The Sequoia Project® Healthcare Directory Implementation Guide

Updated 2018-05-24

Version 1.12

CONTENTS

1. INTRODUCTION

The Sequoia Project® Healthcare Directory is designed to accommodate the needs of Sequoia Project initiatives including the eHealth Exchange and Carequality. For the eHealth Exchange, the directory is the successor to the original UDDI-based directory. For Carequality, the directory is the authoritative representation of the Carequality community of Implementers and their Connections. The primary use case for the directory is the acquisition of organization-level information, including electronic end points. The Sequoia Project is a heavily engaged member of the three main organizations creating the technical standards used by the directory, including the Argonaut Project, HL7, and IHE International. Many of the characteristics of the current FHIR Provider Directory Standard for Trial Use v3 reflect Sequoia Project contributions to, and requirements of, the standard.

2. CLAIMED RIGHTS AND ACKNOWLEDGEMENTS

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3. AUDIENCE

This document is intended for software engineers, architects, configuration managers, and project managers involved with the creation, deployment, and run-time operational support of client software using The Sequoia Project Healthcare Directory. It is assumed that the reader has at least minimal exposure to the HL7 FHIR Standard for Trial Use and directory concepts in general. Deployment teams are expected to be proficient in the curation of directory data, and have access to expertise, within their organizations, in secure deployment architectures (X.509, TLS, security best practices, etc.).

4. DESIGN CONCEPTS

The Sequoia Project Healthcare Directory is an implementation of the Argonaut FHIR Provider Directory work (http://argonautwiki.hl7.org/index.php?title=Implementation_Guide#Provider_Directory) and the current HL7 FHIR Standard for Trial Use v3 (STU3) version 1.8.0 http://hl7.org/fhir/directory.html which, as of the time of this writing, is incorporating the Argonaut work (potentially with some changes). The Sequoia Project's overall approach is to leverage the base Argonaut and HL7 FHIR work, with respect to provider directory use cases and resources, with only minimal added constraints.

5. ANTICIPATED ROADMAP

The version 1.0 Healthcare Directory is anticipated to remain stable from its initial deployment until the FHIR trial standard becomes stable and fully balloted by the HL7 community. At that point, we plan to update the Sequoia Project Healthcare Directory to version 2.0 to reflect the balloted version of the FHIR standard. Operationally, we anticipate providing sufficient overlap between version 1.0 and 2.0 of the Sequoia Healthcare Directory to allow for a graceful migration by vendors, Carequality Implementers, Carequality Connections, and eHealth Exchange Participants. Specifically Sequoia plans to operate the 1.0 provider directory for approximately 1 year after version 2.0 is put into production use. During that 1 year period of time, all users of the directory are expected to complete their migration to version 2.0. After 1 year of dual operation, the 1.0 directory will be decommissioned.

6. ENVIRONMENTS

Sequoia maintains three distinct Healthcare Directory environments:

1) Development (DEV)
2) Validation (VAL)
3) Production (PROD)

Each of these environments has distinct features and security considerations, as further outlined below, but each is secured using an API Key, and, with the exception of the DEV environment, 2-Way TLS with Mutual Authentication. For more information on TLS requirements, see Section 8 below. For more background on the API Key, including how to obtain one for each environment, see Section 9 below.

All three directories have implemented a "honey pot" for defensive security reasons. The honey pot results in long time out delays for any request that is not valid for the supported functionality and use cases. For example, most attackers without special knowledge send commands such as "GET /favicon.gif" or "POST /contact.html" to probe the server of interest. The Sequoia Project Healthcare Directory will only respond to requests such as these after a several minute delay which has the effect of slowing down attacking systems. This also can have the effect of reducing the efficiency of developmental and testing activities, and thus the honey pot can be disabled on a case-by-case basis. Note that the PROD honey pot cannot be disabled. To disable the honey pot, please send an email to techsupport@sequoiaproject.org to initiate the process of obtaining an API key for DEV or PROD.

The various directory environments are secured using TLS and using an API key. In DEV, TLS is not used to allow for convenient message capture. In DEV, the API key automatically disables the honey pot logic and enables diagnostic stack traces. In VAL and PROD, TLS successful connection establishment is mandatory requiring a VAL or PROD, respectively, Sequoia Project x.509 certificate using either the eHealth Exchange or the Carequality security domains.

6.1. The Development Directory (DEV)

The Development directory is designed to accommodate client software development activities and is configured specifically to accomplish this objective. Unlike the VAL or PROD environments, the DEV directory does not implement TLS security. The DEV API key is required in DEV and automatically disables the honey pot and enables the return of detailed diagnostic information to the client software including stack traces, and human readable messages that may assist the client software development team in tracking down problems more efficiently. To obtain the base URL for DEV, please request access by sending an email to techsupport@sequoiaproject.org.

6.2. The Validation Directory (VAL)

The Validation directory environment is designed to emulate PROD as closely as possible while still maintaining complete partitioning between VAL and PROD. TLS connections are required

using FIPS-compatible cipher suites. The VAL environment also differs from PROD in that VAL only has synthetic data. VAL requires the use of the VAL API key. To obtain the base URL for VAL, please request access by sending an email to techsupport@sequoiaproject.org.

6.3. The Production Directory (PROD)

The PROD environment is reserved for limited testing and for bona fide production operational use. Extensive testing, or excessive use resulting in performance degradation will be noted and brought to the attention to the offending party for collaboration and remediation. To obtain the base URL for PROD please request access by sending an email to techsupport@sequoiaproject.org.

The PROD environment is curated by Sequoia Project staff who rely heavily upon the users of the directory to provide high quality information. In the case of the Carequality Directory (see Section 15 below), Carequality Implementers are specifically responsible for submitting complete and accurate information about any Carequality Connections or organizational sub-entities that they wish to include in the Healthcare Directory.

7. THEORY OF OPERATION/PROCESSING MODEL

The directory supports an operational model by which the client software retrieves the contents of the directory in a single RESTful call. Clients may include an optional parameter indicating their preferred data format for the response (JSON vs XML), and additional parameters such as search critera. Additional capabilities may be added in the future if needed by organizations using the directory. A successful call results in a document returned containing a FHIR Resource or a FHIR Bundle, which contains Entries for each Organization resource in the directory. A Resource is returned for REST calls retrieving a specific resource such as Organization\1. A FHIR Bundle is returned for REST calls performing searches, such as ?_id=1. Returned Organization resources will contain general information about the entity being described, such as its general office address(es), telephone numbers, etc. Inside the Organization resource. The returned Organization resource will include any included Endpoint resources as Contained resources. The Endpoint resources specify the technical web services end points for an entity listed in the directory. The Organization and Endpoint resource structures have been extended by Sequoia to meet the needs of its communities, including more detailed information than is present in the base FHIR Endpoint resource type. The extension semantics and syntactic structure are discussed in detail below.

For efficiency, the client software may use cache control mechanisms to specify a retrieval of the entries, i.e. Organization resources and their children, that have been modified since a specific date/time. HTTP etags are also implemented by the Sequoia Project Provider Directory allowing for simple change detection logic. The returned document also contains embedded date/time stamps indicating the most recent update to that element.

Once the client software receives the HTTP response from the Sequoia directory, it is expected to robustly process success or failure conditions. An example response is presented below in Section 13.

8. SECURITY /ACCESS CONTROL MODEL

Client software must be configured to use 2-Way-TLS with mutual authentication. This approach provides assurance to both sides of any transaction that the other party is authentic.

Client x.509 private keys must be managed using best practices, such as, without limit:

- OWASP
- FBCA
- NIST FIPS
- The Sequoia Project technical support knowledge base

9. API KEY

As previously mentioned, access to each directory environment requires the presentation of a valid API Key. The API key is a value that is unique to each client and for each environment. The key serves to perform several functions:

    1) It allows the Sequoia Project Healthcare Directory server to immediately, and efficiently, discard invalid queries, such as those from an unauthorized client software package.

    2) It allows for audit logging of requests.

    3) It allows the server to provide more detailed diagnostics to client applications.

4) It allows The Sequoia Project to identify the organization associated with errant queries, excessive utilization, or other issues.

To obtain an API key please send an email to techsupport@sequoiaproject.org. Once your email has been received by the tech support system, you will automatically be assigned a ticket ID, and an automatic response will be sent to your organization to acknowledge receipt of your email. If you do not receive an automatic response, then the support system likely did not receive your email.

One key will be needed for each environment. A key intended for VAL cannot successful be used in PROD, for example.

To present the key upon an API call to the Sequoia directory, the following syntax must be used:

```
GET http://<base-url>/Organization/?apikey=1234
```

or

```
GET https://<base-url>/Organization/?apikey=1234
```

Where the value "1234" is replaced by your API key value

10.   SECURITY CONSIDERATIONS

The nature of RESTful calls, even those occurring inside an HTTPS (TLS) secure tunnel, exposes the entire URL to some intermediaries between client software and the Sequoia Project Healthcare Directory server. Specifically, various logging software, such as within low-level TLS libraries, or client stacks, may log the URL in its entirety, in plain text format. Full URLs should not be shared with others (such as would occur when an end-user copy/pastes the URL for diagnostic purposes with a peer) because they contain client API Keys. If you are testing the Sequoia Healthcare Directory using a web browser, then the browser may store the URL, including the API Key, in the browser history. If the client software library is written in JavaScript, then attacks such as the Proxy Auto Conf (PAC) vulnerability may also expose the URL and the API key. Other scripting languages used for retrieval or debugging may also contain this value hard-coded. In the event you reasonably suspect that your API key has been obtained by an unauthorized party, then please email Sequoia technical support to request a new key and to ask that the prior key be retired. Note that the actual risk from a compromised

API Key is mitigated by the requirement, outside of the DEV environment, to establish a TLS connection using a Sequoia Project-issued x.509 certificate.

As discussed elsewhere, since access to the VAL and PROD directory servers require a Sequoia-issued x.509 end entity certificate, your organization should protect your environment and the private key associated with that environment using all applicable IT best practices for the use of keys used to establish secure connections AND authenticate connectivity. Such practices are outside the scope of this document, but should include, without limitation, practices such as never backing up or moving a private key off of the environment for which it is intended to be used, never sharing the private key, restricting access to the private key to need-to-know only staff, and deploying it in a securely managed data center.

11. CRUD OPERATIONS

1) Create Operation
   Functionality: Append one or bundle of organizations to orgs hash array.

   -Request
         Request URL: post <base url>/Organization
         Params:
           apikey: ApiKey to check permission of create operation.
          _format: xml must be 'xml' for this release
         Body:
           One organization or bundle of organizations.

         Internal Function:
           createOrganization(orgs, new_org)
   -Response
         Success:
           status: 200
           body:

```xml
<OperationOutcome xmlns="http://hl7.org/fhir">
    <text>
        <status value="generated"/>
        <div xmlns="http://www.w3.org/1999/xhtml">
            <h1>Operation Outcome</h1>
            <table border="0">
                <tr>
                    <td style="font-weight: bold;">success</td>
                    <td>[]</td>
```

```xml
                    <td>
                        <pre>New organization was added
successfully.</pre>
                    </td>
                </tr>
            </table>
        </div>
    </text>
    <issue>
        <severity value="information"/>
        <code value="processing"/>
        <diagnostics value="New organization was added
successfully."/>
    </issue>
</OperationOutcome>
```

Error:

      status: 403

      body:

```xml
<OperationOutcome xmlns="http://hl7.org/fhir">
    <text>
        <status value="generated"/>
        <div xmlns="http://www.w3.org/1999/xhtml">
            <h1>Operation Outcome</h1>
            <table border="0">
                <tr>
                    <td style="font-weight: bold;">error</td>
                    <td>[]</td>
                    <td>
                        <pre>#Error issue here</pre>
                    </td>
                </tr>
            </table>
        </div>
    </text>
    <issue>
        <severity value="error"/>
        <code value="processing"/>
        <diagnostics value=#Error issue here />
    </issue>
</OperationOutcome>
```

2) Query and Retrieve Operations
Functionality: Retrieve zero or one Organization resource which matches the specified
Organizational id resource value, or returns a FHIR Bundle of Organization resources
matching the specified query parameters.
-Request
      Request Url: get <base url>/Organization

Params:

    apikey: ApiKey to check permission of retrieve operation

    _format: xml or json(only xml works at this moment)

    query: To filter organizations use the below query parameters:

    _id=string: Return organization of which id equals to _id

    _zip=string: Return organizations of which postal code equals to _zip

    _radius = int(miles): Return organizations which are within the specified distance in miles

    _radius. Radius based searches require that either 1) the _zip query parameter be specified will all 5 digits, or 2) that both the _city and _state query parameters specified

    _active=true or false: Return organizations of which active equals the specified value (of either true or false)

    _identifier=string: Return organizations of which the Organization identifier exactly equals the _identifier query string

    _sort=orgname: Return the FHIR Bundle sorted by the Organization name attribute

    _start=integer: search Organizations from the _start index

    _count=integer: Return _count of searched organizations. If _count=0, the n it returns number of searched organization with empty Organization list

    Note that using _start and _count allows for convenient paging of the results to only return a manageable amount of queries per response while still allowing acquisition of the full directory

    1) if _count is not a base 10 number then it is ignored.

    2) if _count > number of matching Organization, it returns all matching organizations.

    3) if _count <= number of matching Organization, it returns at most _count matching organizations.

    4) if _sort param is available, then it reduces the result after sorting.

    _name=string: Return organizations of which displayname or at least one aliases starts with the specified string. Please not that only alphanumeric characters are not allowed.

    _name:contains=string: Return organizations of which displayname or at least one aliases contains _name

    _name:exact=string: Return organizations of which displayname or at least one aliases is same as _name

For example:

_name=Texas (would match "texas organization" and "TEXAS")

_name:exact=Texas (would match "Texas" but not "Texas organization" and not "TEXAS")

_name:contains=Texas (would match "Texas" and "Texas organization" and "TEXAS" and "Company in Texas USA")

_lastUpdated=(compare)dateString

gt: Return organizations of which lastUpdated is greater than _lastUpdated

ge:Return organizations of which lastUpdated is not less than _lastUpdated

lt: Return organizations of which lastUpdated is less than _lastUpdated

le:Return organizations of which lastUpdated is not greater than _lastUpda ted.

eq:Return organization of which lastUpdated is equal to _lastUpdated.

ne:Return organization of which lastUpdated is not equal to _lastUpdated.

For example:

_lastUpdated=gt2017-12-31(would match "2017-12-31T00:00:01" and "2018-02-03T21:32:09" but not match "2017-12-30T23:59:59")

_lastUpdated=eq2017-12-30(would match "2017-12-30T00:00:01" but not match "2017-12-31T00:00:01" or "2017-12-29T23:59:59")

Internal Function:

searchOrganizations(orgs, query_hash)

-Response

FHIR Bundle of zero or more Organizations potentially limited as per the above query parameters.

3) Update Operation

Functionality: Potentially update one organization of a certain Organization internal id value.

-Request

Request URL: put <base url>/Organization

Params:

apikey: ApiKey to check permission of update operation

_format: xml

_id: ID of organization to update

Body:

One Organization

Internal Function to update:

updateOrganization(orgs, new_org, org_id)

-Response

Success:

status: 200

body:

```xml
<OperationOutcome xmlns="http://hl7.org/fhir">
  <text>
      <status value="generated"/>
      <div xmlns="http://www.w3.org/1999/xhtml">
          <h1>Operation Outcome</h1>
          <table border="0">
              <tr>
                  <td style="font-weight: bold;">success</td>
                  <td>[]</td>
                  <td>
                      <pre>Organization with id:#{params[:_id]}
      has been updated successfully.</pre>
                  </td>
              </tr>
          </table>
      </div>
  </text>
  <issue>
      <severity value="information"/>
      <code value="processing"/>
      <diagnostics value="Organization with id:#{params[:_id]} has
      been updated successfully."/>
  </issue>
</OperationOutcome>
```

Error:

status: 403

body:

```xml
<OperationOutcome xmlns="http://hl7.org/fhir">
    <text>
        <status value="generated"/>
        <div xmlns="http://www.w3.org/1999/xhtml">
            <h1>Operation Outcome</h1>
            <table border="0">
                <tr>
                    <td style="font-weight: bold;">error</td>
                    <td>[]</td>
                    <td>
                        <pre>#Error issue here</pre>
                    </td>
                </tr>
            </table>
        </div>
```

```xml
        </text>
        <issue>
            <severity value="error"/>
            <code value="processing"/>
            <diagnostics value=#Error issue here />
        </issue>
    </OperationOutcome>
```

4) Delete Operation

Functionality: Potentially remove one organization with certain Organization id from the internal database of all Organizations.

