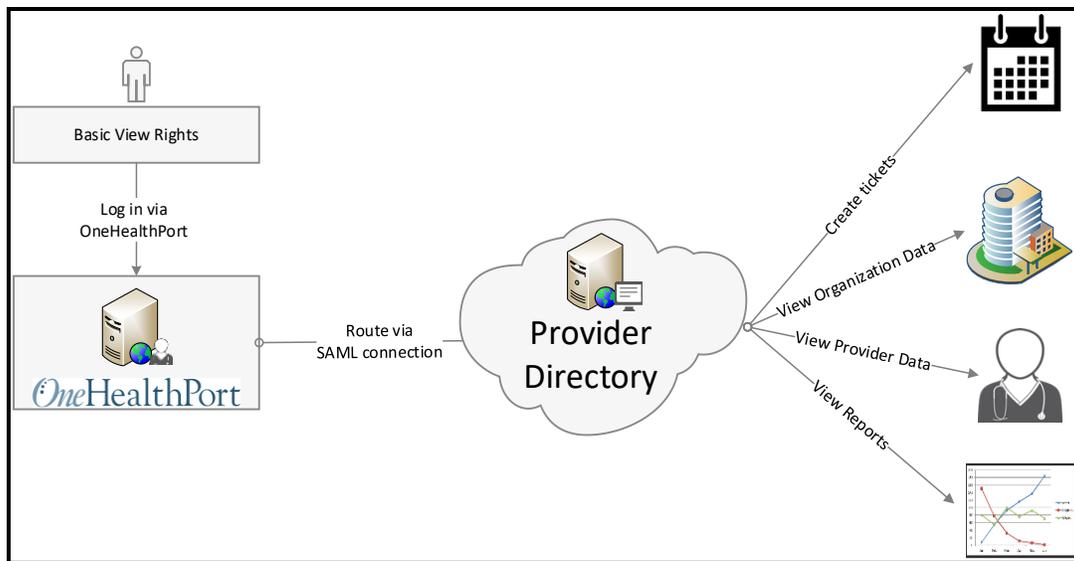
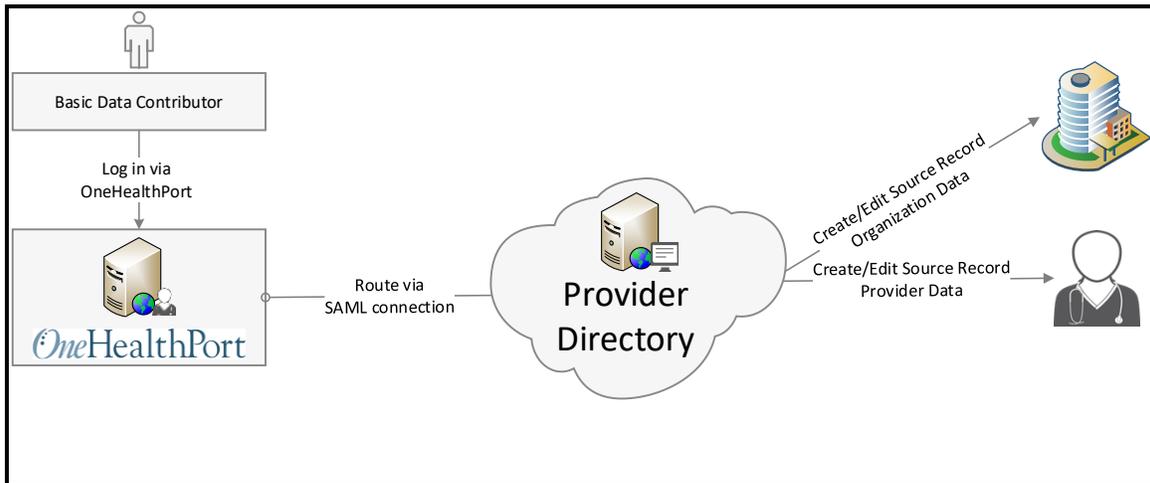


Figure 2: Basic Data Contributor Permission Set Workflow



2.4 REQUESTING ADDITIONAL PERMISSIONS

Through the PD user interface, end-users may request additional permission sets to enhance their basic end-user role. Once a request for additional permissions has been submitted, it is processed through the help desk and follows the help desk process for OHA approval. Examples of additional permission sets include:

- Batch data contributor
- Organization representative
- Provider clerk
- View API (REST)
- Create reports

2.4.1 Batch Data Contributor Permission

The Batch Data Contributor permission allows the end-user to submit source record data in batch. These end-users can submit data in batch using the File Uploader in the user interface or connecting via any of the transport mechanisms. This permission set must be granted 'basic view rights' as a prerequisite. To be granted this permission, end-users must follow the 'Request Additional Permissions' process and complete the MiHIN Data Source Onboarding process.

2.4.2 Organization Representative Permission

The Organization representative permission is for end users who require a higher level of trust when attesting to source records for specific organizations and their associated providers. To be granted this permission, end-users must either follow the 'Request Additional Permissions' process and provide the organization's title and TIN or attain an Organization Administrator data attribute for their organization in their OneHealthPort profile.

2.4.3 Provider Clerk Permission

The Provider clerk permission is for end users who require a higher level of trust when attesting to source records for specific providers. To be granted this permission, end-users must follow the ‘Request Additional Permissions’ process and provide the provider’s first name, last name and NPI.

2.4.4 View API Permission

The View API permission is for end users who would like to view and/or export PD data from an API. To be granted this permission, end-users must follow the ‘Request Additional Permissions’ process. This permission is a pre-requisite to contributing data via API.

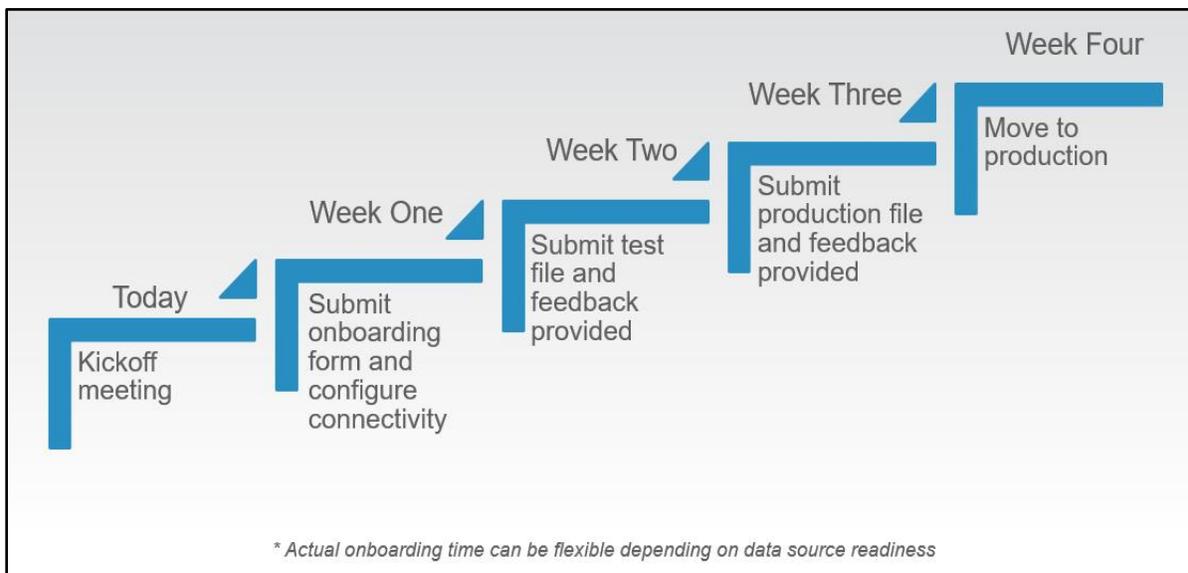
2.4.5 Create Reports Permission

The Create reports permission is for advanced technical users who have business needs to create custom reports. To be granted this permission, end-users must follow the ‘Request Additional Permissions’ process.