-Request

Request URL: delete <base url>/Organization

Params:

apikey: ApiKey to check permission of delete operation

_format: xml

_id: ID of Organization to delete

Internal Function to delete:

removeOrganization(orgs, org_id)

-Response

Success:

status: 200

body:

```xml
<OperationOutcome xmlns="http://hl7.org/fhir">
    <text>
        <status value="generated"/>
        <div xmlns="http://www.w3.org/1999/xhtml">
            <h1>Operation Outcome</h1>
            <table border="0">
                <tr>
                    <td style="font-weight: bold;">success</td>
                    <td>[]</td>
                    <td>
                        <pre>Organization with id:#{params[:_id]}
is deleted success fully.</pre>
                    </td>
                </tr>
            </table>
        </div>
    </text>
    <issue>
        <severity value="information"/>
        <code value="processing"/>
        <diagnostics value="Organization with id:#{params[:_id]}
is deleted successfully."/>
    </issue>
</OperationOutcome>
```

Error:

       status: 403

       body:

```xml
<OperationOutcome xmlns="http://hl7.org/fhir">
    <text>
        <status value="generated"/>
        <div xmlns="http://www.w3.org/1999/xhtml">
            <h1>Operation Outcome</h1>
            <table border="0">
                <tr>
                    <td style="font-weight: bold;">error</td>
                    <td>[]</td>
                    <td>
                        <pre>#Error issue here</pre>
                    </td>
                </tr>
            </table>
        </div>
    </text>
    <issue>
        <severity value="error"/>
        <code value="processing"/>
        <diagnostics value=#Error issue here />
    </issue>
</OperationOutcome>
```

5) Validate Operation

       Used to confirm that a given posted document can be successfully parsed.

  - Request

       Request URL: post <base url>/Organization/validate

       Params:

              apikey: ApiKey for filtering users.

              _format: xml

       Body:

              One or bundle of Organizations.

       Internal Function:

              checkValidationOrganization(request, requestText)

  -Response

       Success:

              status 200

              body:

```xml
<OperationOutcome xmlns="http://hl7.org/fhir">
    <text>
```

```xml
        <status value="generated"/>
        <div xmlns="http://www.w3.org/1999/xhtml">
            <h1>Operation Outcome</h1>
            <table border="0">
                <tr>
                    <td style="font-weight: bold;">information</td>
                    <td>[]</td>
                    <td>
                        <pre>No issues detected during validation</pre>
                    </td>
                </tr>
                <tr>
                    <td style="font-weight: bold;">information</td>
                    <td>[]</td>
                    <td>
                        <pre>No issues detected during validation</pre>
                    </td>
                </tr>
            </table>
        </div>
    </text>
    <issue>
        <severity value="information"/>
        <code value="informational"/>
        <diagnostics value="No issues detected during validation"/>
    </issue>
    <issue>
        <severity value="information"/>
        <code value="informational"/>
        <diagnostics value="No issues detected during validation"/>
    </issue>
</OperationOutcome>
```

Error:

status 403

body:

```xml
<OperationOutcome xmlns="http://hl7.org/fhir">
    <text>
        <status value="generated"/>
        <div xmlns="http://www.w3.org/1999/xhtml">
            <h1>Operation Outcome</h1>
            <table border="0">
                <tr>
                    <td style="font-weight: bold;">error</td>
                    <td>[]</td>
                    <td>
                        <pre>#Error issue here</pre>
                    </td>
                </tr>
            </table>
        </div>
```

```
        </text>
        <issue>
            <severity value="error"/>
            <code value="processing"/>
            <diagnostics value=#Error issue here />
        </issue>
</OperationOutcome>
```

6) UDDI Functions

The Sequoia Provider Directory supports a legacy interface into the directory for the benefit of client applications that need to query the directory using the SOAP UDDI 3 standard. Use of the UDDI interface to the Sequoia Provider Directory is not recommended for new development work and those using the SOAP UDDI interface to the directory are strongly encouraged to move to the FHIR based API instead since the FHIR API is significantly more powerful and is based on contemporary standards.

The Sequoia Provider Directory supports two UDDI functions: find_business and get_businessDetail

URL: post '/uddi/inquiry'

The directory recognizes which of these two functions to preform based on the request body contents, as shown below.

- **get_businessDetail**

    Request Body:

```
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:urn="urn:uddi-org:api_v3">
   <soapenv:Header/>
   <soapenv:Body>
      <urn:get_businessDetail>
 <urn:businessKey>uddi:Company:urn:oid:1.2.3.4</urn:businessKey>
      </urn:get_businessDetail>
   </soapenv:Body>
</soapenv:Envelope>
```

 Response:

        (1) Success

```
                        <?xml version="1.0"?>
<!--The Company Directory. Copyright(c) 2015-2017 The Sequoia Project. All rights
                        reserved. Business confidential.-->
<Envelope xmlns="http://schemas.xmlsoap.org/soap/envelope/">
```

```xml
<Body>
    <businessDetail xmlns="urn:uddi-org:api_v3">
        <businessEntity businessKey="uddi: Org-DisplayName:urn:oid:1.2.3.4">
            <name xml:lang="en">uddi: Org-DisplayName:urn:oid:1.2.3.4</name>
            <description xml:lang="en">345</description>
            <contacts>
                <contact>
                    <personName xml:lang="en">Eric Heflin</personName>
                    <phone>555-555-1212</phone>
                    <email>eheflin.csrk@123.com</email>
                    <address xml:lang="en" useType="" sortCode="">
                        <addressLine>The Sequoia Project</addressLine>
                        <addressLine>100 Main St, Austin, TX,US
                        78737</addressLine>
                    </address>
                </contact>
                <contact>
                    <personName xml:lang="en">Eric Heflin</personName>
                    <phone>555-555-1212</phone>
                    <email>eheflin.csrk@123.com</email>
                    <address xml:lang="en" useType="" sortCode="">
                        <addressLine>The Sequoia Project</addressLine>
                        <addressLine>100 Main St, Austin, TX,US
                        78737</addressLine>
                    </address>
                </contact>
            </contacts>
            <businessServices>
                <businessService serviceKey="uddi:Company:PatientDiscovery"
                        businessKey="uddi:Company:urn:oid:1.2.3.4">
                    <name xml:lang="en">Patient Discovery</name>
                    <description xml:lang="en">This is an implementation of
                        the eHealth Exchange Patient Discovery
                        Specification</description>
                    <bindingTemplates>
                        <bindingTemplate
                        bindingKey="uddi:a64a80906c040135bd800a5612c1bb1e"
                        serviceKey="uddi:Company:PatientDiscovery">
                            <accessPoint
                        useType="endPoint">https://xyz.com/service/patidisc.s
                        vc</accessPoint>
                        </bindingTemplate>
                        <categoryBag>
                            <keyedReference
                        tModelKey="uddi:nhin:versionofservice" keyName=""
                        keyValue="3.0"/>
                        </categoryBag>
                    </bindingTemplates>
                    <categoryBag>
                        <keyedReference tModelKey="uddi:nhin:standard-
                        servicenames" keyName="Patient Discovery"
                        keyValue="Patient Discovery"/>
                    </categoryBag>
                </businessService>
                <businessService serviceKey="uddi:Company:QueryForDocuments"
                        businessKey="uddi:Company:urn:oid:1.2.3.4">
                    <name xml:lang="en">Query for documents</name>
```

```xml
        <description xml:lang="en">This is an implementation of
            the eHealth Exchange Query for documents
            Specification</description>
        <bindingTemplates>
            <bindingTemplate
            bindingKey="uddi:a64b1d406c040135bd800a5612c1bb1e"
            serviceKey="uddi:Company:QueryForDocuments">
                <accessPoint
            useType="endPoint">https://xyz.com/service/query.svc<
            /accessPoint>
            </bindingTemplate>
            <categoryBag>
                <keyedReference
            tModelKey="uddi:nhin:versionofservice" keyName=""
            keyValue="3.0"/>
            </categoryBag>
        </bindingTemplates>
        <categoryBag>
            <keyedReference tModelKey="uddi:nhin:standard-
            servicenames" keyName="QueryForDocuments"
            keyValue="Carequality QueryForDocuments"/>
        </categoryBag>
    </businessService>
    <businessService serviceKey="uddi:Company:RetrieveDocuments"
            businessKey="uddi:Company:urn:oid:1.2.3.4">
        <name xml:lang="en">Retrieve documents</name>
        <description xml:lang="en">This is an implementation of
            the eHealth Exchange Retrieve documents
            Specification</description>
        <bindingTemplates>
            <bindingTemplate
            bindingKey="uddi:a64b1d416c040135bd800a5612c1bb1e"
            serviceKey="uddi:Company:Carequality Retrieve
            documents">
                <accessPoint
            useType="endPoint">https://xyz.com/service/retrieve-
            mtom.svc</accessPoint>
            </bindingTemplate>
            <categoryBag>
                <keyedReference
            tModelKey="uddi:nhin:versionofservice" keyName=""
            keyValue="3.0"/>
            </categoryBag>
        </bindingTemplates>
        <categoryBag>
            <keyedReference tModelKey="uddi:nhin:standard-
            servicenames" keyName="RetrieveDocuments"
            keyValue="Retrieve Documents"/>
        </categoryBag>
    </businessService>
</businessServices>
<identifierBag>
    <keyedReference tModelKey="uddi:nhin:nhie:homecommunityid"
            keyName="" keyValue="urn:oid:1.2.3.4.1"/>
</identifierBag>
<categoryBag>
```

```xml
                    <keyedReference
                            tModelKey="uddi:uddi.org:ubr:categorization:iso3166"
                            keyName="Texas" keyValue="US-TX"/>
                </categoryBag>
            </businessEntity>
        </businessDetail>
    </Body>
</Envelope>
```

(2) Fail

Status : 500

Message : "Parsing XML Request Error!" or ""Your Organization Source contains duplicate business!""

- get_findbusiness

Request Body:

```xml
<soapenv:Envelope
xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:urn="urn:uddi-org:api_v3">
    <soapenv:Header/>
    <soapenv:Body>
       <urn:find_business>
                <urn:name xml:lang="EN">Org-DisplayName</urn:name>
       </urn:find_business>
    </soapenv:Body>
</soapenv:Envelope>
```

Response:

(1) Success

```xml
<?xml version="1.0"?>
<!--The Sequoia Project Healthcare Directory. Copyright(c) 2015-2018 The
Sequoia Project.  All rights reserved.  Business confidential.-->
<Envelope xmlns="http://schemas.xmlsoap.org/soap/envelope/">
    <Body>
        <businessList xmlns="urn:uddi-org:api_v3">
            <listDescription>
                <includeCount>1</includeCount>
                <actualCount>1</actualCount>
                <listHead>1</listHead>
            </listDescription>
          <businessInfos>
                <businessInfo businessKey="uddi:OrgDisplayName:Org-
                Identifier">
                    <name xml:lang="en">Org-DisplayName</name>
                    <serviceInfos>
                        <serviceInfo
                        serviceKey="uddi:OrgDisplayName:Endpoint01-
                        DisplayName" businessKey="uddi:OrgDisplayName:Org-
                        Identifier">
                            <name xml:lang="en">Endpoint01-DisplayName
                            </name>
                        </serviceInfo>
```

```xml
            <serviceInfo
            serviceKey="uddi:OrgDisplayName:Endpoint02-
            DisplayName" businessKey="uddi:OrgDisplayName:Org-
            Identifier">
                    <name xml:lang="en">Endpoint02-DisplayName
                    </name>
            </serviceInfo>
            <serviceInfo
            serviceKey="uddi:OrgDisplayName:Endpoint03-
            DisplayName" businessKey="uddi:OrgDisplayName:Org-
            Identifier">
                    <name xml:lang="en">Endpoint03-DisplayName
                    </name>
            </serviceInfo>
        </serviceInfos>
    </businessInfo>
</businessInfos>
</businessList>
</Body>
</Envelope>
```

(2) Fail

> Status: 500
>
> Message : "Parsing XML Request Error!" or ""Your Organization Source contains duplicate business!""

- To do this, there are 5 internal functions

  parseSoapXMLRequest : Parse XML request and determine the UDDI function requested and the search params.

  checkBusinessKey : Check if businessKey is duplicated

  checkServiceKey: Check if serviceKey is duplicated

  genSoapFindBusiness: Return the XML response of find_business uddi function

  genSoapBusinessDetail: Return the XML response of get_businessDetail uddi function

7) There are three Ruby utility methods for reading, writing and deleting the existing Ruby orgs[] array of a hash structure from a YAML file. (Current YAML file name: CRUD_Operations.yml)

   - Read method

     Name: readFromYaml(orgs)

     Functionality:

     > Initialize orgs hash array from a YAML file.
     >
     > If the CRUD_Operations.yml file does not exist, then it doesn't initialize orgs hash array.
     >
     > If another process is reading or writing from/to YAML file, then it will wait until that process releases the lock and then lock and read from the YAML file.
     >
     > After reading from the YAML file, then it will release lock on that file.

   - Write method

Name: writeToYaml(orgs)

Functionality:

Append orgs hash array to YAML file.

If the CRUD_Operations.yml file does not exist, then it will create a new one and then write to the new file.

If another process is reading or writing from/to YAML file, then it will wait until that process releases the lock and then lock and write to YAML file.

After writing to YAML file, then it will release lock on it.

- Delete method

Name: deleteYaml()

Functionality:

Rename current yaml file to store as an archival copy. Essentially, the "delete" function just renames files.

If another process is reading or writing to/from YAML file, then it will wait until that process releases the lock and then it will lock YAML file and rename it.

After renaming YAML file, then it will release lock on the file.

8) Add longitude/latitude regarding address.

Name: addPosition(orgs)

Functionality:

Read all entries in the orgs[] hash array and by using Google geocoding API, add a new element in the specified Ruby Organization hash with longitude and latitude.

If Ruby organization has already longitude and latitude, then the existing values won't be changed.

For example:

Original:

```
<address>
    <use value="work"/>
    <type value="both"/>
    <line value="311 Main St. "/>
    <city value="Austin"/>
    <state value="TX"/>
    <postalCode value="78737"/>
    <country value="US"/>
  </address>
```

New:

```
<address>
    <use value="work"/>
    <type value="both"/>
    <line value="311 Main St. "/>
```

```
            <city value="Austin"/>
            <state value="TX"/>
            <postalCode value="78737"/>
            <country value="US"/>
            <position>
               <longitude value="30.1097453"/>
               <latitude value="97.3504819"/>
            </position>
         </address>
```

9) Add Access Control

Purpose:

To restrict operations that are not allowed.

For this:

Each apikey will have operation permissions of ("C":Create, "R":Retrieve, "U":Update, and/or "D":Delete) to specify permissions associated with that apikey. Each apikey can have any combination of CRUD permissions. These permissions and the associated apkikey are also linked to a managingOrg directory value to only enable Create, Update and Delete permissions for FHIR Organizations associated with the same organization. This prevents one client application modifying directory entries for another organization inappropriately.

At this time the Read operation is allowed for all valid apikeys.

For example:

If apikey is "xyz", and the associated permissions are "CRD" and managingOrg is "goodhealth", then it means that users who use the xyz apikey can create organizations (when they create organizations, "goodhealth" will be set as the value of managingOrg of them.) Client applications using the xyz API key can also retrieve organizations. And also they can delete organizations of which value of manaingOrg is "goodhealth". But that apikey cannot update organizations.

Internal Function:

checkPermission(apikey, org, operation)

10) Add Binding Keys

Purpose:

To add binding keys for the UDDI functions

For this:

25

addbindingKeys(org): generate bindingkeys of every endpoint of org which is passed in parameter

11) User interface for FHIR CRUD operations.

The Sequoia Provider Directory has a web application user interface to allow for interactive administration of the FHIR-based directory.

- Create

Sequoia Provider Directory Uploader

Interaction: [Create ⌄]

ApiKey: [   ]

Format: [XML ⌄]

Content: [   ]

Please browse to a properly formatted JSON directory file for one or more organizations:

[Submit]

The apiKey and Content fields cannot be empty. Only XML content can be uploaded at this time.

- Retrieve

26

Sequoia Provider Directory Uploader

Interaction: [Read ▼]

ApiKey: [_____]

Format: [XML ▼]

Content: [_____]

Search Param [_id ▼] [▼] [_____]

Please browse to a properly formatted JSON directory file for one or more organizations:

[Submit]

The apikey and Search value cannot be empty. On the search params dropdown list, you can select they query type.

The response is in XML.

- Update

27

Sequoia Provider Directory Uploader

Interaction: [Update ▼] id: [____]

ApiKey: [_____]

Format: [XML ▼]

Content:
[_____]

Please browse to a properly formatted JSON directory file for one or more organizations:

[Submit]

The id, apikey and Content cannot be empty. Only XML is supported.

- Delete

Sequoia Provider Directory Uploader

Interaction: [Delete ▼] id: [____]

ApiKey: [_____]

Format: [XML ▼]

Content:
[_____]

Please browse to a properly formatted JSON directory file for one or more organizations:

[Submit]

The id and apikey fields cannot be empty. Only XML is supported for this function.

- Validate

The apikey field cannot be empty. Only XML content is supported.

12) Create user interface for UDDI operations.
- Create

Sequoia Provider Directory UDDI Management Utility

Interaction: [Create ▼]

ApiKey: [_____]

Format:

Content: [   ]

Please browse to a properly formatted XML uddi file for one or more organizations:

[Submit]

The apikey and Content fields cannot be empty. Only XML content is supported.

- Read

30

Sequoia Provider Directory UDDI Management Utility

Interaction: Read ▼

ApiKey: [   ]

Format:

Content:

Please browse to a properly formatted XML uddi file for one or more organizations:

[Submit]

The apikey and Content fields cannot be empty. The UDDI find_business and get_businessDetail functions are supported.

- Update

Sequoia Provider Directory UDDI Management Utility

Interaction: [Update ▼] id: [_____]

ApiKey: [_____]

Format:

Content: [   ]

Please browse to a properly formatted XML uddi file for one or more organizations:

[Submit]

The id, apikey and Content cannot be empty. Only XML format can be used.

- Delete

Sequoia Provider Directory UDDI Management Utility

Interaction: [Delete ▾] id: [＿＿＿]

ApiKey: [＿＿＿＿＿＿＿＿＿＿＿＿＿]

Format:

Content: [＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿]

Please browse to a properly formatted XML uddi file for one or more organizations:

[Submit]
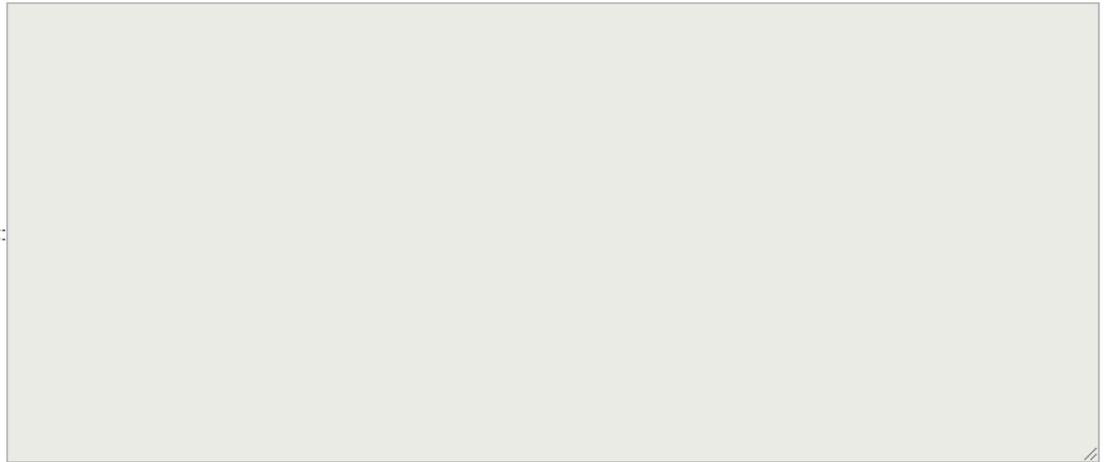
The id and apikey fields cannot be empty.

- Validate

Sequoia Provider Directory UDDI Management Utility

Interaction: [Validate ▾]

ApiKey: [   ]

Format:

Content:

Please browse to a properly formatted XML uddi file for one or more organizations:

[Submit]

The apikey and Content fields cannot be empty. XML must be used.

- Upload

Sequoia Provider Directory UDDI Management Utility

Interaction: [Upload ▼]

ApiKey: [   ]

Format:

Content: [   ]
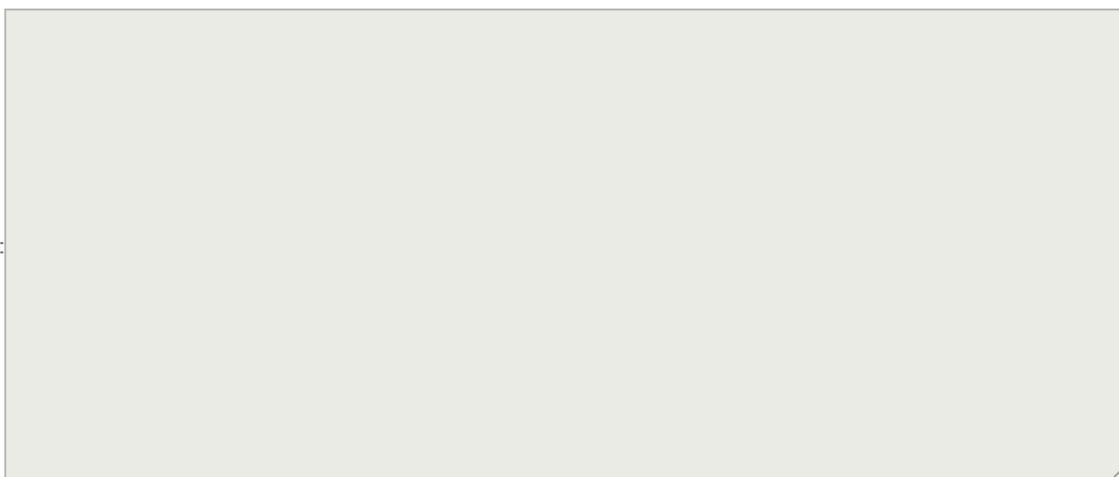
File: [Choose File] No file chosen

DestFilename: [   ]

SrcFilename: [   ]

Please browse to a properly formatted XML uddi file for one or more organizations:

[Submit]

The upload file should choose be a single .zip file. The DestFilename and SrcFilename fields cannot be empty.

13) Add special SSL certificate function

Ruby Sinatra normally only accepts privateKey and Certificate as file objects. To increase security, Sinatra has been modified to use a privateKey and certificate in local variables.

To do that original Sinatra was modified as per the following:

#sinatra_ssl.rb
require 'sinatra'

```ruby
module Sinatra
 class Application
  def self.run!
   super do |server|
    certificate_content = ssl_certificate
    key_content = ssl_key
    server_options = {
     :Host => bind,
     :Port => port,
     :SSLEnable => true,
     :SSLCertificate => OpenSSL::X509::Certificate.new(certificate_content),
     # 123456 is the Private Key Password
     :SSLPrivateKey => OpenSSL::PKey::RSA.new(key_content,"123456"),
     :SSLClientCA=>[OpenSSL::X509::Certificate.new(File.read("server.crt"))] #Add
client certs
      :SSLVerifyClient => OpenSSL::SSL::VERIFY_PEER #setting tls mode
    }
   end
  end
 end
end
```

Change configuration of Sinatra as follows:

```ruby
    #FHIRserver.rb
    class << settings
      def server_settings
      {
      :backend => MyThinBackend,
      :verify_peer => true
      }
      end
     end
    set :ssl_certificate, @certificate
    set :ssl_key, @privateKey
```
@privateKey is the content of privateKey.key file.
@certificate is the content of certificate.crt file.

12.   XMLTOYAML UTILITY

Functionality:

Generate yaml from xml or xml from yaml.

Run command:

ruby xmlToyaml.rb -i inputXMLName -o outputXMLName -y YamlName [-r]

-i, -o, -y are required command line options.

-r : if it is absent, then it will generate yaml from xml. If it is presented, then it will generate xml from yaml

Global Variables:

xmlFileName : It is used when generate yaml from xml.

outputFileName: It is used when generate xml from yaml.

yamlName: It is the name of yamlName and it can be used the source or destination file.

Internal Functions:

getOrganizationName(businessKey) : get organization name from businessKey

getOrganizationIdentifier(businessKey): get organization identifier from businessKey

13.   OPERATIONAL MONITORING

- The Sequoia Project Provider Directory includes an service-specific operational monitoring utility.
-
- To run operational monitoring, you need to install 3 gems.
  Gem 'rufus-scheduler'
  Gem ''tzinfo-data'

Gem 'inifile'

- Global Variables

    1) EVN['TZ'] and $timezoneStr : This is for cron jobs to determine timezone and also to check if it is military time. So you need to change it as your timezone **(IMPORTANT)**
    2) $fileName: name of ini file
    3) $receiveEmail: NotifyEmail of Default section in ini file
    4) $notificationInterval: NotificationInterval of Default section in ini file
    5) MonitoringSetting: This is the structure to store the settings from ini file.
    6) $monitoringConf: Saves all monitoring settings in MonitoringSetting from ini file.
    7) $serverStatus: To record status of all servers. This is string array and every element is the string of 5 maximum length.
       For example : 01022 means that 1 fail, 2 success, 2 slow through 5 attempts.
    8) $lastEmailSent: To record the time at which the latest email was sent.
    9) $escalatingEmail: Email for receiving escalated mail.
    10) $notificationOpCheckingInterval: Checking interval if operational monitoring is live.
    11) $escalatingInterval: Interval to check if server is down for a certain period.
    12) $lastFailedTime: Array of Time to store the last failed time for each server.
    13) options: To configure mail servers.

- Internal Functions
    1) readServers(fileName): Load server list and server settings from the ini file received by param and return array of MonitoringSetting.
    2) scheduling(monitoringConf): Schedule cron jobs according the monitoringConf. Every server will have one cron job to check their status.
    3) checkServerStatus(conf, index) : check the status of the server of index, and update $serverStatus.
    4) updateAndSendEmail(conf, index): Setting to record only numberOfAttempts for each server.
    5) sendEmail() : Check the records of server status and after determine to send Email not in military time, and then send Email to admin user.
    6) sendLiveEmail() : Send the email which shows that operational monitoring is running.

- Flow

readServers -> scheduling -> checkServerStatus -> updateAndSendEmail -> SendEmail

- Deploying Op monitoring utility and webpage in windows.
  1) Download xampp and install it.
  2) Copy the monitoring.rar file into c:/xampp/htdocs and unzip it.
  3) Then you need to run operational monitoring.
     C:/xampp/htdocs/monitoring/Operationg monitoring/operating.rb
  4) Run xampp and start apache.
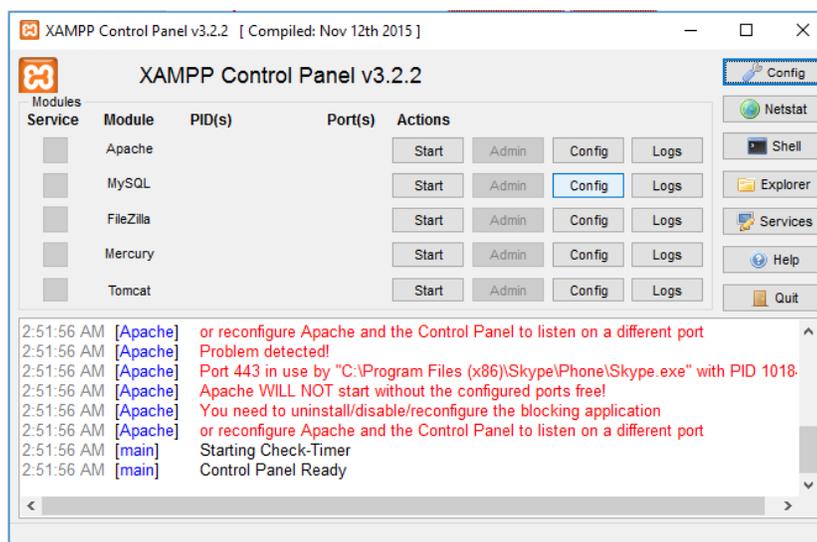
  5) http://localhost/monitoring/index.html: this will show the webpage.
- Deploying Op monitoring utility and webpage in CentOS.
  1) Installing apache
     - sudo yum update
     - sudo yum install httpd
     - sudo systemctl enable httpd.service
     - sudo systemctl restart httpd.service
  2) Deploying web page and op monitoring.
     - Unzip the rar file and copy the monitoring folder into /var/www/html
     - Ruby op monitoring(/var/www/html/monitoring/Operational Monitoring/operating.rb)
     - http://localhost/monitoring/index.html : This will show the web page

14.   TESTING

Organizations are encouraged to test their initial client software against the Sequoia DEV environment before attempting to establish connections in VAL or PROD.

Ruby cucumber can be used for testing.

You can change org directory file name if desired.

The 'when' clause is executed for every scenario. But org directory file name can only be changed when server is running in test mode.

There are 4 feature files for CRUD operation.

- create.feature
  For create operation, there are 3 test cases mainly (as scenarios).
  1) If apikey is not valid for create operation, then it should receive operation outcome as following with status code 403

```xml
<OperationOutcome xmlns="http://hl7.org/fhir">
      <text>
            <status value="generated"/>
            <div xmlns="http://www.w3.org/1999/xhtml">
                  <h1>Operation Outcome</h1>
                  <table border="0">
                        <tr>
                              <td style="font-weight: bold;">error</td>
                              <td>[]</td>
                              <td>
                                    <pre>Api Key is not valid for create
operation.</pre>
                              </td>
                        </tr>
                  </table>
            </div>
      </text>
      <issue>
            <severity value="error"/>
            <code value="processing"/>
            <diagnostics value="Api Key is not valid for create operation."/>
      </issue>
</OperationOutcome>
```

  2) If content is not valid for organization entity, then it should receive operation outcome as following with status code 403.
     (1) When content doesn't contain endPoint element

```xml
<OperationOutcome xmlns="http://hl7.org/fhir">
    <text>
        <status value="generated"/>
        <div xmlns="http://www.w3.org/1999/xhtml">
            <h1>Operation Outcome</h1>
            <table border="0">
                <tr>
                    <td style="font-weight: bold;">error</td>
                    <td>[]</td>
                    <td>
                        <pre>Failed to parse request body as XML resource
because your request body has to contain at least one EndPoint element.</pre>
                    </td>
                </tr>
            </table>
        </div>
    </text>
    <issue>
        <severity value="error"/>
        <code value="processing"/>
        <diagnostics value="Failed to parse request body as XML resource."/>
    </issue>
</OperationOutcome>
```

(2) When content doesn't contain contact element

```xml
<OperationOutcome xmlns="http://hl7.org/fhir">
    <text>
        <status value="generated"/>
        <div xmlns="http://www.w3.org/1999/xhtml">
            <h1>Operation Outcome</h1>
            <table border="0">
                <tr>
                    <td style="font-weight: bold;">error</td>
                    <td>[]</td>
                    <td>
                        <pre>Failed to parse request body as XML resource
because your request body has to contain at least one Contact element.</pre>
                    </td>
                </tr>
            </table>
        </div>
    </text>
    <issue>
        <severity value="error"/>
        <code value="processing"/>
        <diagnostics value="Failed to parse request body as XML resource."/>
    </issue>
</OperationOutcome>
```

(3) When content doesn't contain identifier element

```xml
<OperationOutcome xmlns="http://hl7.org/fhir">
    <text>
```

```xml
        <status value="generated"/>
        <div xmlns="http://www.w3.org/1999/xhtml">
            <h1>Operation Outcome</h1>
            <table border="0">
                <tr>
                    <td style="font-weight: bold;">error</td>
                    <td>[]</td>
                    <td>
                        <pre>Failed to parse request body as XML resource
because your request body has to contain at least one Identifier
element.</pre>
                    </td>
                </tr>
            </table>
        </div>
    </text>
    <issue>
        <severity value="error"/>
        <code value="processing"/>
        <diagnostics value="Failed to parse request body as XML resource."/>
    </issue>
</OperationOutcome>
```

3) If all things are good, then it should receive operation outcome as following with status code 200

```xml
<OperationOutcome xmlns="http://hl7.org/fhir">
    <text>
        <status value="generated"/>
        <div xmlns="http://www.w3.org/1999/xhtml">
            <h1>Operation Outcome</h1>
            <table border="0">
                <tr>
                    <td style="font-weight: bold;">success</td>
                    <td>[]</td>
                    <td>
                        <pre>New organization was added successfully.</pre>
                    </td>
                </tr>
            </table>
        </div>
    </text>
    <issue>
        <severity value="information"/>
        <code value="processing"/>
        <diagnostics value="New organization was added successfully."/>
    </issue>
</OperationOutcome>
```

- retrieve.feature
    For create operation, there are 2 test cases mainly (it is described as scenario).

1) Retrieve by id

   If id < number of Organization, then it should return one organization entity of which id is the same as id passed by parameter.

2) Retrieve by combination of queries

   Currently, there are 12 test cases for all queries (without combination).

   Then it should receive bundle of organizations

- update.feature

   For update operation, there are 4 test cases mainly (described as scenario).