3.0 BATCH DATA CONTRIBUTOR ONBOARDING

Onboarding Coordinators will guide data sources through an onboarding process for the Provider Directory after a request to become a batch data contributor has been submitted. Figure 3 shows the projected timeline and steps for the onboarding process. This timeline is flexible to meet the unique needs of each data source.

Figure 3: Onboarding Timeline



Details for each stage are as follows:

- **Stage 1:** Kickoff Meeting
- **Stage 2:** Submit onboarding form and configure connectivity
- **Stage 3:** Submit test file and feedback provided to data source
- **Stage 4:** Data Quality Assurance Period: Submit production file and feedback provided to data source
- **Stage 5:** Move to production

3.1 LEGAL ONBOARDING WITH OHA

Eligibility: OHA will continuously identify eligible batch data contributors for the PD. Data sources can also submit a help desk ticket to MiHIN if they are interested in submitting data to the PD. For data sources submitting a ticket, MiHIN will review the ticket and follow the data governance model described in *section 2.0*. OHA will approve or reject the data source's request. Once OHA approves or rejects the data source, MiHIN will communicate the decision to the data source. If approved, data source onboarding will be initiated. Review *section 3.1* for onboarding details.

Legal Agreements: All data sources must first be Oregon PD end users through the OneHealthPort Single Sign-on. Before an end user can access the PD, OHA will determine if their organization qualifies as a Medicaid entity, and execute all legal agreements with the organization. OHA will then confirm in writing that the appropriate legal agreements have been established by requesting the organization's TIN be added to the PD login workflow approved TIN list via the PD help desk.

Once MiHIN receives this confirmation, the organization's TIN will be added to the approved TIN list which allows end users associated with that TIN in OneHealthPort to enter the PD user interface. Once an end user has successfully logged in to the PD user interface, they can then apply to become a batch data contributor to submit batch data files. OHA and the data contributor will work together with MiHIN to provide the necessary onboarding materials to proceed to technical onboarding.

3.2 TECHNICAL ONBOARDING

Details for each stage are as follows:

Stage 1: Kickoff Meeting

The data source will be presented a brief overview of the PD. The MiHIN onboarding team will walk the data source through the PD data source onboarding form to determine the format and type of data that will be submitted to the PD. If the data source needs to take the worksheet back to their organization to accurately complete the required information, they are expected to return it to the MiHIN onboarding team as soon as possible. MiHIN will provide the data loading specifications which outline the required fields, other fields, validation rules per field, maximum character limits per field, accepted values for restricted fields, etc.

The minimum data requirements established by OHA are defined in *Appendix B: Data Source Loading Specifications* on the Specifications tab and noted as required. The data source will also be briefed on the help desk ticket processes during the onboarding meeting and presentation.

Stage 2: Submit onboarding form and configure connectivity

The data source will complete the onboarding form to begin configuration. Configuration of requirements will be dependent on the method of transport selected by the data source. See *Section 4.0 Transport mechanism implementation* to review transport method options. Any necessary connectivity testing will be completed within this stage with the data source.

Stage 3: Submit data for testing and feedback provided to data source

The data source will submit sample data for MiHIN to load into the pre-production PD environment. Sample data will be in the format agreed upon during the earlier stages of onboarding. MiHIN will provide feedback about the success or failure of the data load to the data source.

If the data source has a production ready data set with which they would like to perform testing with instead of a sample data set, they may do so.

Stage 4: Data Quality Assurance Period: Submit production file and feedback provided to data source

After the sample data is successfully loaded, the data source will provide MiHIN with a production ready file. If the provided test file is valid it may be used for DQA.

This initiates the Data Quality Assurance period (DQA). The production file will be loaded into the pre-production PD environment. MiHIN will provide feedback about the success or failure of the data load to the data source. If necessary, a meeting can be scheduled with the data source to review the import process and to confirm the final data loaded in the PD.

Stage 5: Move to production

When the production file has successfully passed the DQA period, MiHIN will communicate to the data source that they will be loading the data into the production PD. At this point, the data source will be expected to provide the data in the agreed upon format, transport method, and frequency. If a data source requires a change in the established transport method, format, or frequency, the data source will need to submit a help desk ticket.

3.2.1 Onboarding Materials

The data source must provide the following items which are necessary for MiHIN to continue the onboarding process:

1. PD data source onboarding form

2. Production-ready file

Additionally, OHA shall provide data source maps which contain the level at which the new data source is trusted for each field.

Note: The onboarding process SLA measurement begins when MiHIN receives all the above onboarding requisites.

3.3 CONTRIBUTING PROGRAMS DATA

Programs data to be submitted to the PD must be provided by the program itself, such as PDMP or PCPCH. The program point of contact can become a batch data contributor through the PD user interface to begin the data source onboarding process. The program can choose a transport mechanism and frequency for data submissions. Programs do not have the option to use file uploader for data quality purposes regarding other file uploader users. Since only programs can enter program information as the source of truth.

4.0 TRANSPORT MECHANISM IMPLEMENTATION

During the data source onboarding process, a transport mechanism is selected that best fits the data source's needs. To be granted the batch data contributor permission, end-users must follow the 'Request Additional Permissions' process. This permission is a pre-requisite to contributing batch data. The details of the specific data source transport mechanism are reviewed and tested during the onboarding process before going into production. All traffic inbound to PD is required to be TLS v1.2 or higher. The Provider Directory solution provides encryption of data at rest via native encryption (AES 256) within the Salesforce platform. PD does not accept any protocol of lower versions. The PD solution accepts data from the following electronic transport mechanisms:

4.1 USER INTERFACE FILE UPLOADER

4.1.1 Overview

Users can drag and drop or upload their file within the PD user interface. The file must be in the MiHIN recommended data specification to utilize this option. Validation feedback is returned in near real time within the user interface as well as within email.

4.1.2 Authentication and Testing

Upon receiving a file from a batch data contributor, the pre-loading data validator will review the format and data content. When data is not provided in the correct format, tasks can present error messages and a notification will automatically generate with more details about the error(s) and how it can be addressed. Batch data contributors will be notified through email and through the file uploader user interface page that the data was not loaded due to errors. Errors details will also be listed. The validator identifies errors by column and by row, however it will *only* list the first error in each row.

4.1.3 Implementation

The Batch Data Contributor permission allows the end-user to submit source record data in batch. These end-users can submit data in batch using the File Uploader in the user interface or connecting via any the transport mechanisms. This permission set must be granted ‘basic view rights’ as a prerequisite. To be granted this permission, end-users must follow the ‘Request Additional Permissions’ process and complete the MiHIN Data Source Onboarding process.

4.2 SECURE FILE TRANSFER PROTOCOL (SFTP)

4.2.1 Overview

Secure File Transfer Protocol (SFTP) is a network protocol for secure data transfer via a Secure Shell (SSH) data stream connection. This is the most commonly used and most preferred method of transport for batch files. SFTP files will be loaded into PD using Informatica Extract, Transfer, & Load (ETL). During initial data source onboarding kickoff meeting, data sources will confirm if they choose to submit batch files through this transport method.

4.2.2 Authentication and Testing

Authentication and testing are conducted as part of the onboarding process in section 3.2.

To be granted the batch data contributor permission, end-users must follow the ‘Request Additional Permissions’ process. This permission is a pre-requisite to contributing batch data.

If a data source chooses to submit recurring batch files through SFTP, the PD onboarding team will provide a form to fill out necessary information. A SFTP form is available below:

Figure 4: [SFTP Request Form](#)

Using this information, the PD onboarding team initiates the SFTP internal processes.

4.2.3 Implementation

Once the SFTP account has been created, the PD onboarding team securely communicates to the data source their SFTP account username and password. Generally, usernames are sent via email and passwords are sent via text message from MiHIN to the user. With this information, the data source logs into the SFTP account and utilizes an SFTP process to move files into the secure location. An example process using WinSCP to Access SFTP is below:

Figure 5: [Sample SFTP Guide](#)

4.3 REPRESENTATIONAL STATE TRANSFER (REST) API

4.3.1 Overview

Representational State Transfer (REST) APIs can return formats such as XML, JSON, and YAML for transactional record updates as well as data retrieval. REST API provides a powerful, convenient, and simple Web services API for interacting with the Salesforce Lightning Platform. Its advantages include ease of integration and development, and it's an excellent choice of technology for use with mobile applications and Web 2.0 projects. If you have many records to process, consider using Bulk API, which is based on REST principles and optimized for large sets of data.¹ REST queries will use object and field names from the Data Dictionary in Appendix C.

4.3.2 Authentication and Testing

Authentication and testing are conducted as part of the onboarding process in section 3.2. To be granted the view API permission or batch data contributor permission, end-users must follow the 'Request Additional Permissions' process. This process is a pre-requisite to viewing data via API and/or contributing batch data.

Salesforce uses the OAuth protocol to allow users of applications to securely access data without having to reveal username and password credentials. Before making REST API calls, data sources must authenticate the application user using Auth 2.0. The steps include:

1. Set up your application as a connected app in the Salesforce organization.
2. Determine the correct Salesforce OAuth endpoint for your connected app to use.
3. Authenticate the connected app user via one of several different OAuth 2.0 authentication flows.²

An OAuth authentication flow defines a series of steps used to coordinate the authentication process between your application and Salesforce. Supported OAuth flows include:

- Web server flow, where the server can securely protect the consumer secret.
- User-agent flow used by applications that cannot securely store the consumer secret.
- Username-password flow, where the application has direct access to user credentials.³

After successfully authenticating the connected app user with Salesforce, users receive an access token which can be used to make authenticated REST API calls.

Limits for native REST API queries from Salesforce are as follows:

¹ https://developer.salesforce.com/docs/atlas.en-us.api_rest.meta/api_rest/intro_what_is_rest_api.htm

² https://resources.docs.salesforce.com/214/latest/en-us/sfdc/pdf/api_rest.pdf

³ https://resources.docs.salesforce.com/214/latest/en-us/sfdc/pdf/api_rest.pdf

- The maximum possible result size is 2000 rows. This limit is also driven by the number of characters included in the response.
- The maximum total result size is bound by the URL limit around 20,000 characters.
- Each field included in the query reduces the number of possible results.
- The native REST API will not limit results beyond this.

4.3.3 Implementation

Salesforce provides extensive documentation regarding REST API connections. The following information has been compiled from Salesforce resources to provide an overview to data sources who wish to utilize this transport mechanism. All the information mentioned below is available in more detail here: https://developer.salesforce.com/docs/atlas.en-us.api_rest.meta/api_rest/quickstart.htm.

1. Prerequisites:
 - Install development platform according to its product documentation.
 - Become familiar with cURL, the tool used to execute REST requests in this quick start. If you use another tool, you should be familiar enough with it to translate the example code.
 - Become familiar with JSON which is used in this quick start or be able to translate samples from JSON to the standard you use.
 - Enable an SSL endpoint in your application server.
 - Become familiar with OAuth 2.0, which requires some setup. We provide the steps, but it will help if you are familiar with the basic concepts and workflow.
 - Read through all the steps before beginning this quick start. You may also wish to review the rest of this document to familiarize yourself with terms and concepts.⁴
2. Obtain a Salesforce Developer Edition Organization for testing the code:
 - If not already a member of the Lightning Platform developer community, go to developer.salesforce.com/signup and follow the instructions for signing up for a Developer Edition organization. Even if you already have Enterprise Edition, Unlimited Edition, or Performance Edition, use Developer Edition for developing, staging, and testing your solutions against sample data to protect your organization's live data. This is especially true for applications that insert, update, or delete data (as opposed to simply reading data).
 - If you already have a Developer Edition organization, verify that the API Enabled permission. This permission is enabled by default but may have been changed by an administrator. For more information, see the help in the Salesforce user interface.⁵

⁴ https://developer.salesforce.com/docs/atlas.en-us.api_rest.meta/api_rest/quickstart_prereq.htm

⁵ https://developer.salesforce.com/docs/atlas.en-us.api_rest.meta/api_rest/quickstart_dev_org.htm

3. Set Up Authorization

There are two methods to set up authorization, OAuth 2.0 or by passing a session ID. If you're handling someone else's password, don't use session ID.

- Setting up OAuth 2.0 requires that you take some steps within Salesforce and in other locations. If any of the steps are unfamiliar, see [Understanding Authentication](#). The following example uses the [Web server OAuth flow](#).⁶
 - a. Create a connected app if you haven't already done so.
 - b. In Salesforce Classic, from Setup, enter Apps in the Quick Find box, select Apps (under Build | Create), then click the name of the connected app.
 - c. In Lightning Experience, from Setup, enter Apps in the Quick Find box, select App Manager, click, and then select Edit.
 - d. Click Enable OAuth Settings and specify your callback URL and OAuth scopes. The Callback URL you supply here is the same as your application's callback URL. Usually it is a servlet if you work with Java. It must be secure: http:// does not work, only https://. For development environments, the callback URL is like https://localhost:8443/RestTest/oauth/_callback. When you click Save, the Consumer Key is created and displayed, and a Consumer Secret is created (click the link to reveal it).
 - e. The OAuth 2.0 specification uses "client" instead of "consumer." Salesforce supports OAuth 2.0.
 - f. The values here correspond to the following values in the sample code in the rest of this procedure:
 - g. client_id is the Consumer Key
 - h. client_secret is the Consumer Secret
 - i. redirect_uri is the Callback URL.
 - j. In your client application, redirect the user to the appropriate Salesforce authorization endpoint. On successful user login, Salesforce calls your redirect URI with an authorization code. You use the authorization code in the next step to get the access token. The authorization code expires after 15 minutes.
 - k. From your Java or other client application, make a request to the appropriate Salesforce token request endpoint that passes in grant_type, client_id, client_secret, and redirect_uri. The redirect_uri is the URI that Salesforce sends a callback to.
 - l. If the value of client_id (or consumer key) and client_secret (or consumer secret) are valid, Salesforce sends a callback to the URI specified in redirect_uri that contains a value for access_token.