   1) If apikey is not valid for create operation, then it should receive operation outcome as following with status code 403

```xml
<OperationOutcome xmlns="http://hl7.org/fhir">
      <text>
            <status value="generated"/>
            <div xmlns="http://www.w3.org/1999/xhtml">
                  <h1>Operation Outcome</h1>
                  <table border="0">
                        <tr>
                              <td style="font-weight: bold;">error</td>
                              <td>[]</td>
                              <td>
                                    <pre>Api Key is not valid for update
operation.</pre>
                              </td>
                        </tr>
                  </table>
            </div>
      </text>
      <issue>
            <severity value="error"/>
            <code value="processing"/>
            <diagnostics value="Api Key is not valid for create operation."/>
      </issue>
</OperationOutcome>
```

   2) If id is not valid, then it should receive operation outcome as following with status code 403

```xml
<OperationOutcome xmlns="http://hl7.org/fhir">
   <text>
      <status value="generated"/>
      <div xmlns="http://www.w3.org/1999/xhtml">
         <h1>Operation Outcome</h1>
         <table border="0">
            <tr>
               <td style="font-weight: bold;">error</td>
               <td>[]</td>
               <td>
                  <pre>id:9999 is not valid.</pre>
               </td>
```

```xml
            </tr>
        </table>
    </div>
</text>
<issue>
    <severity value="error"/>
    <code value="processing"/>
    <diagnostics value="id:9999 is not valid."/>
</issue>
</OperationOutcome>
```

3) If content is not valid for organization entity, then it should receive operation outcome as following with status code 403

    (1) When content doesn't contain endPoint element

```xml
<OperationOutcome xmlns="http://hl7.org/fhir">
    <text>
        <status value="generated"/>
        <div xmlns="http://www.w3.org/1999/xhtml">
            <h1>Operation Outcome</h1>
            <table border="0">
                <tr>
                    <td style="font-weight: bold;">error</td>
                    <td>[]</td>
                    <td>
                        <pre>Failed to parse request body as XML resource
because your request body has to contain at least one EndPoint element.</pre>
                    </td>
                </tr>
            </table>
        </div>
    </text>
    <issue>
        <severity value="error"/>
        <code value="processing"/>
        <diagnostics value="Failed to parse request body as XML resource."/>
    </issue>
</OperationOutcome>
```

    (2) When content doesn't contain contact element

```xml
<OperationOutcome xmlns="http://hl7.org/fhir">
    <text>
        <status value="generated"/>
        <div xmlns="http://www.w3.org/1999/xhtml">
            <h1>Operation Outcome</h1>
            <table border="0">
                <tr>
                    <td style="font-weight: bold;">error</td>
                    <td>[]</td>
                    <td>
                        <pre>Failed to parse request body as XML resource
because your request body has to contain at least one Contact element.</pre>
```

```xml
                </td>
            </tr>
        </table>
    </div>
</text>
<issue>
    <severity value="error"/>
    <code value="processing"/>
    <diagnostics value="Failed to parse request body as XML resource."/>
</issue>
</OperationOutcome>
```

(3) When content doesn't contain identifier element

```xml
<OperationOutcome xmlns="http://hl7.org/fhir">
    <text>
        <status value="generated"/>
        <div xmlns="http://www.w3.org/1999/xhtml">
            <h1>Operation Outcome</h1>
            <table border="0">
                <tr>
                    <td style="font-weight: bold;">error</td>
                    <td>[]</td>
                    <td>
                        <pre>Failed to parse request body as XML resource
because your request body has to contain at least one Identifier
element.</pre>
                    </td>
                </tr>
            </table>
        </div>
    </text>
    <issue>
        <severity value="error"/>
        <code value="processing"/>
        <diagnostics value="Failed to parse request body as XML resource."/>
    </issue>
</OperationOutcome>
```

4) If all things are good, then it should receive operation outcome as following with status code 200

```xml
<OperationOutcome xmlns="http://hl7.org/fhir">
    <text>
        <status value="generated"/>
        <div xmlns="http://www.w3.org/1999/xhtml">
            <h1>Operation Outcome</h1>
            <table border="0">
                <tr>
                    <td style="font-weight: bold;">success</td>
                    <td>[]</td>
                    <td>
```

```
                                <pre>Organization with id:1 has been updated
successfully.</pre>
                        </td>
                </tr>
            </table>
        </div>
    </text>
    <issue>
        <severity value="information"/>
        <code value="processing"/>
        <diagnostics value="Organization with id:1 has been updated
successfully."
    </issue>
</OperationOutcome>
```

- delete.feature

  For update operation, there are 4 test cases mainly (scenarios).

  1) If apikey is not valid for create operation, then it should receive operation outcome as following with status code 403

```
<OperationOutcome xmlns="http://hl7.org/fhir">
    <text>
        <status value="generated"/>
        <div xmlns="http://www.w3.org/1999/xhtml">
            <h1>Operation Outcome</h1>
            <table border="0">
                <tr>
                    <td style="font-weight: bold;">error</td>
                    <td>[]</td>
                    <td>
                        <pre>Api Key is not valid for delete
operation.</pre>
                    </td>
                </tr>
            </table>
        </div>
    </text>
    <issue>
        <severity value="error"/>
        <code value="processing"/>
        <diagnostics value="Api Key is not valid for create operation."/>
    </issue>
</OperationOutcome>
```

  2) If id is not valid, then it should receive operation outcome as following with status code 403

```
<OperationOutcome xmlns="http://hl7.org/fhir">
    <text>
```

```xml
        <status value="generated"/>
        <div xmlns="http://www.w3.org/1999/xhtml">
            <h1>Operation Outcome</h1>
            <table border="0">
                <tr>
                    <td style="font-weight: bold;">error</td>
                    <td>[]</td>
                    <td>
                        <pre>id:9999 is not valid.</pre>
                    </td>
                </tr>
            </table>
        </div>
    </text>
    <issue>
        <severity value="error"/>
        <code value="processing"/>
        <diagnostics value="id:9999 is not valid."/>
    </issue>
</OperationOutcome>
```

3) If all things are good, then it should receive operation outcome as following with status code 200

```xml
<OperationOutcome xmlns="http://hl7.org/fhir">
    <text>
        <status value="generated"/>
        <div xmlns="http://www.w3.org/1999/xhtml">
            <h1>Operation Outcome</h1>
            <table border="0">
                <tr>
                    <td style="font-weight: bold;">success</td>
                    <td>[]</td>
                    <td>
                        <pre>Organization with id:1 has been deleted
successfully.</pre>
                    </td>
                </tr>
            </table>
        </div>
    </text>
    <issue>
        <severity value="information"/>
        <code value="processing"/>
        <diagnostics value="Organization with id:1 has been deleted
successfully."
    </issue>
</OperationOutcome>
```

15. OPERATIONAL CONSIDERATIONS

In order to efficiently operate the directory, and to help ensure short response times, the PROD Sequoia Project Healthcare Directory must be queried no more often than once every hours for general operational use. More frequent queries are acceptable for short periods of time if needed for PROD testing, configuration, or similar activities. Prolonged intervals of queries at a more frequent interval than once per hour will result in temporary suspension of access until the problem is remediated.

The directory itself is hosted on a cluster of computers that can be relatively easily scaled horizontally to ensure sufficient response times. The cluster is operationally monitored using predictive analytics and is sized with conservatively excess capacity.

16. EXAMPLES

16.1. XML Example

Retrieve all organizations:

    GET http://<base-url>/fhir-stu3/1.0/Organization/

Sample response:

```
Request headers:
Accept: */*

Request parameters:
_format=json
Apikey=<your key>
_count=2

Response headers:
HTTP/1.1 200 OK
Content-Type: application/xml; charset=utf-8
X-Custom-Value: Copyright(c) 2016-17 The Sequoia Project. All rights reserved.
Business confidential.
X-Powered-By: The Sequoia Project Healthcare Directory Server
Server: Undisclosed
Cache-Control: public, must-revalidate, max-age=3600
```

```
Expires: 2017-02-19 12:27:06 -0600
ETag: "8f6f26c0-d8f6-0134-16be-05343c7258ab"
Content-Length: 32638
X-Content-Type-Options: nosniff
Connection: keep-alive


<?xml version="1.0"?>
<!--The Sequoia Project Healthcare Directory. Copyright(c) 2015-2018 The Sequoia
Project.  All rights reserved.  Business confidential.-->
<Bundle xmlns="http://hl7.org/fhir">
  <!--Start of header elements-->
  <id value="ea32c220-d8f5-0134-16b8-05343c7258ab"/>
  <meta>
    <lastUpdated value="2017-02-19T11:22:29-06:00"/>
  </meta>
  <type value="searchset"/>
  <total value="2"/>
  <link>
    <relation value="self"/>
    <url value="/Organization?_format=xml"/>
  </link>
  <search>
    <mode value="match"/>
  </search>
  <!--The entry object is repeated for each organization listed in the directory--
>
  <entry>
    <fullUrl value="/Organization/Organization-1"/>
    <resource>
      <Organization>
        <!--The ID value is subject to change-->
        <id value="Organization-1"/>
        <meta>
          <versionId value="1"/>
          <lastUpdated value="2017-02-19T11:22:29-06:00"/>
        </meta>
        <!--This is the XCA/XCPD HomeCommunityID OID in URN format-->
        <identifier>
          <use value="official"/>
          <system value="http://www.hl7.org/oid/"/>
          <value value="Org-Identifier"/>
        </identifier>
        <active value="Org-Status"/>
        <name value="Org-DisplayName"/>
        <alias value="Org-OtherNames"/>
        <!--The contact object is repeated for each person listed in the
directory-->
        <contact>
          <purpose value="Person01-ContactType"/>
          <name>
            <use value="official"/>
            <given value="Person01-Name"/>
          </name>
          <telcom>
             <ContactPoint>
               <system value="phone"/>
               <value value="Person01-Phone"/>
               <use value="work"/>
```

```xml
        </ContactPoint>
        <!--General address for this specific person-->
      </telcom>
        <address>
          <use value="work"/>
          <type value="both"/>
          <line value="Person01-StreetAddress"/>
          <line value=""/>
          <city value="Person01-City"/>
          <postalCode value="Person01-ZIPCodePostalCode"/>
          <country value="Person01-Country"/>
        </address>


    </contact>
    <contact>
      <purpose value="Person02-ContactType"/>
      <name>
        <use value="official"/>
        <given value="Person02-Name"/>
      </name>
      <telcom>
        <ContactPoint>
          <system value="phone"/>
          <value value="Person02-Phone"/>
          <use value="work"/>
        </ContactPoint>
        <!--General address for this specific person-->
      </telcom>
      <address>
        <use value="work"/>
        <type value="both"/>
        <line value="Person02-StreetAddress"/>
        <line value=""/>
        <city value="Person02-City"/>
        <postalCode value="Person02-ZIPCodePostalCode"/>
        <country value="Person02-Country"/>
      </address>


    </contact>
    <!--General organizational physical and mailing address-->
    <address>
      <use value="work"/>
      <type value="both"/>
      <line value="818 N Main Avenue"/>
      <line value="Suite 500"/>
      <city value="Austin"/>
      <state value="TX"/>
      <postalCode value="48111"/>
      <country value="US"/>
    </address>
    <!--If this is a Carequality Connection, then the partOf object points to
the Carequality Implementer-->
    <!--If this is a eHealth Exchange Sub-Participant, then the partOf object
points to the eHealth Exchange Participant-->
    <!--If this is a lower-level organization, then the partOf object points
to the immediate parent organization-->
```

```xml
        <!--If this is a top-level organization, then the partOf object is not
specified-->
        <partOf>
          <Reference>
            <!--Home Community ID of parent org, if any-->
            <identifier>
              <use value="official"/>
              <type value="HCID"/>
              <system value="http://www.hl7.org/oid/"/>
              <value value="1.2.3.4.1"/>
            </identifier>
          </Reference>
        </partOf>
        <!--The Endpoints are represented as contained resources and are repeated
as needed-->
        <contained>
          <Endpoint>
            <!--Home Community ID-->
            <identifier>
              <use value="official"/>
              <type value="HCID"/>
              <system value="http://www.hl7.org/oid/"/>
              <value value="Endpoint01-HomeCommunityID"/>
            </identifier>
            <!--Assigning Authority ID-->
            <identifier>
              <use value="official"/>
              <type type="AAID"/>
              <system value="http://www.hl7.org/oid/"/>
              <value value="Endpoint01-AssigningAuthorityID"/>
            </identifier>
            <connectionType>
              <system value="http://hl7.org/fhir/subscription-channel-type"/>
              <code value="IHE-XCA"/>
            </connectionType>
            <name value="Endpoint01-DisplayName"/>
            <managingOrganization/>
            <address value="Endpoint01-URL"/>
            <payloadMimeFormat value="text/xml"/>
            <payloadType>
              <coding>
                <system value="urn:oid:1.3.6.1.4.1.19376.1.2.3"/>
                <code value="Endpoint01-ContentTypesSupported"/>
              </coding>
            </payloadType>
            <extension
url="https://sequoiaproject.org/StructureDefinition/Endpoint/main/1.0.0">
              <extension url="Transaction">
                <valueString value="Endpoint01-SupportedTransactions"/>
              </extension>
              <!--Is this gateway an initiator or responder actor-->
              <extension url="Actor">
                <valueCodeableConcept>
                  <coding>
                    <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Actor/1.0.0"/>
                    <value value="Responding Gateway"/>
                  </coding>
```

```xml
          </valueCodeableConcept>
        </extension>
        <!--Version of the service as per the eHealth Exchange
specifications-->
        <extension url="Version">
          <valueCodeableConcept>
            <coding>
              <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Version/1.0.0"/>
              <value value="2.0"/>
            </coding>
          </valueCodeableConcept>
        </extension>
        <!--Initiative specific list of use cases supported-->
        <extension url="UseCases">
          <valueCodeableConcept>
            <coding>
              <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/UseCases/1.0.0"/>
              <value value="Endpoint01-UseCasesSupported"/>
            </coding>
          </valueCodeableConcept>
        </extension>
        <!--PurposesOfUse Value Set for SAML header and/or access control-->
        <extension url="PurposesOfUse">
          <valueCodeableConcept>
            <coding>
              <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/PurposesOfUse/1.0.0
"/>
              <value value="Endpoint01-PurposeOfUseAllowed"/>
            </coding>
          </valueCodeableConcept>
        </extension>
        <!--Roles Value Set for SAML header and/or access control-->
        <extension url="Roles">
          <valueCodeableConcept>
            <coding>
              <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Roles/1.0.0"/>
              <value value="Endpoint01-RolesAllowed"/>
            </coding>
          </valueCodeableConcept>
        </extension>
        <!--IPAs of gateway, may repeat-->
        <extension url="IPA">
          <valueCodeableConcept>
            <coding>
              <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/IPA/1.0.0"/>
              <value value="Endpoint01-IPAddress"/>
            </coding>
          </valueCodeableConcept>
        </extension>
      </extension>
    </Endpoint>
  </contained>
  <contained>
```

```xml
<Endpoint>
  <!--Home Community ID-->
  <identifier>
    <use value="official"/>
    <type value="HCID"/>
    <system value="http://www.hl7.org/oid/"/>
    <value value="Endpoint02-HomeCommunityID"/>
  </identifier>
  <!--Assigning Authority ID-->
  <identifier>
    <use value="official"/>
    <type type="AAID"/>
    <system value="http://www.hl7.org/oid/"/>
    <value value="Endpoint02-AssigningAuthorityID"/>
  </identifier>
  <connectionType>
    <system value="http://hl7.org/fhir/subscription-channel-type"/>
    <code value="IHE-XCA"/>
  </connectionType>
  <name value="Endpoint02-DisplayName"/>
  <managingOrganization/>
  <address value="Endpoint02-URL"/>
  <payloadMimeFormat value="text/xml"/>
  <payloadType>
    <coding>
      <system value="urn:oid:1.3.6.1.4.1.19376.1.2.3"/>
      <code value="Endpoint02-ContentTypesSupported"/>
    </coding>
  </payloadType>
  <extension
url="https://sequoiaproject.org/StructureDefinition/Endpoint/main/1.0.0">
    <extension url="Transaction">
      <valueString value="Endpoint02-SupportedTransactions"/>
    </extension>
    <!--Is this gateway an initiator or responder actor-->
    <extension url="Actor">
      <valueCodeableConcept>
        <coding>
          <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Actor/1.0.0"/>
          <value value="Responding Gateway"/>
        </coding>
      </valueCodeableConcept>
    </extension>
    <!--Version of the service as per the eHealth Exchange
specifications-->
    <extension url="Version">
      <valueCodeableConcept>
        <coding>
          <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Version/1.0.0"/>
          <value value="2.0"/>
        </coding>
      </valueCodeableConcept>
    </extension>
    <!--Initiative specific list of use cases supported-->
    <extension url="UseCases">
      <valueCodeableConcept>
```

```xml
                    <coding>
                        <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/UseCases/1.0.0"/>
                        <value value="Endpoint02-UseCasesSupported"/>
                    </coding>
                </valueCodeableConcept>
            </extension>
            <!--PurposesOfUse Value Set for SAML header and/or access control-->
            <extension url="PurposesOfUse">
                <valueCodeableConcept>
                    <coding>
                        <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/PurposesOfUse/1.0.0
"/>
                        <value value="Endpoint02-PurposeOfUseAllowed"/>
                    </coding>
                </valueCodeableConcept>
            </extension>
            <!--Roles Value Set for SAML header and/or access control-->
            <extension url="Roles">
                <valueCodeableConcept>
                    <coding>
                        <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Roles/1.0.0"/>
                        <value value="Endpoint02-RolesAllowed"/>
                    </coding>
                </valueCodeableConcept>
            </extension>
            <!--IPAs of gateway, may repeat-->
            <extension url="IPA">
                <valueCodeableConcept>
                    <coding>
                        <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/IPA/1.0.0"/>
                        <value value="Endpoint02-IPAddress"/>
                    </coding>
                </valueCodeableConcept>
            </extension>
        </extension>
    </Endpoint>
</contained>
<contained>
    <Endpoint>
        <!--Home Community ID-->
        <identifier>
            <use value="official"/>
            <type value="HCID"/>
            <system value="http://www.hl7.org/oid/"/>
            <value value="Endpoint03-HomeCommunityID"/>
        </identifier>
        <!--Assigning Authority ID-->
        <identifier>
            <use value="official"/>
            <type type="AAID"/>
            <system value="http://www.hl7.org/oid/"/>
            <value value="Endpoint03-AssigningAuthorityID"/>
        </identifier>
        <connectionType>
```

```xml
        <system value="http://hl7.org/fhir/subscription-channel-type"/>
        <code value="IHE-XCA"/>
      </connectionType>
      <name value="Endpoint03-DisplayName"/>
      <managingOrganization/>
      <address value="Endpoint03-URL"/>
      <payloadMimeFormat value="text/xml"/>
      <payloadType>
        <coding>
          <system value="urn:oid:1.3.6.1.4.1.19376.1.2.3"/>
          <code value="Endpoint03-ContentTypesSupported"/>
        </coding>
      </payloadType>
      <extension
url="https://sequoiaproject.org/StructureDefinition/Endpoint/main/1.0.0">
        <extension url="Transaction">
          <valueString value="Endpoint03-SupportedTransactions"/>
        </extension>
        <!--Is this gateway an initiator or responder actor-->
        <extension url="Actor">
          <valueCodeableConcept>
            <coding>
              <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Actor/1.0.0"/>
              <value value="Responding Gateway"/>
            </coding>
          </valueCodeableConcept>
        </extension>
        <!--Version of the service as per the eHealth Exchange
specifications-->
        <extension url="Version">
          <valueCodeableConcept>
            <coding>
              <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Version/1.0.0"/>
              <value value="2.0"/>
            </coding>
          </valueCodeableConcept>
        </extension>
        <!--Initiative specific list of use cases supported-->
        <extension url="UseCases">
          <valueCodeableConcept>
            <coding>
              <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/UseCases/1.0.0"/>
              <value value="Endpoint03-UseCasesSupported"/>
            </coding>
          </valueCodeableConcept>
        </extension>
        <!--PurposesOfUse Value Set for SAML header and/or access control-->
        <extension url="PurposesOfUse">
          <valueCodeableConcept>
            <coding>
              <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/PurposesOfUse/1.0.0
"/>
              <value value="Endpoint03-PurposeOfUseAllowed"/>
            </coding>
```

```xml
            </valueCodeableConcept>
          </extension>
          <!--Roles Value Set for SAML header and/or access control-->
          <extension url="Roles">
            <valueCodeableConcept>
              <coding>
                <system value="https://sequoiaproject.org/StructureDefinition/Endpoint/Roles/1.0.0"/>
                <value value="Endpoint03-RolesAllowed"/>
              </coding>
            </valueCodeableConcept>
          </extension>
          <!--IPAs of gateway, may repeat-->
          <extension url="IPA">
            <valueCodeableConcept>
              <coding>
                <system value="https://sequoiaproject.org/StructureDefinition/Endpoint/IPA/1.0.0"/>
                <value value="Endpoint03-IPAddress"/>
              </coding>
            </valueCodeableConcept>
          </extension>
        </extension>
      </Endpoint>
    </contained>
  </Organization>
    </resource>
  </entry>
  <!--The entry object is repeated for each organization listed in the directory-->
  <entry>
    <fullUrl value="/Organization/Organization-2"/>
    <resource>
      <Organization>
        <!--The ID value is subject to change-->
        <id value="Organization-2"/>
        <meta>
          <versionId value="1"/>
          <lastUpdated value="2017-02-19T11:22:29-06:00"/>
        </meta>
        <!--This is the XCA/XCPD HomeCommunityID OID in URN format-->
        <identifier>
          <use value="official"/>
          <system value="http://www.hl7.org/oid/"/>
          <value value="urn:oid:1.2.3.4"/>
        </identifier>
        <active value="true"/>
        <name value="The Sequoia Project"/>
        <alias value="Other Names"/>
        <!--The contact object is repeated for each person listed in the
directory-->
        <contact>
          <purpose value="Operations"/>
          <name>
            <use value="official"/>
            <given value="Eric"/>
            <family value="Heflin"/>
          </name>
```

```xml
            <telcom>
                <ContactPoint>
                  <system value="phone"/>
                  <value value="555-555-1212"/>
                  <use value="work"/>
                </ContactPoint>
                <!--General address for this specific person-->
            </telcom>
            <address>
              <use value="work"/>
              <type value="both"/>
              <line value="100 Main St"/>
              <line value=""/>
              <city value="Austin"/>
              <postalCode value="78737"/>
              <country value="US"/>
            </address>

    </contact>
    <contact>
      <purpose value="Technical "/>
      <name>
        <use value="official"/>
        <given value="Eric"/>
        <family value="Heflin"/>
        </name>
      <telcom>
                <ContactPoint>
                  <system value="phone"/>
                  <value value="555-555-1212"/>
                  <use value="work"/>
                </ContactPoint>
                <!--General address for this specific person-->
            </telcom>
            <address>
                <use value="work"/>
                <type value="both"/>
                <line value="100 Main St"/>
                <line value=""/>
                <city value="Austin"/>
                <postalCode value="78737"/>
                <country value="US"/>
            </address>


    </contact>
    <!--General organizational physical and mailing address-->
    <address>
      <use value="work"/>
      <type value="both"/>
      <line value="800 Main Avenue"/>
      <line value="Suite 5"/>
      <city value="Belle"/>
      <state value="MI"/>
      <postalCode value="48111"/>
      <country value="US"/>
    </address>
    <!--If this is a Carequality Connection, then the partOf object points to
```

```xml
        the Carequality Implementer-->
        <!--If this is a eHealth Exchange Sub-Participant, then the partOf object
points to the eHealth Exchange Participant-->
        <!--If this is a lower-level organization, then the partOf object points
to the immediate parent organization-->
        <!--If this is a top-level organization, then the partOf object is not
specified-->
        <partOf>
          <Reference>
            <!--Home Community ID of parent org, if any-->
            <identifier>
              <use value="official"/>
              <type value="HCID"/>
              <system value="http://www.hl7.org/oid/"/>
              <value value="1.2.3.4.1"/>
            </identifier>
          </Reference>
        </partOf>
        <!--The Endpoints are represented as contained resources and are repeated
as needed-->
        <contained>
          <Endpoint>
            <!--Home Community ID-->
            <identifier>
              <use value="official"/>
              <type value="HCID"/>
              <system value="http://www.hl7.org/oid/"/>
              <value value="urn:oid:1.2.3.4.1"/>
            </identifier>
            <!--Assigning Authority ID-->
            <identifier>
              <use value="official"/>
              <type type="AAID"/>
              <system value="http://www.hl7.org/oid/"/>
              <value value="urn:oid:1.2.3.4.3"/>
            </identifier>
            <connectionType>
              <system value="http://hl7.org/fhir/subscription-channel-type"/>
              <code value="IHE-XCA"/>
            </connectionType>
            <name value="Carequality Patient Discovery"/>
            <managingOrganization/>
            <address value="https://xyz.com/service/patidisc.svc"/>
            <payloadMimeFormat value="text/xml"/>
            <payloadType>
              <coding>
                <system value="urn:oid:1.3.6.1.4.1.19376.1.2.3"/>
                <code value="All"/>
              </coding>
            </payloadType>
            <extension
url="https://sequoiaproject.org/StructureDefinition/Endpoint/main/1.0.0">
              <extension url="Transaction">
                <valueString value="XCPD ITI-55"/>
              </extension>
              <!--Is this gateway an initiator or responder actor-->
              <extension url="Actor">
                <valueCodeableConcept>
```

```xml
              <coding>
                <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Actor/1.0.0"/>
                <value value="Responding Gateway"/>
              </coding>
            </valueCodeableConcept>
          </extension>
          <!--Version of the service as per the eHealth Exchange
specifications-->
          <extension url="Version">
            <valueCodeableConcept>
              <coding>
                <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Version/1.0.0"/>
                <value value="2.0"/>
              </coding>
            </valueCodeableConcept>
          </extension>
          <!--Initiative specific list of use cases supported-->
          <extension url="UseCases">
            <valueCodeableConcept>
              <coding>
                <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/UseCases/1.0.0"/>
                <value value="QueryBasedDocumentExchange"/>
              </coding>
            </valueCodeableConcept>
          </extension>
          <!--PurposesOfUse Value Set for SAML header and/or access control-->
          <extension url="PurposesOfUse">
            <valueCodeableConcept>
              <coding>
                <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/PurposesOfUse/1.0.0
"/>
                <value value="Treatment"/>
              </coding>
            </valueCodeableConcept>
          </extension>
          <!--Roles Value Set for SAML header and/or access control-->
          <extension url="Roles">
            <valueCodeableConcept>
              <coding>
                <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Roles/1.0.0"/>
                <value value="All"/>
              </coding>
            </valueCodeableConcept>
          </extension>
          <!--IPAs of gateway, may repeat-->
          <extension url="IPA">
            <valueCodeableConcept>
              <coding>
                <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/IPA/1.0.0"/>
              </coding>
            </valueCodeableConcept>
          </extension>
```

```xml
        </extension>
      </Endpoint>
    </contained>
    <contained>
      <Endpoint>
        <!--Home Community ID-->
        <identifier>
          <use value="official"/>
          <type value="HCID"/>
          <system value="http://www.hl7.org/oid/"/>
          <value value="urn:oid:1.2.3.4.1"/>
        </identifier>
        <!--Assigning Authority ID-->
        <identifier>
          <use value="official"/>
          <type type="AAID"/>
          <system value="http://www.hl7.org/oid/"/>
          <value value="urn:oid:1.2.3.4.3"/>
        </identifier>
        <connectionType>
          <system value="http://hl7.org/fhir/subscription-channel-type"/>
          <code value="IHE-XCA"/>
        </connectionType>
        <name value="Carequality Query for documents"/>
        <managingOrganization/>
        <address value="https://xyz.com/service/query.svc"/>
        <payloadMimeFormat value="text/xml"/>
        <payloadType>
          <coding>
            <system value="urn:oid:1.3.6.1.4.1.19376.1.2.3"/>
            <code value="All"/>
          </coding>
        </payloadType>
        <extension
url="https://sequoiaproject.org/StructureDefinition/Endpoint/main/1.0.0">
          <extension url="Transaction">
            <valueString value="XCA ITI-38"/>
          </extension>
          <!--Is this gateway an initiator or responder actor-->
          <extension url="Actor">
            <valueCodeableConcept>
              <coding>
                <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Actor/1.0.0"/>
                <value value="Responding Gateway"/>
              </coding>
            </valueCodeableConcept>
          </extension>
          <!--Version of the service as per the eHealth Exchange
specifications-->
          <extension url="Version">
            <valueCodeableConcept>
              <coding>
                <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Version/1.0.0"/>
                <value value="2.0"/>
              </coding>
            </valueCodeableConcept>
```

```xml
            </extension>
            <!--Initiative specific list of use cases supported-->
            <extension url="UseCases">
              <valueCodeableConcept>
                <coding>
                  <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/UseCases/1.0.0"/>
                  <value value="QueryBasedDocumentExchange"/>
                </coding>
              </valueCodeableConcept>
            </extension>
            <!--PurposesOfUse Value Set for SAML header and/or access control-->
            <extension url="PurposesOfUse">
              <valueCodeableConcept>
                <coding>
                  <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/PurposesOfUse/1.0.0
"/>
                  <value value="Treatment"/>
                </coding>
              </valueCodeableConcept>
            </extension>
            <!--Roles Value Set for SAML header and/or access control-->
            <extension url="Roles">
              <valueCodeableConcept>
                <coding>
                  <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Roles/1.0.0"/>
                  <value value="All"/>
                </coding>
              </valueCodeableConcept>
            </extension>
            <!--IPAs of gateway, may repeat-->
            <extension url="IPA">
              <valueCodeableConcept>
                <coding>
                  <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/IPA/1.0.0"/>
                </coding>
              </valueCodeableConcept>
            </extension>
          </extension>
        </Endpoint>
      </contained>
      <contained>
        <Endpoint>
          <!--Home Community ID-->
          <identifier>
            <use value="official"/>
            <type value="HCID"/>
            <system value="http://www.hl7.org/oid/"/>
            <value value="urn:oid:1.2.3.4.1"/>
          </identifier>
          <!--Assigning Authority ID-->
          <identifier>
            <use value="official"/>
            <type type="AAID"/>
            <system value="http://www.hl7.org/oid/"/>
```

```xml
            <value value="urn:oid:1.2.3.4.3"/>
          </identifier>
          <connectionType>
            <system value="http://hl7.org/fhir/subscription-channel-type"/>
            <code value="IHE-XCA"/>
          </connectionType>
          <name value="Carequality Retrieve documents"/>
          <managingOrganization/>
          <address value="https://xyz.com/service/retrieve-mtom.svc"/>
          <payloadMimeFormat value="text/xml"/>
          <payloadType>
            <coding>
              <system value="urn:oid:1.3.6.1.4.1.19376.1.2.3"/>
              <code value="All"/>
            </coding>
          </payloadType>
          <extension
url="https://sequoiaproject.org/StructureDefinition/Endpoint/main/1.0.0">
            <extension url="Transaction">
              <valueString value="XCA ITI-39"/>
            </extension>
            <!--Is this gateway an initiator or responder actor-->
            <extension url="Actor">
              <valueCodeableConcept>
                <coding>
                  <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Actor/1.0.0"/>
                  <value value="Responding Gateway"/>
                </coding>
              </valueCodeableConcept>
            </extension>
            <!--Version of the service as per the eHealth Exchange
specifications-->
            <extension url="Version">
              <valueCodeableConcept>
                <coding>
                  <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Version/1.0.0"/>
                  <value value="2.0"/>
                </coding>
              </valueCodeableConcept>
            </extension>
            <!--Initiative specific list of use cases supported-->
            <extension url="UseCases">
              <valueCodeableConcept>
                <coding>
                  <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/UseCases/1.0.0"/>
                  <value value="QueryBasedDocumentExchange"/>
                </coding>
              </valueCodeableConcept>
            </extension>
            <!--PurposesOfUse Value Set for SAML header and/or access control-->
            <extension url="PurposesOfUse">
              <valueCodeableConcept>
                <coding>
                  <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/PurposesOfUse/1.0.0
```

```xml
"/>
                    <value value="Treatment"/>
                </coding>
              </valueCodeableConcept>
            </extension>
            <!--Roles Value Set for SAML header and/or access control-->
            <extension url="Roles">
              <valueCodeableConcept>
                <coding>
                  <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Roles/1.0.0"/>
                  <value value="All"/>
                </coding>
              </valueCodeableConcept>
            </extension>
            <!--IPAs of gateway, may repeat-->
            <extension url="IPA">
              <valueCodeableConcept>
                <coding>
                  <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/IPA/1.0.0"/>
                </coding>
              </valueCodeableConcept>
            </extension>
          </extension>
        </Endpoint>
      </contained>
    </Organization>
  </resource>
</entry>
</Bundle>
```

16.2. JSON Example

Request JSON response format:

```
GET http://<base-url>/fhir-stu3/1.0/Organization/?_format=json
```

Request XML response format:

```
GET http://<base-url>/fhir-stu3/1.0/Organization/?_format=xml
```