⁶ https://developer.salesforce.com/docs/atlas.en-us.api_rest.meta/api_rest/quickstart_oauth.htm

- m. Store the access token value as a cookie to use in all subsequent requests.
- n. This step completes the authentication. Once authenticated, every request must pass in the `access_token` value in the header. It cannot be passed as a request parameter

Further information plus examples of syntax associated with the commands can be found here: https://developer.salesforce.com/docs/atlas.en-us.api_rest.meta/api_rest/quickstart_oauth.htm.

A Session ID instead of an OAuth 2.0 access token can also be used following the steps below.

- a. Obtain a session ID, for example, a SOAP API `login()` call returns the session ID. You can also have the session ID, for example as part of the Apex current context. If you need a session ID just for testing purposes during development, use the username-password OAuth flow in a cURL command like the following⁷:

```
curl https://login.salesforce.com/services/oauth2/token -d "grant_type=password" -d "client_id=myclientid" -d "client_secret=myclientsecret" -d "username=mylogin@salesforce.com" -d "password=mypassword123456"
```

- b. You must provide your client id, client secret, username, and password with user security token appended.
- c. Use the session ID when you send a request to the resource. Substitute the ID for the `token` value. The syntax is the same:

Authorization: Bearer access_token :

For example:

```
curl https://instance\_name.salesforce.com/services/data/v20.0/ -H 'Authorization: Bearer access_token'
```

4. Send HTTP Requests with cURL

- To interact with the Lightning Platform REST API, the application needs to be set up to construct HTTP requests.

The REST API uses HTTP GET and HTTP POST methods to send and receive JSON and XML content, so it is very simple to build applications using the tool or the language of your choice. We use a command-line tool called cURL to simplify sending and receiving HTTP requests and responses. cURL is pre-installed on many Linux and Mac systems. Windows users can download a version at curl.haxx.se/. When using HTTPS on Windows, ensure that your system meets the cURL requirements for SSL.⁸

⁷ https://developer.salesforce.com/docs/atlas.en-us.api_rest.meta/api_rest/quickstart_oauth.htm

⁸ https://developer.salesforce.com/docs/atlas.en-us.api_rest.meta/api_rest/intro_usage_rest_resources.htm

- Your HTTP requests to a REST API resource should contain the following information:
 - An HTTP method (HEAD, GET, POST, PATCH, or DELETE).
 - An OAuth 2.0 access token used to authenticate the request. For information on how to retrieve the token, see [Quick Start](#).
 - An HTTP ACCEPT header used to indicate the resource format (XML or JSON), or a .json or .xml extension to the URI. The default is JSON.
 - The Lightning Platform REST resource.
 - Any JSON or XML files containing information needed for requests, such as updating a record with new information.
- The HTTP methods are used to indicate the desired action, such as retrieving information, as well as creating, updating, and deleting records.⁹
 - HEAD is used to retrieve resource metadata.
 - GET is used to retrieve information, such as basic resource summary information.
 - POST is used to create a new object.
 - PATCH is used to update a record.
 - DELETE is used to delete a record.

To access a resource, submit an HTTP request containing a header, method, and resource name.

For an example with associated syntax, navigate [here](#). For a list of the resources and their corresponding URIs, see [Reference](#).

5. Walk through the Sample Code

Salesforce provides users an opportunity to test their connections by creating a series of REST requests. cURL will be used to construct the requests, and JSON will be used as the format for all requests and responses.¹⁰

For more information or to complete these examples navigate to this [page](#).

6. Using Workbench

If cURL is not being used, the Workbench tool can be used to obtain data about your organization. Navigate using the following steps¹¹:

⁹ https://developer.salesforce.com/docs/atlas.en-us.api_rest.meta/api_rest/intro_usage_rest_resources.htm

¹⁰ https://developer.salesforce.com/docs/atlas.en-us.api_rest.meta/api_rest/quickstart_code.htm

¹¹ https://developer.salesforce.com/docs/atlas.en-us.api_rest.meta/api_rest/quickstart_using_workbench.htm

- a. Log in to your organization.
- b. Open a new browser tab and navigate to <https://developer.salesforce.com/page/Workbench>.
- c. Log in to Workbench and allow access to your organization. Workbench is a public site and won't retain your data.
- d. Click **Utilities | REST Explorer**.
- e. Ensure that **Get** is selected. The Execute text box is prepopulated with a portion of a resource path. Add the remaining information for your resource. Click **Execute**.
- f. Click **Expand All** or **Show Raw Response** to view your data.
- g. If you receive a "Service not found" message, verify your resource path.

Salesforce Documentation also includes a [table](#) which lists supported REST resources in the API and provides a brief description for each.

For more information about using the Provider Directory's APIs, review the Salesforce REST API Guide here:

Figure 6: [REST API Guide](#)

4.4 SIMPLE OBJECT ACCESS PROTOCOL (SOAP) API

4.4.1 Overview

Simple Object Access Protocol (SOAP) APIs can be used for transactional record update as well as data retrieval. Use SOAP API to create, retrieve, update or delete records, such as accounts, leads, and custom objects. With more than 20 different calls, SOAP API also allows you to maintain passwords, perform searches, and much more. Use SOAP API in any language that supports Web services.¹² SOAP queries will use object and field names from the Data Dictionary in Appendix C.

4.4.2 Authentication and Testing

Authentication and testing are conducted as part of the onboarding process in section 3.2. To be granted the batch data contributor permission, end-users must follow the 'Request Additional Permissions' process. This process is a pre-requisite to contributing batch data.

Client applications must log in using valid credentials for an organization. The server authenticates these credentials and, if valid, provides the client application with the following:

¹² https://developer.salesforce.com/docs/atlas.en-us.214.0.api.meta/api/sforce_api_quickstart_intro.htm

- A session Id that must be set into the session header so that all subsequent calls to the Web service are authenticated
- A URL address (server URL) for the client application's Web service requests

Salesforce supports only the Transport Layer Security (TLS) protocol and `frontdoor.jsp`. Ciphers must have a key length of at least 128bits. The SOAP API maximum number of rows is 200 to submit per API call.

Detailed information can be found in the attached SOAP API document (see Figure 7).

Figure 7: [SOAP API Developer Guide](#)

4.4.3 Implementation

Salesforce provides extensive documentation regarding their SOAP API. The following information has been compiled from Salesforce resources to provide an overview to Data Sources who wish to utilize this transport mechanism. All the information mentioned below plus more is available here: https://developer.salesforce.com/docs/atlas.en-us.214.0.api.meta/api/sforce_api_quickstart_steps.htm

1. Obtain a Salesforce Developer Edition Organization for testing the code
 - If not already a member of the Lightning Platform developer community, go to developer.salesforce.com/signup and follow the instructions for signing up for a Developer Edition organization. Even if you already have Enterprise Edition, Unlimited Edition, or Performance Edition, use Developer Edition for developing, staging, and testing your solutions against sample data to protect your organization's live data. This is especially true for applications that insert, update, or delete data (as opposed to simply reading data).¹³
 - If you already have a Developer Edition organization, verify that the API Enabled permission. This permission is enabled by default but may have been changed by an administrator. For more information, see the help in the Salesforce user interface.¹⁴
2. Generate or Obtain the Web Service WSDL
 - To access the Lightning Platform Web service, you need a Web Service Description Language (WSDL) file. The WSDL file defines the Web service that is available to you. Your development platform uses this WSDL to generate an API to access the Lightning Platform Web service it defines. You can either obtain the WSDL file from your organization's Salesforce administrator or you can generate it yourself if you have access to the WSDL download page in the Salesforce user interface. You can

¹³ https://developer.salesforce.com/docs/atlas.en-us.214.0.api.meta/api/sforce_api_quickstart_steps_obtain_dev_org.htm

¹⁴ https://developer.salesforce.com/docs/atlas.en-us.214.0.api.meta/api/sforce_api_quickstart_steps_obtain_dev_org.htm

navigate to the most recent WSDL for your organization from Setup by entering API in the Quick Find box, then selecting API. For more information about WSDL, see <http://www.w3.org/TR/wsdl>.¹⁵

- Generating the WSDL File for Your Organization: Any user with the Modify All Data permission can download the Web Services Description Language (WSDL) file to integrate and extend Salesforce using the API. (The System Administrator profile has this permission.) The WSDL file is dynamically generated based on which type of WSDL file (enterprise or partner) you download. The generated WSDL defines all the API calls, objects (including standard and custom objects), and fields that are available for API access for your organization.¹⁶

To generate the WSDL file for your organization:

- a. Log in to your Enterprise, Unlimited, Performance, or Developer Edition Salesforce account. You must log in as an administrator or as a user who has the “Modify All Data” permission. Logins are checked to ensure they are from a known IP address. For more information, see “Restrict Where and When Users Can Log In to Salesforce” in the Salesforce online help.
 - b. From Setup, enter API in the Quick Find box, then select API to display the WSDL download page.
 - c. Download the appropriate WSDL:
 - d. If you’re downloading an enterprise WSDL and you have managed packages installed in your org, click Generate Enterprise WSDL. Salesforce prompts you to select the version of each installed package to include in the generated WSDL.
 - e. Otherwise, right-click the link for the appropriate WSDL document to save it to a local directory. In the menu, Internet Explorer users can choose Save Target As, while Mozilla Firefox users can choose Save Link As.¹⁷
3. Import the WSDL File Into Your Development Platform

Once you have the WSDL file, you need to import it into your development platform so that your development environment can generate the necessary objects for use in building client Web service applications in that environment. [Click here](#) for sample instructions regarding Java(WSC) Environments and Microsoft Visual Studio.¹⁸

4. Walk Through the Sample Code

¹⁵ https://developer.salesforce.com/docs/atlas.en-us.214.0.api.meta/api/sforce_api_quickstart_steps_generate_wsdl.htm

¹⁶ https://developer.salesforce.com/docs/atlas.en-us.214.0.api.meta/api/sforce_api_quickstart_steps_generate_wsdl.htm

¹⁷ https://developer.salesforce.com/docs/atlas.en-us.214.0.api.meta/api/sforce_api_quickstart_steps_generate_wsdl.htm

¹⁸ https://developer.salesforce.com/docs/atlas.en-us.214.0.api.meta/api/sforce_api_quickstart_steps_import_wsdl.htm

Once you have imported your WSDL file, you can begin building client applications that use the API. Use the [following samples](#) to create a basic client application. Comments embedded in the sample explain each section of code.¹⁹

For more information about using the Provider Directory's APIs, review the Salesforce SOAP API Guide in Appendix A.

4.5 DIRECT SECURE MESSAGING (DSM)

4.5.1 Overview

Direct Secure Messaging (DSM) is a national encryption standard that utilizes a secure email type of communication to electronically transport healthcare data.²⁰ A Direct Secure Messaging address is like a typical email address and can be issued to an individual, organization, or system, but all addresses must have a primary owner. Files sent through DSM will be loaded into PD using Informatica Extract, Transfer, & Load (ETL). During their initial onboarding meeting, data sources will confirm whether they choose to submit batch files through this method.

4.5.2 Authentication and Testing

Authentication and testing are conducted as part of the onboarding process in section 3.2. To be granted the batch data contributor permission, end-users must follow the 'Request Additional Permissions' process. This process is a pre-requisite to contributing batch data.

If a data source chooses to submit batch files through Direct Secure Messaging, the PD onboarding team provides them a form to fill out with necessary information. Using the information populated onto the form by the data source, the PD onboarding team initiates the Direct Secure Messaging internal processes. Due to its secure nature, completed DSM forms must be notarized to proceed. A sample DSM request form is included as Figure 8.

Figure 8: [Sample DSM Request Form](#)

¹⁹ https://developer.salesforce.com/docs/atlas.en-us.214.0.api.meta/api/sforce_api_quickstart_steps_walk_through_code.htm

²⁰ DataMotionHealth: Direct Secure Messaging, Copyright 2017, <https://www.datamotion.com/products/direct/what-is-direct-secure-messaging/>

4.5.3 Implementation

Once the Direct Secure Messaging account has been created, the PD onboarding team will provide the data source with all necessary connection information to access and utilize the DSM account for sending provider and organization information to be loaded into the PD.

This System Direct Secure Messaging Account is used for system-to-system communications (e.g. sending from an electronic health record to a health information network). A System address uses the following format: yourpracticename@direct.mihin.org.

4.6 FAST HEALTHCARE INTEROPERABILITY RESOURCE (FHIR)

4.6.1 Overview

The PD solution may utilize FHIR for data retrieval in the post go-live enhancement period, if prioritized by OHA.

Fast Healthcare Interoperability Resource (FHIR) is a standard framework created by HL7 using modular components called “resources” suitable for health information exchange²¹. In the PD solution, FHIR can be used for data retrieval at a future time. See Table 1 for FHIR Mapping.

Table 1: FHIR Mapping

FHIR Resource	Mapped PD Object
Practitioner	Provider
Organization	Organization
PractitionerRole	Affiliation Provider Organization
Coverage	Insurance Product Line
Coverage.contract	In-Network Provider

4.6.2 Authentication and Testing

Authentication and testing are conducted as part of the onboarding process in section 3.2. To be granted the batch data contributor permission, end-users must follow the ‘Request Additional Permissions’ process. This process is a pre-requisite to contributing batch data.

OAuth (Open Authorization) is an open protocol that provides secure API authorization from applications in a simple and standardized way. OAuth can authorize access to resources without

²¹ FHIR: Introducing HL7 FHIR, Last updated April 2017, <https://www.hl7.org/fhir/summary.html>

revealing user credentials to apps. Apps that use OAuth can also directly authenticate and access Salesforce resources without a user present.

Data source username and password credentials are required to request an access token, which are used as a session ID. Submit an out-of-band POST request to the token endpoint, with the following parameters:

- grant_type — Value must be password for FHIR resources
- client_id — Consumer key value.
- client_secret — Consumer secret from the connected app definition.
- Username — End-user username.
- Password — End-user password

Note: password = Salesforce Password + Salesforce Security Token

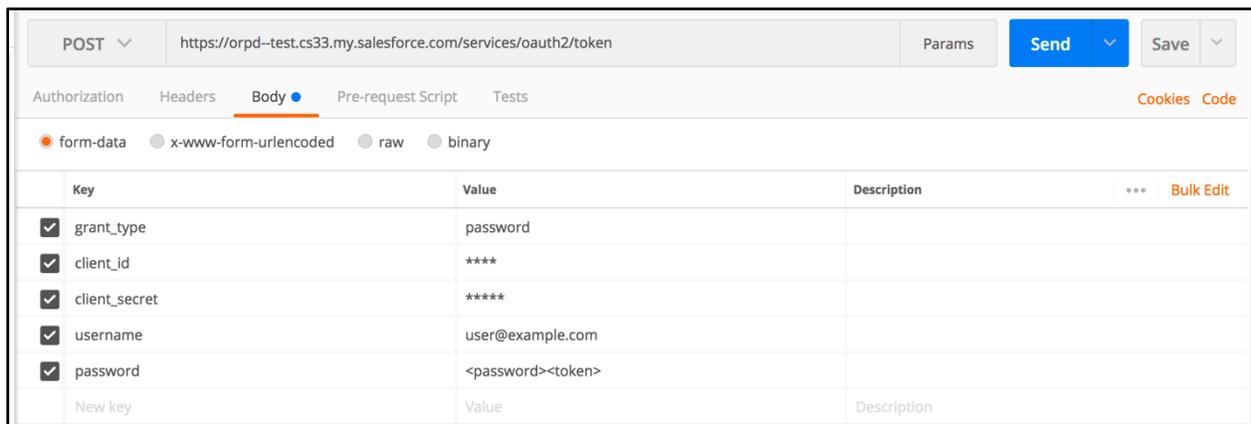
4.6.3 Implementation

Data sources submitting files via FHIR API can view the following implementation example for reference. Again, the PD onboarding team will be available for questions and will help the data source implement as part of the initial onboarding process outlined in section 3.2.