Note: use of https is required in VAL and PROD.

```
Request headers:
Accept: */*

Request parameters:
_format=json
Apikey=<your key>
_count=2
```

```
Response headers:
HTTP/1.1 200 OK
Content-Type: application/json+fhir; charset=utf-8
X-Custom-Value: Copyright(c) 2016-17 The Sequoia Project. All rights reserved.
Business confidential.
X-Powered-By: The Sequoia Project Healthcare Directory Server
Server: Undisclosed
Cache-Control: public, must-revalidate, max-age=3600
Expires: 2017-02-19 12:23:25 -0600
ETag: "0b5cc6c0-d8f6-0134-16ba-05343c7258ab"
Content-Length: 45417
X-Content-Type-Options: nosniff
Connection: keep-alive


{
  "Bundle": {
    "xmlns": "http://hl7.org/fhir",
    "id": {
      "value": "0b5dff40-d8f6-0134-16bc-05343c7258ab"
    },
    "meta": {
      "lastUpdated": {
        "value": "2017-02-19T11:23:25-06:00"
      }
    },
    "type": {
      "value": "searchset"
    },
    "total": {
      "value": "2"
    },
    "link": {
      "relation": {
        "value": "self"
      },
      "url": {
        "value": "/Organization?_format=json"
      }
    },
    "search": {
      "mode": {
        "value": "match"
      }
    },
    "entry": [
      {
        "fullUrl": {
          "value": "/Organization/Organization-1"
        },
        "resource": {
          "Organization": {
            "id": {
              "value": "Organization-1"
            },
            "meta": {
              "versionId": {
                "value": "1"
```

```
          },
      "lastUpdated": {
        "value": "2017-02-19T11:23:25-06:00"
      }
    },
    "identifier": {
      "use": {
        "value": "official"
      },
      "system": {
        "value": "http://www.hl7.org/oid/"
      },
      "value": {
        "value": "Org-Identifier"
      }
    },
    "active": {
      "value": "Org-Status"
    },
    "name": {
      "value": "Org-DisplayName"
    },
    "alias": {
      "value": "Org-OtherNames"
    },
    "contact": [
      {
        "purpose": {
          "value": "Person01-ContactType"
        },
        "name": {
          "use": {
            "value": "official"
          },
          "given": {
            "value": "Person01-Name"
          }
        },
        "telcom": {
            "ContactPoint": {
              "system": {
                "value": "phone"
              },
              "value": {
                "value": "Person01-Phone"
              },
              "use": {
                "value": "work"
              }
            },
        },
        "address": {
            "use": {
              "value": "work"
            },
            "type": {
              "value": "both"
            },
```

```
        "line": [
          {
            "value": "Person01-StreetAddress"
          },
          {
            "value": ""
          }
        ],
        "city": {
          "value": "Person01-City"
        },
        "postalCode": {
          "value": "Person01-ZIPCodePostalCode"
        },
        "country": {
          "value": "Person01-Country"
        }
      }
    },
    {
      "purpose": {
        "value": "Person02-ContactType"
      },
      "name": {
        "use": {
          "value": "official"
        },
        "given": {
          "value": "Person02-Name"
        }
      },
        "telcom": {
          "ContactPoint": {
            "system": {
              "value": "phone"
            },
            "value": {
              "value": "Person02-Phone"
            },
            "use": {
              "value": "work"
            }
          }
        },
      "address": {
          "use": {
            "value": "work"
          },
          "type": {
            "value": "both"
          },
          "line": [
            {
              "value": "Person02-StreetAddress"
            },
            {
              "value": ""
            }
          ],
```

```
              "city": {
                "value": "Person02-City"
              },
              "postalCode": {
                "value": "Person02-ZIPCodePostalCode"
              },
              "country": {
                "value": "Person02-Country"
              }
            }
          }
        ],
        "address": {
          "use": {
            "value": "work"
          },
          "type": {
            "value": "both"
          },
          "line": [
            {
              "value": "818 N Main Avenue"
            },
            {
              "value": "Suite 500"
            }
          ],
          "city": {
            "value": "Austin"
          },
          "state": {
            "value": "TX"
          },
          "postalCode": {
            "value": "48111"
          },
          "country": {
            "value": "US"
          }
        },
        "partOf": {
          "Reference": {
            "identifier": {
              "use": {
                "value": "official"
              },
              "type": {
                "value": "HCID"
              },
              "system": {
                "value": "http://www.hl7.org/oid/"
              },
              "value": {
                "value": "1.2.3.4.1"
              }
            }
          }
        },
```

```json
"contained": [
  {
    "Endpoint": {
      "identifier": [
        {
          "use": {
            "value": "official"
          },
          "type": {
            "value": "HCID"
          },
          "system": {
            "value": "http://www.hl7.org/oid/"
          },
          "value": {
            "value": "Endpoint01-HomeCommunityID"
          }
        },
        {
          "use": {
            "value": "official"
          },
          "type": null,
          "system": {
            "value": "http://www.hl7.org/oid/"
          },
          "value": {
            "value": "Endpoint01-AssigningAuthorityID"
          }
        }
      ],
      "connectionType": {
        "system": {
          "value": "http://hl7.org/fhir/subscription-channel-type"
        },
        "code": {
          "value": "IHE-XCA"
        }
      },
      "name": {
        "value": "Endpoint01-DisplayName"
      },
      "managingOrganization": null,
      "address": {
        "value": "Endpoint01-URL"
      },
      "payloadMimeFormat": {
        "value": "text/xml"
      },
      "payloadType": {
        "coding": {
          "system": {
            "value": "urn:oid:1.3.6.1.4.1.19376.1.2.3"
          },
          "code": {
            "value": "Endpoint01-ContentTypesSupported"
          }
        }
      }
```

```
                    },
                    "extension": {
                      "url":
"https://sequoiaproject.org/StructureDefinition/Endpoint/main/1.0.0",
                      "extension": [
                        {
                          "url": "Transaction",
                          "valueString": {
                            "value": "Endpoint01-SupportedTransactions"
                          }
                        },
                        {
                          "url": "Actor",
                          "valueCodeableConcept": {
                            "coding": {
                              "system": {
                                "value":
"https://sequoiaproject.org/StructureDefinition/Endpoint/Actor/1.0.0"
                              },
                              "value": {
                                "value": "Responding Gateway"
                              }
                            }
                          }
                        },
                        {
                          "url": "Version",
                          "valueCodeableConcept": {
                            "coding": {
                              "system": {
                                "value":
"https://sequoiaproject.org/StructureDefinition/Endpoint/Version/1.0.0"
                              },
                              "value": {
                                "value": "2.0"
                              }
                            }
                          }
                        },
                        {
                          "url": "UseCases",
                          "valueCodeableConcept": {
                            "coding": {
                              "system": {
                                "value":
"https://sequoiaproject.org/StructureDefinition/Endpoint/UseCases/1.0.0"
                              },
                              "value": {
                                "value": "Endpoint01-UseCasesSupported"
                              }
                            }
                          }
                        },
                        {
                          "url": "PurposesOfUse",
                          "valueCodeableConcept": {
                            "coding": {
                              "system": {
```

```
                                      "value":
"https://sequoiaproject.org/StructureDefinition/Endpoint/PurposesOfUse/1.0.0"
                                    },
                                    "value": {
                                      "value": "Endpoint01-PurposeOfUseAllowed"
                                    }
                                  }
                                }
                              },
                              {
                                "url": "Roles",
                                "valueCodeableConcept": {
                                  "coding": {
                                    "system": {
                                      "value":
"https://sequoiaproject.org/StructureDefinition/Endpoint/Roles/1.0.0"
                                    },
                                    "value": {
                                      "value": "Endpoint01-RolesAllowed"
                                    }
                                  }
                                }
                              },
                              {
                                "url": "IPA",
                                "valueCodeableConcept": {
                                  "coding": {
                                    "system": {
                                      "value":
"https://sequoiaproject.org/StructureDefinition/Endpoint/IPA/1.0.0"
                                    },
                                    "value": {
                                      "value": "Endpoint01-IPAddress"
                                    }
                                  }
                                }
                              }
                            ]
                          }
                        }
                      },
                      {
                        "Endpoint": {
                          "identifier": [
                            {
                              "use": {
                                "value": "official"
                              },
                              "type": {
                                "value": "HCID"
                              },
                              "system": {
                                "value": "http://www.hl7.org/oid/"
                              },
                              "value": {
                                "value": "Endpoint02-HomeCommunityID"
                              }
                            },
```

```
                {
                  "use": {
                    "value": "official"
                  },
                  "type": null,
                  "system": {
                    "value": "http://www.hl7.org/oid/"
                  },
                  "value": {
                    "value": "Endpoint02-AssigningAuthorityID"
                  }
                }
              ],
              "connectionType": {
                "system": {
                  "value": "http://hl7.org/fhir/subscription-channel-type"
                },
                "code": {
                  "value": "IHE-XCA"
                }
              },
              "name": {
                "value": "Endpoint02-DisplayName"
              },
              "managingOrganization": null,
              "address": {
                "value": "Endpoint02-URL"
              },
              "payloadMimeFormat": {
                "value": "text/xml"
              },
              "payloadType": {
                "coding": {
                  "system": {
                    "value": "urn:oid:1.3.6.1.4.1.19376.1.2.3"
                  },
                  "code": {
                    "value": "Endpoint02-ContentTypesSupported"
                  }
                }
              },
              "extension": {
                "url":
"https://sequoiaproject.org/StructureDefinition/Endpoint/main/1.0.0",
                "extension": [
                  {
                    "url": "Transaction",
                    "valueString": {
                      "value": "Endpoint02-SupportedTransactions"
                    }
                  },
                  {
                    "url": "Actor",
                    "valueCodeableConcept": {
                      "coding": {
                        "system": {
                          "value":
"https://sequoiaproject.org/StructureDefinition/Endpoint/Actor/1.0.0"
```

```
                               },
                               "value": {
                                 "value": "Responding Gateway"
                               }
                             }
                           }
                         },
                         {
                           "url": "Version",
                           "valueCodeableConcept": {
                             "coding": {
                               "system": {
                                 "value":
"https://sequoiaproject.org/StructureDefinition/Endpoint/Version/1.0.0"
                               },
                               "value": {
                                 "value": "2.0"
                               }
                             }
                           }
                         },
                         {
                           "url": "UseCases",
                           "valueCodeableConcept": {
                             "coding": {
                               "system": {
                                 "value":
"https://sequoiaproject.org/StructureDefinition/Endpoint/UseCases/1.0.0"
                               },
                               "value": {
                                 "value": "Endpoint02-UseCasesSupported"
                               }
                             }
                           }
                         },
                         {
                           "url": "PurposesOfUse",
                           "valueCodeableConcept": {
                             "coding": {
                               "system": {
                                 "value":
"https://sequoiaproject.org/StructureDefinition/Endpoint/PurposesOfUse/1.0.0"
                               },
                               "value": {
                                 "value": "Endpoint02-PurposeOfUseAllowed"
                               }
                             }
                           }
                         },
                         {
                           "url": "Roles",
                           "valueCodeableConcept": {
                             "coding": {
                               "system": {
                                 "value":
"https://sequoiaproject.org/StructureDefinition/Endpoint/Roles/1.0.0"
                               },
                               "value": {
```

```
                                      "value": "Endpoint02-RolesAllowed"
                                  }
                              }
                          }
                      },
                      {
                        "url": "IPA",
                        "valueCodeableConcept": {
                          "coding": {
                            "system": {
                              "value":
"https://sequoiaproject.org/StructureDefinition/Endpoint/IPA/1.0.0"
                            },
                            "value": {
                              "value": "Endpoint02-IPAddress"
                            }
                          }
                        }
                      }
                  ]
                }
              }
          },
          {
            "Endpoint": {
              "identifier": [
                {
                  "use": {
                    "value": "official"
                  },
                  "type": {
                    "value": "HCID"
                  },
                  "system": {
                    "value": "http://www.hl7.org/oid/"
                  },
                  "value": {
                    "value": "Endpoint03-HomeCommunityID"
                  }
                },
                {
                  "use": {
                    "value": "official"
                  },
                  "type": null,
                  "system": {
                    "value": "http://www.hl7.org/oid/"
                  },
                  "value": {
                    "value": "Endpoint03-AssigningAuthorityID"
                  }
                }
              ],
              "connectionType": {
                "system": {
                  "value": "http://hl7.org/fhir/subscription-channel-type"
                },
                "code": {
```

```
                "value": "IHE-XCA"
              }
            },
            "name": {
              "value": "Endpoint03-DisplayName"
            },
            "managingOrganization": null,
            "address": {
              "value": "Endpoint03-URL"
            },
            "payloadMimeFormat": {
              "value": "text/xml"
            },
            "payloadType": {
              "coding": {
                "system": {
                  "value": "urn:oid:1.3.6.1.4.1.19376.1.2.3"
                },
                "code": {
                  "value": "Endpoint03-ContentTypesSupported"
                }
              }
            },
            "extension": {
              "url":
"https://sequoiaproject.org/StructureDefinition/Endpoint/main/1.0.0",
              "extension": [
                {
                  "url": "Transaction",
                  "valueString": {
                    "value": "Endpoint03-SupportedTransactions"
                  }
                },
                {
                  "url": "Actor",
                  "valueCodeableConcept": {
                    "coding": {
                      "system": {
                        "value":
"https://sequoiaproject.org/StructureDefinition/Endpoint/Actor/1.0.0"
                      },
                      "value": {
                        "value": "Responding Gateway"
                      }
                    }
                  }
                },
                {
                  "url": "Version",
                  "valueCodeableConcept": {
                    "coding": {
                      "system": {
                        "value":
"https://sequoiaproject.org/StructureDefinition/Endpoint/Version/1.0.0"
                      },
                      "value": {
                        "value": "2.0"
                      }
```

```
                    }
                  }
                },
                {
                  "url": "UseCases",
                  "valueCodeableConcept": {
                    "coding": {
                      "system": {
                        "value":
"https://sequoiaproject.org/StructureDefinition/Endpoint/UseCases/1.0.0"
                      },
                      "value": {
                        "value": "Endpoint03-UseCasesSupported"
                      }
                    }
                  }
                },
                {
                  "url": "PurposesOfUse",
                  "valueCodeableConcept": {
                    "coding": {
                      "system": {
                        "value":
"https://sequoiaproject.org/StructureDefinition/Endpoint/PurposesOfUse/1.0.0"
                      },
                      "value": {
                        "value": "Endpoint03-PurposeOfUseAllowed"
                      }
                    }
                  }
                },
                {
                  "url": "Roles",
                  "valueCodeableConcept": {
                    "coding": {
                      "system": {
                        "value":
"https://sequoiaproject.org/StructureDefinition/Endpoint/Roles/1.0.0"
                      },
                      "value": {
                        "value": "Endpoint03-RolesAllowed"
                      }
                    }
                  }
                },
                {
                  "url": "IPA",
                  "valueCodeableConcept": {
                    "coding": {
                      "system": {
                        "value":
"https://sequoiaproject.org/StructureDefinition/Endpoint/IPA/1.0.0"
                      },
                      "value": {
                        "value": "Endpoint03-IPAddress"
                      }
                    }
                  }
                }
```

```
                      }
                    ]
                  }
                }
              }
            ]
          }
        }
      },
      {
        "fullUrl": {
          "value": "/Organization/Organization-2"
        },
        "resource": {
          "Organization": {
            "id": {
              "value": "Organization-2"
            },
            "meta": {
              "versionId": {
                "value": "1"
              },
              "lastUpdated": {
                "value": "2017-02-19T11:23:25-06:00"
              }
            },
            "identifier": {
              "use": {
                "value": "official"
              },
              "system": {
                "value": "http://www.hl7.org/oid/"
              },
              "value": {
                "value": "urn:oid:1.2.3.4"
              }
            },
            "active": {
              "value": true
            },
            "name": {
              "value": "The Sequoia Project"
            },
            "alias": {
              "value": "Other Names"
            },
            "contact": [
              {
                "purpose": {
                  "value": "Operations"
                },
                "name": {
                  "use": {
                    "value": "official"
                  },
                  "given": {
                    "value": "Eric"
                  },
```

```
                "family": {
                  "value": "Heflin"
                }
              },
               "telcom": {
                 "ContactPoint": {
                   "system": {
                     "value": "phone"
                   },
                   "value": {
                     "value": "555-555-1212"
                   },
                   "use": {
                     "value": "work"
                   }
                 }
               },
                "address": {
                  "use": {
                    "value": "work"
                  },
                  "type": {
                    "value": "both"
                  },
                  "line": [
                    {
                      "value": "100 Main St"
                    },
                    {
                      "value": ""
                    }
                  ],
                  "city": {
                    "value": "Austin"
                  },
                  "postalCode": {
                    "value": "78737"
                  },
                  "country": {
                    "value": "US"
                  }
                }
          },
          {
            "purpose": {
              "value": "Technical "
            },
            "name": {
              "use": {
                "value": "official"
              },
              "given": {
                "value": "Eric"
              },
              "family": {
                "value": "Heflin"
              }
```

```
        },
         "telcom": {
           "ContactPoint": {
             "system": {
               "value": "phone"
             },
             "value": {
               "value": "555-555-1212"
             },
             "use": {
               "value": "work"
             }
           }
         },
          "address": {
            "use": {
              "value": "work"
            },
            "type": {
              "value": "both"
            },
            "line": [
              {
                "value": "100 Main St"
              },
              {
                "value": ""
              }
            ],
            "city": {
              "value": "Austin"
            },
            "postalCode": {
              "value": "78737"
            },
            "country": {
              "value": "US"
            }
          }
        }
    ],
    "address": {
      "use": {
        "value": "work"
      },
      "type": {
        "value": "both"
      },
      "line": [
        {
          "value": "818 N Main Avenue"
        },
        {
          "value": "Suite 500"
        }
      ],
      "city": {
        "value": "Austin"
```

```
      },
      "state": {
        "value": "TX"
      },
      "postalCode": {
        "value": "48111"
      },
      "country": {
        "value": "US"
      }
    },
    "partOf": {
      "Reference": {
        "identifier": {
          "use": {
            "value": "official"
          },
          "type": {
            "value": "HCID"
          },
          "system": {
            "value": "http://www.hl7.org/oid/"
          },
          "value": {
            "value": "1.2.3.4.1"
          }
        }
      }
    },
    "contained": [
      {
        "Endpoint": {
          "identifier": [
            {
              "use": {
                "value": "official"
              },
              "type": {
                "value": "HCID"
              },
              "system": {
                "value": "http://www.hl7.org/oid/"
              },
              "value": {
                "value": "urn:oid:1.2.3.4.1"
              }
            },
            {
              "use": {
                "value": "official"
              },
              "type": null,
              "system": {
                "value": "http://www.hl7.org/oid/"
              },
              "value": {
                "value": "urn:oid:1.2.3.4.3"
              }
            }
```

```
                }
              ],
              "connectionType": {
                "system": {
                  "value": "http://hl7.org/fhir/subscription-channel-type"
                },
                "code": {
                  "value": "IHE-XCA"
                }
              },
              "name": {
                "value": "Carequality Patient Discovery"
              },
              "managingOrganization": null,
              "address": {
                "value": "https://xyz.com/service/patidisc.svc"
              },
              "payloadMimeFormat": {
                "value": "text/xml"
              },
              "payloadType": {
                "coding": {
                  "system": {
                    "value": "urn:oid:1.3.6.1.4.1.19376.1.2.3"
                  },
                  "code": {
                    "value": "All"
                  }
                }
              },
              "extension": {
                "url":
"https://sequoiaproject.org/StructureDefinition/Endpoint/main/1.0.0",
                "extension": [
                  {
                    "url": "Transaction",
                    "valueString": {
                      "value": "XCPD ITI-55"
                    }
                  },
                  {
                    "url": "Actor",
                    "valueCodeableConcept": {
                      "coding": {
                        "system": {
                          "value":
"https://sequoiaproject.org/StructureDefinition/Endpoint/Actor/1.0.0"
                        },
                        "value": {
                          "value": "Responding Gateway"
                        }
                      }
                    }
                  },
                  {
                    "url": "Version",
                    "valueCodeableConcept": {
                      "coding": {
```

```
                            "system": {
                              "value":
"https://sequoiaproject.org/StructureDefinition/Endpoint/Version/1.0.0"
                            },
                            "value": {
                              "value": "2.0"
                            }
                          }
                        }
                      },
                      {
                        "url": "UseCases",
                        "valueCodeableConcept": {
                          "coding": {
                            "system": {
                              "value":
"https://sequoiaproject.org/StructureDefinition/Endpoint/UseCases/1.0.0"
                            },
                            "value": {
                              "value": "QueryBasedDocumentExchange"
                            }
                          }
                        }
                      },
                      {
                        "url": "PurposesOfUse",
                        "valueCodeableConcept": {
                          "coding": {
                            "system": {
                              "value":
"https://sequoiaproject.org/StructureDefinition/Endpoint/PurposesOfUse/1.0.0"
                            },
                            "value": {
                              "value": "Treatment"
                            }
                          }
                        }
                      },
                      {
                        "url": "Roles",
                        "valueCodeableConcept": {
                          "coding": {
                            "system": {
                              "value":
"https://sequoiaproject.org/StructureDefinition/Endpoint/Roles/1.0.0"
                            },
                            "value": {
                              "value": "All"
                            }
                          }
                        }
                      },
                      {
                        "url": "IPA",
                        "valueCodeableConcept": {
                          "coding": {
                            "system": {
```

```
                                    "value":
"https://sequoiaproject.org/StructureDefinition/Endpoint/IPA/1.0.0"
                                }
                            }
                        }
                    }
                ]
            }
        }
    },
    {
      "Endpoint": {
        "identifier": [
          {
            "use": {
              "value": "official"
            },
            "type": {
              "value": "HCID"
            },
            "system": {
              "value": "http://www.hl7.org/oid/"
            },
            "value": {
              "value": "urn:oid:1.2.3.4.1"
            }
          },
          {
            "use": {
              "value": "official"
            },
            "type": null,
            "system": {
              "value": "http://www.hl7.org/oid/"
            },
            "value": {
              "value": "urn:oid:1.2.3.4.3"
            }
          }
        ],
        "connectionType": {
          "system": {
            "value": "http://hl7.org/fhir/subscription-channel-type"
          },
          "code": {
            "value": "IHE-XCA"
          }
        },
        "name": {
          "value": "Carequality Query for documents"
        },
        "managingOrganization": null,
        "address": {
          "value": "https://xyz.com/service/query.svc"
        },
        "payloadMimeFormat": {
          "value": "text/xml"
        },
```

```
                    "payloadType": {
                      "coding": {
                        "system": {
                          "value": "urn:oid:1.3.6.1.4.1.19376.1.2.3"
                        },
                        "code": {
                          "value": "All"
                        }
                      }
                    },
                    "extension": {
                      "url":
"https://sequoiaproject.org/StructureDefinition/Endpoint/main/1.0.0",
                      "extension": [
                        {
                          "url": "Transaction",
                          "valueString": {
                            "value": "XCA ITI-38"
                          }
                        },
                        {
                          "url": "Actor",
                          "valueCodeableConcept": {
                            "coding": {
                              "system": {
                                "value":
"https://sequoiaproject.org/StructureDefinition/Endpoint/Actor/1.0.0"
                              },
                              "value": {
                                "value": "Responding Gateway"
                              }
                            }
                          }
                        },
                        {
                          "url": "Version",
                          "valueCodeableConcept": {
                            "coding": {
                              "system": {
                                "value":
"https://sequoiaproject.org/StructureDefinition/Endpoint/Version/1.0.0"
                              },
                              "value": {
                                "value": "2.0"
                              }
                            }
                          }
                        },
                        {
                          "url": "UseCases",
                          "valueCodeableConcept": {
                            "coding": {
                              "system": {
                                "value":
"https://sequoiaproject.org/StructureDefinition/Endpoint/UseCases/1.0.0"
                              },
                              "value": {
                                "value": "QueryBasedDocumentExchange"
```

```
                                  }
                                }
                              }
                            },
                            {
                              "url": "PurposesOfUse",
                              "valueCodeableConcept": {
                                "coding": {
                                  "system": {
                                    "value":
"https://sequoiaproject.org/StructureDefinition/Endpoint/PurposesOfUse/1.0.0"
                                  },
                                  "value": {
                                    "value": "Treatment"
                                  }
                                }
                              }
                            },
                            {
                              "url": "Roles",
                              "valueCodeableConcept": {
                                "coding": {
                                  "system": {
                                    "value":
"https://sequoiaproject.org/StructureDefinition/Endpoint/Roles/1.0.0"
                                  },
                                  "value": {
                                    "value": "All"
                                  }
                                }
                              }
                            },
                            {
                              "url": "IPA",
                              "valueCodeableConcept": {
                                "coding": {
                                  "system": {
                                    "value":
"https://sequoiaproject.org/StructureDefinition/Endpoint/IPA/1.0.0"
                                  }
                                }
                              }
                            }
                          ]
                        }
                      }
                    },
                    {
                      "Endpoint": {
                        "identifier": [
                          {
                            "use": {
                              "value": "official"
                            },
                            "type": {
                              "value": "HCID"
                            },
                            "system": {
```

```
            "value": "http://www.hl7.org/oid/"
          },
          "value": {
            "value": "urn:oid:1.2.3.4.1"
          }
        },
        {
          "use": {
            "value": "official"
          },
          "type": null,
          "system": {
            "value": "http://www.hl7.org/oid/"
          },
          "value": {
            "value": "urn:oid:1.2.3.4.3"
          }
        }
      ],
      "connectionType": {
        "system": {
          "value": "http://hl7.org/fhir/subscription-channel-type"
        },
        "code": {
          "value": "IHE-XCA"
        }
      },
      "name": {
        "value": "Carequality Retrieve documents"
      },
      "managingOrganization": null,
      "address": {
        "value": "https://xyz.com/service/retrieve-mtom.svc"
      },
      "payloadMimeFormat": {
        "value": "text/xml"
      },
      "payloadType": {
        "coding": {
          "system": {
            "value": "urn:oid:1.3.6.1.4.1.19376.1.2.3"
          },
          "code": {
            "value": "All"
          }
        }
      },
      "extension": {
        "url":
"https://sequoiaproject.org/StructureDefinition/Endpoint/main/1.0.0",
        "extension": [
          {
            "url": "Transaction",
            "valueString": {
              "value": "XCA ITI-39"
            }
          },
          {
```

```
                         "url": "Actor",
                         "valueCodeableConcept": {
                           "coding": {
                             "system": {
                               "value":
"https://sequoiaproject.org/StructureDefinition/Endpoint/Actor/1.0.0"
                             },
                             "value": {
                               "value": "Responding Gateway"
                             }
                           }
                         }
                       },
                       {
                         "url": "Version",
                         "valueCodeableConcept": {
                           "coding": {
                             "system": {
                               "value":
"https://sequoiaproject.org/StructureDefinition/Endpoint/Version/1.0.0"
                             },
                             "value": {
                               "value": "2.0"
                             }
                           }
                         }
                       },
                       {
                         "url": "UseCases",
                         "valueCodeableConcept": {
                           "coding": {
                             "system": {
                               "value":
"https://sequoiaproject.org/StructureDefinition/Endpoint/UseCases/1.0.0"
                             },
                             "value": {
                               "value": "QueryBasedDocumentExchange"
                             }
                           }
                         }
                       },
                       {
                         "url": "PurposesOfUse",
                         "valueCodeableConcept": {
                           "coding": {
                             "system": {
                               "value":
"https://sequoiaproject.org/StructureDefinition/Endpoint/PurposesOfUse/1.0.0"
                             },
                             "value": {
                               "value": "Treatment"
                             }
                           }
                         }
                       },
                       {
                         "url": "Roles",
                         "valueCodeableConcept": {
```

```
                    "coding": {
                      "system": {
                        "value":
"https://sequoiaproject.org/StructureDefinition/Endpoint/Roles/1.0.0"
                      },
                      "value": {
                        "value": "All"
                      }
                    }
                  }
                },
                {
                  "url": "IPA",
                  "valueCodeableConcept": {
                    "coding": {
                      "system": {
                        "value":
"https://sequoiaproject.org/StructureDefinition/Endpoint/IPA/1.0.0"
                      }
                    }
                  }
                }
              ]
            }
          }
        }
      ]
    }
  }
}
]
}
}
}
```

16.3. TSV Example

For now, it only contains Organization name, Organization City and Organization Sate.

Request JSON response format:

```
GET http://<base-url>/fhir-stu3/1.0/Organization/?_format=tsv
```

Response:
Org-Name   Org-City   Org-State
Vali Ehealth   Austin TX

17. DIRECTORY DOCUMENT SEMANTICS

The directory document is returned following the current version of the Argonaut Provider Directory work group, as of this writing. Below is an annotated example documenting key aspects of the structure.

```xml
<?xml version="1.0"?>
<Bundle xmlns="http://hl7.org/fhir">
  <id value="70f78821-bd90-0134-f350-152dc5587e3b"/>
  <meta>
    <lastUpdated value="2017-01-15T20:38:05+00:00"/>
  </meta>
  <type value="searchset"/>
  <total value="1"/>
  <link>
    <relation value="self"/>
    <url value="http://52.26.91.242:80//Organization?_format=xml"/>
  </link>
  <entry>
    <fullUrl value="http://52.26.91.242:80//Organization/Organization-1"/>
    <resource>
      <Organization>
        <id value="Organization-1"/>
        <meta/>
        <versionId value="1"/>
        <lastUpdated value="2017-01-15T20:38:05+00:00"/>
        <identifier>
          <use value="official"/>
          <system value="http://www.hl7.org/oid/"/>
          <value value="1.2.3.4.1"/>
        </identifier>
        <identifier>
          <use value="official"/>
          <type>
            <coding>
              <system value="http://hl7.org/fhir/v2/0203"/>
              <code value="PRN"/>
              <display value="Provider number"/>
            </coding>
            <text value="US National Provider Identifier"/>
          </type>
          <system value="http://hl7.org/fhir/sid/us-npi"/>
          <value value="999999991"/>
        </identifier>
        <identifier>
          <use value="official"/>
          <type>
            <coding>
              <system value="http://hl7.org/fhir/v2/0203"/>
              <code value="TAX"/>
              <display value="Tax ID number"/>
            </coding>
            <text value="US Employer Identification Number"/>
          </type>
          <system value="http://hl7.org/fhir/sid/us-tax"/>
```

These values change each time the bundle is updated and can help client software detect new content.

Start of Organization resource.

```xml
    <value value="000000001"/>
  </identifier>
  <active value="true"/>
  <name value="State Datahub"/>
  <telecom>
    <system value="phone"/>
    <value value="(555) 555-6282"/>
    <use value="work"/>
  </telecom>
  <address>
    <line value="818 N Main Avenue"/>
    <city value="Austin"/>
    <district value="Wayne County"/>
    <state value="TX"/>
    <postalCode value="48111"/>
  </address>
  <contained>
    <Endpoint>
      <id value="ep-1"/>
      <status value="true"/>
      <name value="Saint Luke's Hospital of Kansas City"/>
      <managingOrganization>
        <reference value="Organization/393872"/>
      </managingOrganization>
      <connectionType>
        <system value="http://hl7.org/fhir/subscription-channel-type"/>
        <code value="email"/>
      </connectionType>
      <address value="mailto:aaa@xyz.com"/>
      <payloadFormat value="CDA"/>
      <payloadType>
        <coding>
          <system value="urn:oid:1.3.6.1.4.1.19376.1.2.3"/>
          <code value="urn:ihe:pcc:xphr:2007"/>
          <display value="HL7 CCD Document"/>
        </coding>
      </payloadType>
      <payloadType>
        <coding>
          <system value="urn:oid:1.3.6.1.4.1.19376.1.2.3"/>
          <code value="urn:ihe:pcc:xds-ms:2007"/>
          <display value="XDS Medical Summaries"/>
        </coding>
      </payloadType>
      <payloadType>
        <coding>
          <system value="urn:oid:1.3.6.1.4.1.19376.1.2.3"/>
          <code value="urn:hl7-org:sdwg:ccda-structuredBody:1.1"/>
          <display value="C-CDA constraints using a structured body"/>
        </coding>
      </payloadType>
      <payloadType>
        <coding>
          <system value="urn:oid:1.3.6.1.4.1.19376.1.2.3"/>
          <code value="urn:hl7-org:sdwg:ccda-nonXMLBody:1.1"/>
          <display value="C-CDA constraints using a non structured body."/>
        </coding>
      </payloadType>
```

> Start of a contained Endpoint resource.

```
      </Endpoint>
    </contained>
  </Organization>
  <search>
    <mode value="match"/>
  </search>
  </resource>
  </entry>
</Bundle>
```

1.1.1 Value Sets

1.1.1.1 Bundle/entry/resource/Organization/contained/Endpoint/connectionType

Code	Display	Definition
ihe-xcpd	IHE XCPD	IHE Cross Community Patient Discovery Profile (XCPD) - http://wiki.ihe.net/index.php/Cross-Community_Patient_Discovery
ihe-xca	IHE XCA	IHE Cross Community Access Profile (XCA) - http://wiki.ihe.net/index.php/Cross-Community_Access
ihe-xdr	IHE XDR	IHE Cross-Enterprise Document Reliable Exchange (XDR) - http://wiki.ihe.net/index.php/Cross-enterprise_Document_Reliable_Interchange
ihe-xds	IHE XDS	IHE Cross-Enterprise Document Sharing (XDS) - http://wiki.ihe.net/index.php/Cross-Enterprise_Document_Sharing
ihe-iid	IHE IID	IHE Invoke Image Display (IID) - http://wiki.ihe.net/index.php/Invoke_Image_Display
dicom-wado-rs	DICOM WADO-RS	DICOMweb RESTful Image Retrieve - http://dicom.nema.org/medical/dicom/current/output/chtml/part18/sect_6.5.html

dicom-qido-rs	DICOM QIDO-RS	DICOMweb RESTful Image query - http://dicom.nema.org/medical/dicom/current/output/chtml/part18/sect_6.7.html
dicom-stow-rs	DICOM STOW-RS	DICOMweb RESTful image sending and storage - http://dicom.nema.org/medical/dicom/current/output/chtml/part18/sect_6.6.html
dicom-wado-uri	DICOM WADO-URI	DICOMweb Image Retrieve - http://dicom.nema.org/dicom/2013/output/chtml/part18/sect_6.3.html
hl7-fhir-rest	HL7 FHIR	Interact with the server interface using FHIR's RESTful interface. For details on its version/capabilities you should connect the the value in Endpoint.address and retrieve the FHIR CapabilityStatement.
hl7-fhir-msg	HL7 FHIR Messaging	Use the servers FHIR Messaging interface. Details can be found on the messaging.html page in the FHIR Specification. The FHIR server's base address is specified in the Endpoint.address property.
hl7v2-mllp	HL7 v2 MLLP	HL7v2 messages over an LLP TCP connection
secure-email	Secure email	Email delivery using a digital certificate to encrypt the content using the public key, receiver must have the private key to decrypt the content
direct-project	Direct Project	Direct Project information http://build.fhir.org/valueset-endpoint-connection-type.html

1.1.1.2   Bundle/entry/resource/Organization/contained/Endpoint/connectionType

http://build.fhir.org/valueset-endpoint-status.html

Code	Display	Definition

active	Active	This endpoint is expected to be active and can be used
suspended	Suspended	This endpoint is temporarily unavailable
error	Error	This endpoint has exceeded connectivity thresholds and is considered in an error state and should no longer be attempted to connect to until corrective action is taken
off	Off	This endpoint is no longer to be used
entered-in-error	Entered in error	This instance should not have been part of this patient's medical record.
test	Test	This endpoint is not intended for production usage.