1. Request and Access Token

Pass specified values in the BODY as a POST to the token endpoint.

Figure 9: FHIR API: Body as a Post



Key	Value	Description
<input checked="" type="checkbox"/> grant_type	password	
<input checked="" type="checkbox"/> client_id	****	
<input checked="" type="checkbox"/> client_secret	*****	
<input checked="" type="checkbox"/> username	user@example.com	
<input checked="" type="checkbox"/> password	<password><token>	
New key	Value	Description

2. Retrieve the Access Token

In the Body of the response, an access_token is received that can be used to query FHIR resources based on your user permissions.

Figure 10: Received Access Token



3. User Access Token to Query Resource

In this example we used the access token to query an Organization Record. Use the access_token with the Authorization Key in the header to perform the query.

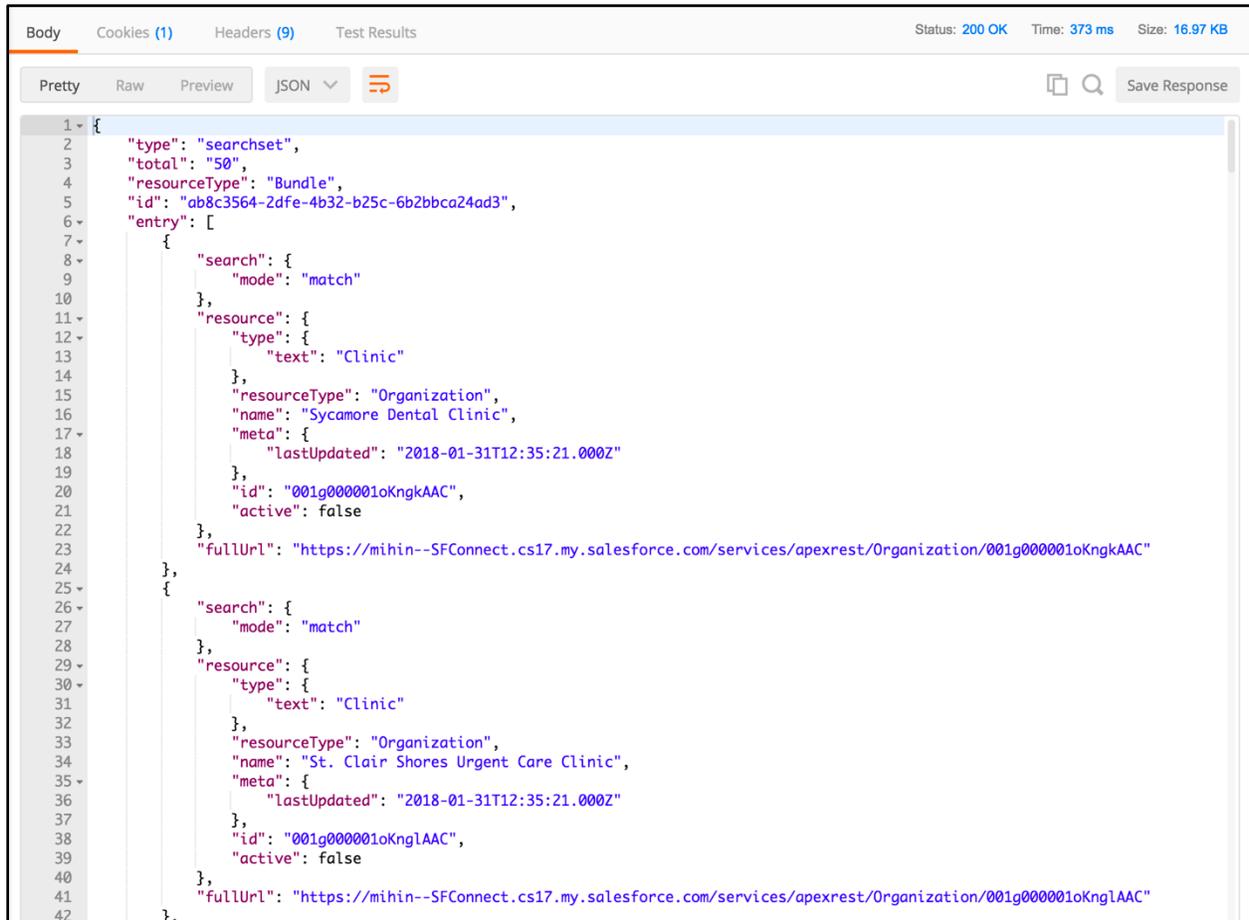
Figure 11: Query With Access Token



4. View Response

In this example we used the access token to query an Organization Record. Use the access_token with the Authorization Key in the header to perform the query and then view the response of the query.

Figure 12: Organization Record Query



```

1- {
2-   "type": "searchset",
3-   "total": "50",
4-   "resourceType": "Bundle",
5-   "id": "ab8c3564-2dfe-4b32-b25c-6b2bbca24ad3",
6-   "entry": [
7-     {
8-       "search": {
9-         "mode": "match"
10-      },
11-      "resource": {
12-        "type": {
13-          "text": "Clinic"
14-        },
15-        "resourceType": "Organization",
16-        "name": "Sycamore Dental Clinic",
17-        "meta": {
18-          "lastUpdated": "2018-01-31T12:35:21.000Z"
19-        },
20-        "id": "001g000001oKngkAAC",
21-        "active": false
22-      },
23-      "fullUrl": "https://mihin--SFConnect.cs17.my.salesforce.com/services/apexrest/Organization/001g000001oKngkAAC"
24-    },
25-     {
26-       "search": {
27-         "mode": "match"
28-      },
29-      "resource": {
30-        "type": {
31-          "text": "Clinic"
32-        },
33-        "resourceType": "Organization",
34-        "name": "St. Clair Shores Urgent Care Clinic",
35-        "meta": {
36-          "lastUpdated": "2018-01-31T12:35:21.000Z"
37-        },
38-        "id": "001g000001oKnglAAC",
39-        "active": false
40-      },
41-      "fullUrl": "https://mihin--SFConnect.cs17.my.salesforce.com/services/apexrest/Organization/001g000001oKnglAAC"
42-    }
43-   ]
44- }

```

5.0 TECHNICAL GUIDE

5.1 DATA SPECIFICATION

5.1.1 Data Loading File Specifications

Various data sources will utilize the Data Loading Specification document during their onboarding process. Organizations should review each tab and confirm which data elements they are going to send. While providing data for all fields is encouraged, minimum data requirements have been established and are detailed in the specifications. Populating the optional fields allows

for more robust and accurate records within the Provider Directory. The PD data specification can be found in Appendix B.

The data source file must be submitted as a comma separated value file (CSV). All data will be double quoted, and comma separated. This is to allow for fields that contain commas like addresses and organization names.

Example: “a”,”b”,”c”

If the value has a double quote, then another double quote is used to escape it. For example, when reporting the two fields: “Name”, “Age” with the values of: "a""b,c",”12”. The person's name is interpreted as a" b, c and their age as 12 because there is no comma in between a and b. The two quotation marks on their own are not field separators and therefore need the separating commas to correctly provide the data. Incorrectly formatted data will be likely to cause errors and delay the processing time.

When the file has successfully passed pre-production validation, it is communicated to the data source that the data will be loaded into the production environment of the Provider Directory. From that point on, the data source is expected to provide the same data format, through the same agreed upon transport method, as well as the same agreed upon frequency. The data sources may submit a help desk ticket for any change requested for transport method, format or frequency.

As mentioned before, any additional data is beneficial to the directory. Provider Directory data stewards coordinate with each data source to map supplementary data to the fields available within the Provider Directory.

If a batch data contributor is unable to conform to the PD data loading specifications, please contact OHA at Oregon.Provider-Directory@dhsosha.state.or.us to determine if eligible to submit data in an alternate format.

5.1.2 Resolving Data Submission Issues

To resolve data submission issues quickly, please contact the PD help desk (see Section 7: Support).

Batch data submission

It is recommended that provider and organizational data that is submitted by a batch data contributor be reviewed and updated as frequently as possible. Intervals of weekly, monthly, or quarterly are ideal. Data quality is reviewed and evaluated by data stewards based on the initial agreed upon format and frequency decided during the onboarding process.

Confirmation notifications to batch data contributors for data submission acceptance/failure are initially established during the data source onboarding process. Each file submission will receive a notification.

The File Uploader notifications are:

1. Passed validation/ Queued for loading
2. Failed validation
3. Data load

Individual data submission (attestation)

All end users in the PD user interface have permission to create source records and edit their own source records. Data submission through individual creation is validated immediately upon ‘save’ and will display any errors with the data entered.

Additionally, business rules are used to create the master record, trigger notifications, and identify data discrepancies. The master record is populated from source records that OHA has identified as the most trusted data sources for each field.

5.1.3 Reporting an Inaccuracy

Data discrepancy business rules are managed by the PD analysts. End-users can “flag” discrepancies within the Provider Directory. When a data discrepancy is identified, it is assigned to an active data steward for review and that field is marked as ‘under review.’ Data sources are notified by phone, mail or electronically when a discrepancy is reported in their data. The ‘under review’ flag may be seen by end-users. When a data discrepancy is verified the indicated change will be made to the master record and the ‘under review’ flag on that field is removed.

5.1.4 Resolving Data Access Issues

User registration and access to the PD is provided via OneHealthPort (OHP). If end-users are unable to access the PD due to an account setting, locked username, or locked password, please contact the OneHealthPort help desk.

Once in the PD solution, if end-users are not able to find or access data they are encouraged to review the training materials related to searching for data and creating reports. End-users may also contact the PD help desk.

5.2 REPORTING SPECIFICATION

Report access is available for all basic end-users. The PD user interface has a tab for viewing reports on the home page.

5.2.1 Standard Reports

The table below captures the list of standard reports in the Oregon Provider Directory as of the delivery of the latest version of this Implementation Guide. For the latest list of standard reports and their fields, reference the PD Standard Reports Criteria document, maintained as a stand-alone program artifact.

Note: Although TIN is listed as a field in some reports, only end users with the View Rights to the TIN field will be able to see it in the report. At this time, no end users will by default have View Rights to TIN. View TIN was also removed from the Request Permissions options per OHA.

Table 2: Standard List of Provider Directory Reports and Fields

Standard Report	Fields
1. Provider Demographics	First Name Middle Name Last Name NPI OR Medicaid ID Provider Gender Provider Type: Concept Name Degree(s): Concept Name Primary Specialty: Specialty Name License Number License State Phone Mobile Fax Email Direct Address Organization Name: Physical/Service Address 1 Organization Name: Physical/Service Address 2 Organization Name: Physical/Service City Organization Name: Physical/Service State Organization Name: Physical/Service Postal Code
2. Organization Demographics	Organization: Organization Name Organizational OID OR Medicaid ID Organization Type Organization Specialty Website Email Office Phone Physical/Service Address 1 Physical/Service Address 2 Physical/Service City Physical/Service State Physical/Service Postal Code
3. Practice Locations with Aff Providers	Affiliation: Affiliation: ID Provider: Provider Name NPI OR Medicaid ID (Provider) License Number Affiliation Type Organization: Organization Name Organization OID OR Medicaid ID (Org) Organization: Email Organization: Office Phone Organization: Physical/Service Address 1 Organization: Physical/Service Address 2 Organization: Physical/Service City Organization: Physical/Service State Organization: Physical/Service Postal Code Start Date End Date
4. Managing Organizations with Affiliated Providers	Affiliation: ID Provider: Provider Name Provider: NPI Provider: OR Medicaid ID Provider: License Number Affiliation Type Organization: Organization Name Organizational OID OR Medicaid ID (Org) Start Date End Date
5. Managing Organizations with Affiliated Practices	Organization Affiliation: ID Affiliated Organization Affiliated Organization OID Affiliated Organization OR Medicaid ID Affiliation Type Member Organization Member Organizational OID Member Organization OR Medicaid ID Start Date End Date
6. Provider Program Participation	Program Name: Program Name Program Name: Status Program Name: Program Manager : Organization Name Program Participation Name Provider: Provider Name Provider NPI Participation ID Program Year Tier/Stage Membership Status Start Date End Date

Standard Report	Fields
7. Organization Program Participation	Program Name: Program Name Program Name: Status Program Name: Program Manager: Organization Name Program Participation Name Organization Name Organization OID Participation ID Program Year Tier/Stage Membership Status Start Date End Date
8. Flat File Directory: Providers	First Name Middle Name Last Name Prefix Suffix Title NPI Degree(s): Concept Name License Number License State Primary Specialty: Specialty Code Secondary Specialty: Specialty Code Provider Gender Provider Race Provider Ethnicity Languages Spoken Endpoint: Address Organization: Organization Name Organization: Physical/Service Address 1 Organization: Physical/Service Address 2 Organization: Physical/Service City Organization: Physical/Service State Organization: Physical/Service Postal Code Organization: Office Phone Organization: Office Fax Organization: Billing Address 1 Organization: Billing Address 2 Organization: Billing City Organization: Billing State Organization: Billing Postal Code Organization: Billing Phone Number Organization: Billing Fax
9. Flat File Directory: Organizations	Organization Name Other Organization Names Organizational NPI – Type II Organizational OID Endpoint: Endpoint Name Endpoint: Address Physical/Service Address 1 Physical/Service Address 2 Physical/Service City Physical/Service State Physical/Service Postal Code Office Phone Office Fax Billing Address 1 Billing Address 2 Billing City Billing State Billing Postal Code Billing Phone Number Billing Fax License Number License State Organization Specialty: Specialty Code Languages Spoken Email
Remaining 8 Customized standard reports	Reports remaining to be customized by OHA over the operational period

5.2.2 Custom Reports

‘Create reports’ is an additional permission that end-users need to request through the help desk if their business needs require.

In the PD user interface under ‘View Reports’, there is an additional button to launch the reports builder tool which allows for custom report building. This allows users to create reports within the PD solution using any of the available data fields.

It is recommended to review the training materials on creating reports to learn how to build, save, and subscribe to custom reports.

5.3 SERVICE LEVEL AVAILABILITY SPECIFICATION

The Service Level Availability requirements which apply to PD implementation are listed below:

SLA ID 1: Access to the solution

The vendor will acknowledge receipt of 100% of user's/organization's access requests to the Provider Directory and provide acknowledgement back to the user and OHA within one (1) business day of the request.

The vendor shall electronically notify the user/organization and OHA of acceptance/denial of user/organizations access request to the Provider Directory within two (2) business days of receipt unless additional non-standard verification is required in which case the vendor will electronically notify the user of acceptance/denial within ten (10) business days of receipt.

SLA ID 33: System availability

The software or service applications that comprise the Provider Directory Solution (along with associated Web Portal) shall be available 99% of the time except for pre-authorized and approved Planned Outages, including regularly scheduled maintenance windows.

SLA: Access to be a data source

The vendor shall acknowledge receipt of new organization's requests to be a data contributor for the Provider Directory and provide acknowledgement back to the organization and OHA within one (1) business day of the request. Additionally, the vendor shall either onboard each requesting organization to the Provider Directory as a data contributor (including configuration of any vendor side data mapping and business rules engine) or electronically notify the data contributing organization and OHA of denial of each organizations request (with denial reason if applicable) to contribute data to the Provider Directory within sixty (60) calendars days of vendor receipt of all requirements prerequisites needed for onboarding (e.g. data specification) and OHA approval of data source.

6.0 CONFIGURATION GUIDE

6.1 ORGANIZATION ACCOUNT MANAGEMENT

End-users must login through the OneHealthPort website with their OneHealthPort credentials to be authenticated. Single Factor Authentication has been implemented on the PD solution for all users. After logging in, the user will navigate to the Provider Directory user interface.

The PD connects to OneHealthPort via SAML 2.0 connection. OneHealthPort will serve as the SAML identity provider which will send session attributes to the PD upon log in. Information about the user's organization will be used to associate them with an organization in the PD hierarchy and its corresponding data source.

6.2 SECURITY AND ACCESS

All technologies included in the PD solution are HITRUST-certified. This multi-layered security model consistently monitors and adjusts system performance, applies patches, security updates and service packs, and repairs/upgrades for the Provider Directory service. In addition, Salesforce has robust security guarding, monitoring, and detection which incorporates Open Web Application Security Project (OWASP) recommendations into its security layer as well.²²

The hosting environment is Service Organization Controls 2 (SOC 2) and Federal Risk and Authorization Management Program (FedRAMP) certified. It is a highly-secure environment that is compliant with industry security guidelines (ISO 27001, SSAE16/ISAE 3402 SOC-1, SOC-2, SOC-3, FedRAMP, PCI-DSS, TUEV Rheinland Certified Cloud Service, and HITRUST Certified Privacy Seal). Lists of certifications can be found at the provided link below:

<https://trust.salesforce.com/en/compliance/>.

All system resources are continuously monitored using automated monitoring tools, monitored system logs and access authorizations are established and maintained. The PD currently supports TLS 1.2 to protect data in transit. Salesforce allows role-based access control using stackable permission sets.

All software releases will be internally scanned for any security vulnerability prior to promoting to the production environment.

All transport methodologies listed in the transport mechanism section conform to secure encrypted protocol ensuring data integrity.

End-user access via browser utilizes the ‘https’ encryption with pre-determined session settings ensure a secure connection to the PD solution.

All data is covered by Salesforce security including firewalls. There are no application servers dedicated to OHA in the Salesforce cloud architecture. Salesforce uses a runtime engine that materializes all application data from metadata – data about the data itself. ETL tools use the same connection SSL 3.0/TLS 1.2.

For more information, Salesforce outlines in detail its Security, Privacy, and Architecture overview here:

<https://help.salesforce.com/servlet/servlet.FileDownload?file=0150M000003wzJAQAY>

6.3 CONFIGURATION MANAGEMENT

The PD Configuration Management process follows industry standards including interface management, role-based access, release changes, and version control. Using populations and

²² Salesforce Security Guide version 42.0 Last updated February 2018,

https://resources.docs.salesforce.com/212/latest/en-us/sfdc/pdf/salesforce_security_impl_guide.pdf

profile templates, user privileges can be administered at large scale. Only PD administrators are permitted to configure Salesforce.

Configuration management is an essential part of system maintenance. It is aided with version control tools to control configuration versions or patch management.

Quality is ensured through change management, reporting, and audit logging. PD operations reporting displays data to show services are performing as expected. If reports show unexpected data, then steps are taken to follow the standard operations process to ensure integrity of data.

6.4 RELEASE MANAGEMENT

Release management is coordinated through the production team. All configurations begin in the lowest development environment and are promoted up one environment at a time with testing at each site. A deployed package can be uninstalled, and the last deployment can be rolled back to return to previous state. A full back-up including meta-data will be taken prior to any deployments. Pre-production deployment testing will be performed to minimize the risk and impact of having to do a rollback.

The PD support team ensures that testers and implementers have independent roles and user interface changes are encapsulated in "change sets" which isolates the change being promoted.

Weekly maintenance windows are reserved for critical security patches and bug fixes.

7.0 SUPPORT

Help desk support is available Monday through Friday from 8am to 5pm PST. For assistance, users may call, email, or submit a ticket through the PD user interface to contact the help desk.

- **Phone:** Help desk support can be reached via phone at: 1 (877) 285-1954. All calls to the help desk are recorded for quality assurance and will be stored for two months. A help desk agent will create a ticket for the issue or request upon receiving the call.
- **Email:** For PD items, the help desk can be reached via email at help@oregon-pd.org with a description of the issue. A ticket containing the information included in the email autogenerates when an email is sent to this address and will be routed to the help desk.
- **User Interface:** The Oregon Help Desk can be reached by submitting a ticket through the OPD user interface by following these steps:
 1. Log into OneHealthPort, then access the Provider Directory and navigate to the "Contact Support" option located in the Support tab.
 2. Fill out the subject line and description text box.
 3. Click "Submit."
 4. The ticket will be routed to the help desk.

8.0 APPENDICES

8.1 APPENDIX A: SALESFORCE STANDARD REST API DOCUMENTATION

1. [Salesforce API Documentation and Developer Guide](#)
2. [SF Reports and Dashboards REST API](#)
3. [SF REST API Cheatsheet](#)

8.2 APPENDIX B: DATA SOURCE LOADING SPECIFICATIONS

The PD Data Loading Specification spreadsheets are managed as stand-alone program artifacts and not embedded in this document to improve document control. At the time of version 0.3 delivery of this Implementation Guide, there were 13 Data Loading Specifications.

8.3 APPENDIX C: DATA DICTIONARY

The PD Data Dictionary spreadsheet is managed as stand-alone program artifacts and not embedded in this document to improve document versioning control.

8.4 APPENDIX D: ONBOARDING FORM AND ONBOARDING MEETING PRESENTATION

The PD Data Source Onboarding form (word document) and Data Source Onboarding Kickoff presentation (PowerPoint) are managed as stand-alone program artifacts.