1.1.1.3   Bundle/entry/resource/Organization/contained/Endpoint/payloadType

http://build.fhir.org/valueset-endpoint-payload-type.html

This value set includes codes from the following code systems:

Include all codes defined in http://hl7.org/fhir/endpoint-payload-type

Include these codes as defined in urn:oid:1.3.6.1.4.1.19376.1.2.3

Code	Display
urn:ihe:pcc:handp:2008	History and Physical Specification
urn:ihe:pcc:xphr:2007	HL7 CCD Document
urn:ihe:pcc:aps:2007	IHE Antepartum Summary
urn:ihe:pcc:xds-ms:2007	XDS Medical Summaries
urn:ihe:pcc:xphr:2007	Personal Health Records

urn:ihe:pcc:edr:2007	Emergency Department Referral (EDR)
urn:ihe:pcc:edes:2007	Emergency Department Encounter Summary (EDES)
urn:ihe:pcc:apr:handp:2008	Antepartum Record (APR) - History and Physical
urn:ihe:pcc:apr:lab:2008	Antepartum Record (APR) - Laboratory
urn:ihe:pcc:apr:edu:2008	Antepartum Record (APR) - Education
urn:ihe:pcc:irc:2008	Immunization Registry Content (IRC)
urn:ihe:pcc:crc:2008	Cancer Registry Content (CRC)
urn:ihe:pcc:cm:2008	Care Management (CM)
urn:ihe:pcc:ic:2009	Immunization Content (IC)
urn:ihe:pcc:tn:2007	PCC TN
urn:ihe:pcc:nn:2007	PCC NN
urn:ihe:pcc:ctn:2007	PCC CTN
urn:ihe:pcc:edpn:2007	PCC EDPN
urn:ihe:pcc:hp:2008	PCC HP
urn:ihe:pcc:ldhp:2009	PCC LDHP
urn:ihe:pcc:lds:2009	PCC LDS
urn:ihe:pcc:mds:2009	PCC MDS
urn:ihe:pcc:nds:2010	PCC NDS

urn:ihe:pcc:ppvs:2010	PCC PPVS
urn:ihe:pcc:trs:2011	PCC TRS
urn:ihe:pcc:ets:2011	PCC ETS
urn:ihe:pcc:its:2011	PCC ITS
urn:ihe:iti:bppc:2007	Basic Patient Privacy Consents
urn:ihe:iti:bppc-sd:2007	Basic Patient Privacy Consents with Scanned Document
urn:ihe:iti:xdw:2011:workflowDoc	XDW Workflow Document
urn:ihe:iti:dsg:detached:2014	DSG Detached Document
urn:ihe:iti:dsg:enveloping:2014	DSG Enveloping Document
urn:ihe:iti:xds-sd:pdf:2008	PDF embedded in CDA per XDS-SD profile
urn:ihe:iti:xds-sd:text:2008	Text embedded in CDA per XDS-SD profile
urn:ihe:lab:xd-lab:2008	CDA Laboratory Report
urn:ihe:rad:TEXT	Radiology XDS-I Text
urn:ihe:rad:PDF	Radiology XDS-I PDF
urn:ihe:rad:CDA:ImagingReportStructuredHeadings:2013	Radiology XDS-I Structured CDA
urn:ihe:card:imaging:2011	Cardiac Imaging Report
urn:ihe:card:CRC:2012	Cardiology CRC
urn:ihe:card:EPRC-IE:2014	Cardiology EPRC-IE
urn:ihe:dent:TEXT	Dental Text
urn:ihe:dent:PDF	Dental PDF

urn:ihe:dent:CDA:ImagingReportStructuredHeadings:2013	Dental CDA
urn:ihe:pat:apsr:all:2010	Anatomic Pathology Structured Report All
urn:ihe:pat:apsr:cancer:all:2010	Anatomic Pathology Structured Report Cancer All
urn:ihe:pat:apsr:cancer:breast:2010	Anatomic Pathology Structured Report Cancer Breast
urn:ihe:pat:apsr:cancer:colon:2010	Anatomic Pathology Structured Report Cancer Colon
urn:ihe:pat:apsr:cancer:prostate:2010	Anatomic Pathology Structured Report Cancer Prostate
urn:ihe:pat:apsr:cancer:thyroid:2010	Anatomic Pathology Structured Report Cancer Thyroid
urn:ihe:pat:apsr:cancer:lung:2010	Anatomic Pathology Structured Report Cancer Lung
urn:ihe:pat:apsr:cancer:skin:2010	Anatomic Pathology Structured Report Cancer Skin
urn:ihe:pat:apsr:cancer:kidney:2010	Anatomic Pathology Structured Report Cancer Kidney
urn:ihe:pat:apsr:cancer:cervix:2010	Anatomic Pathology Structured Report Cancer Cervix
urn:ihe:pat:apsr:cancer:endometrium:2010	Anatomic Pathology Structured Report Cancer Endometrium
urn:ihe:pat:apsr:cancer:ovary:2010	Anatomic Pathology Structured Report Cancer Ovary
urn:ihe:pat:apsr:cancer:esophagus: 2010	Anatomic Pathology Structured Report Cancer Esophagus

95

urn:ihe:pat:apsr:cancer:stomach: 2010	Anatomic Pathology Structured Report Cancer Stomach
urn:ihe:pat:apsr:cancer:liver:2010	Anatomic Pathology Structured Report Cancer Liver
urn:ihe:pat:apsr:cancer:pancreas: 2010	Anatomic Pathology Structured Report Cancer Pancreas
urn:ihe:pat:apsr:cancer:testis:2010	Anatomic Pathology Structured Report Cancer Testis
urn:ihe:pat:apsr:cancer:urinary_bladder:2010	Anatomic Pathology Structured Report Cancer Urinary Bladder
urn:ihe:pat:apsr:cancer:lip_oral_cavity:2010	Anatomic Pathology Structured Report Cancer Lip Oral Cavity
urn:ihe:pat:apsr:cancer:pharynx:2010	Anatomic Pathology Structured Report Cancer Pharynx
urn:ihe:pat:apsr:cancer:salivary_gland:2010	Anatomic Pathology Structured Report Cancer Salivary Gland
urn:ihe:pat:apsr:cancer:larynx:2010	Anatomic Pathology Structured Report Cancer Larynx
urn:ihe:pharm:pre:2010	Pharmacy Pre
urn:ihe:pharm:padv:2010	Pharmacy PADV
urn:ihe:pharm:dis:2010	Pharmacy DIS
urn:ihe:pharm:pml:2013	Pharmacy PML
urn:hl7-org:sdwg:ccda-structuredBody:1.1	For documents following C-CDA constraints using a structured body.

urn:hl7-org:sdwg:ccda-nonXMLBody:1.1	For documents following C-CDA constraints using a non structured body.

1.1.1.4 Carequality Policy Assertions

Proposed addition: We propose adding a new EndPoint data element indicating if the described Initiating Gateway supports sending policy assertions or not. If the Initiating Gateway supports sending the Carequality policy assertion statements (as per the Carequality Implementation Guide), then the Bundle/entry/resource/Organization/contained/Endpoint/payloadType Healthcare Directory will contain one or more of the following values:

This value is mandatory and may not be left empty or missing in the Healthcare Directory.

Data Value	Description	Comments
InitiateSendAssertNone	The Initiating Gateway does not send Carequality policy assertions.	The Initiating Gateway will not send Carequality assertions and will silently fail to parse responses with Carequality Policy assertion data.
InitiateSendAssertSome	The Initiating Gateway can send Carequality policy assertions, but may not send an assertion in all cases.	An assertion will be sent if the Initiating Gateway determines that it is appropriate. In some cases the assertion will not be sent, such as if the Initiating Gateway does not have a policy assertion.
InitiateSendAssertAll	The Initiating Gateway can send Carequality policy assertions, and will send an assertion in all cases.	A populated assertion data element will be sent if the Initiating Gateway determines that it is appropriate. In some cases the assertion cannot be populated and, in this case,

		will be sent as an empty assertion data element.
InitiateReceiveAssertNone	The Initiating Gateway has no awareness of responses to it that contain Carequality policy assertions.	Responses to the Initiating Gateway that contain Carequality policy assertions will not result in syntax parsing errors by the Initiating Gateway, and will be ignored by the Initiating Gateway.

On the Responding Gateway side, the responder gateway EndPoint description in the Healthcare Directory must populate Bundle/entry/resource/Organization/contained/Endpoint/payloadType with one or more of the following values:

Data Value	Description	Comments
RespondSendAssertNone	The Responding Gateway does not send Carequality policy assertion information in the response.	
RespondSendAssertSome	The Responding Gateway can send Carequality policy assertions in the response, but may not send an assertion response in all cases.	
RespondSendAssertAll	The Responding Gateway can send Carequality policy assertions in responses, and will send an assertion in responses in all cases.	

18.   EHEALTH EXCHANGE AND CAREQUALITY HEALTHCARE DIRECTORY DIFFERENCES

Separate Healthcare Directory PROD environments are maintained for the Carequality Directory and for the eHealth Exchange directory. The DEV and VAL environments are identical across those two initiatives.

19.   SUMMARY/NEXT STEPS

This document covers what The Sequoia Project believes is the minimal information necessary to successfully understand the approach and connect to the Sequoia Project Healthcare Directory environments. The Sequoia Project will endeavor to maintain the directory with a high degree of stability with respect to the structure of the entries and the processing model until FHIR matures. FHIR has many additional capabilities that are not considered to be important, at this time, for Sequoia Project initiatives, including queries, historical version retrieval, and more. The Sequoia Project welcomes feedback on additional capabilities that may help participants use the directory more effectively. Any subsequent changes to the directory will be implemented in a backward compatible manner, if possible.

Sequoia Project staff are available to assist to a limited extent for organizations needing additional information about the directory.

20.   FAQ

Question 1: Will the Sequoia Project directory change as FHIR evolves?

Answer: The Sequoia Project is seeking to maintain the directory, largely as is, until FHIR reaches final ballot status as a full standard. We do not, at this time, anticipate changing the Sequoia directory to maintain lock-step with the FHIR standard as it evolves, until the standard is complete. This approach is intended to provide a high degree of stability for client software packages, and to avoid the associated effort involved with an ever-changing environment.

Question 2: Does my organization need an API key to access the Healthcare Directory?

> **Answer**: Yes. The API key helps The Sequoia Project efficiently, and securely, manage the directory for the benefit of all clients.

Question 3: Will my organization be able to publish to the Sequoia Project Healthcare Directory using the API?

> **Answer**: If your organization is interested in this capability, please provide feedback to The Sequoia Project expressing interest, and the anticipated value to your organization, for this capability.

Question 4: Can client software retrieve individual organizations?

> **Answer**: Not at this time. But please let The Sequoia Project know if this capability is important to you and what use cases drive this requirement.

Question 5: Can client software use FHIR query parameters?

> **Answer**: Not at this time. But please let The Sequoia Project know if this capability is important to you and what use cases drive this requirement.

Question 6: What is the directory technology stack?

> **Answer**: The Sequoia Project Healthcare Directory is based on original Sequoia Project source code, written in Ruby, using the Sinatra framework, a purpose-built in-memory database. We considered existing solutions and rejected each due to bloated capabilities, performance, production quality robustness, and lag time in implementing the Argonaut structure as enhanced by The Sequoia Project.

Question 7: Does the Sequoia Project directory support federation?

> **Answer**: In theory it should support federation. But a use case has not been advanced at this time requiring such, thus this is untested functionality.

Question 8: Does the directory contain patients or physicians?

> **Answer**: No. At this time the directory only contains organizations, contacts at those organizations, and relationships between organizations. The current directory maintains two levels of depth. For the eHealth Exchange, the directory contains Participants, and optionally sub-participants. For Carequality, the directory contains

Implementers and Connections. In the future, the directory may contain more information, as driven by approved use cases.

21.   REFERENCES

- Argonaut Project:
  http://argonautwiki.hl7.org/index.php?title=Implementation_Guide#Provider_Directory
- HL7 STU3:
  http://hl7.org/fhir/2017Jan/index.html
- The Sequoia Project
  http://sequoiaproject.org

22.   DOCUMENT CHANGE CONTROL

Version	Date	Contributors	Description
1.0 DRAFT	2017-02-01	Author: Eric Heflin Reviewers: Theresa Wiebold, Dawn Van Dyke, Didi Davis, Matt Blackmon	Initial release.
1.01 DRAFT	2017-04-12	Author Eric Heflin	Added new element indicating if a given Initiating Gateway or Responding Gateway supports policy assertions. Added value set definitions in section 14.
1.1 DRAFT	2017-10-23	Eric Heflin, Louis Alonozo	Added documentation for CRUD operation, operational monitoring, and UDDI functions.
1.12 DRAFT	2018-01-15	Eric Heflin	Internal draft.
1.12	2018-05-24	Eric Heflin	Additional clarifications and editorial changes.

23. ENVIRONMENTS

23.1. FHIR Example

1) Create/Update

Request Header:

Content-Type: text/xml, application/xml, application/fhir+xml

Url:

Create: post /fhir-stu3/1.0.0/Organization?apikey={your api key}&_format=xml

Update: put /fhir-stu3/1.0.0/Organization/:_id?apikey={your api key}&_format=xml

(1) Successful Request Body and Response

- Request Body

Sample 1

```xml
<Organization>
    <!--The ID value is internal only and subject to change for each
directory data refresh and should not be used as a persistent ID-->
    <id value="0"/>
    <meta>
        <versionId value="1"/>
        <lastUpdated value="2017-05-11T17:08:32-05:00"/>
    </meta>
    <!--This is the XCA/XCPD HomeCommunityID OID in URN format-->
    <identifier>
        <use value="official"/>
        <system value="http://www.hl7.org/oid/"/>
        <value value="urn:oid:2.16.840.1.113883.3.564.1"/>
    </identifier>
    <description value=""/>
    <active value="true"/>
    <name value="EHR Gateway Vendor"/>
    <alias value=""/>
    <!--The contact object is repeated for each person listed in the
directory-->
    <contact>
        <purpose value="Operations"/>
        <name>
            <use value="official"/>
            <text>Dasn</text>
            <given value="Dasn"/>
        </name>
        <telcom>
            <ContactPoint>
```

```xml
                <system value="email"/>
                <value value="steve@testmail.edu"/>
                <use value="work"/>
        </ContactPoint>
        <ContactPoint>
                <system value="phone"/>
                <value value="555-402-1025"/>
                <use value="work"/>
        </ContactPoint>
    </telcom>
    <!--General address for this specific person-->
    <address>
        <use value="work"/>
        <type value="both"/>
        <line value="311 Main St."/>
        <line value=""/>
        <city value="Austin"/>
        <postalCode value="2472"/>
        <country value="US"/>
    </address>
</contact>
<contact>
    <purpose value="Technical "/>
    <name>
        <use value="official"/>
        <text>Jo</text>
        <given value="Jo"/>
    </name>
    <telcom>
        <ContactPoint>
                <system value="phone"/>
                <value value="555-402-8751"/>
                <use value="work"/>
        </ContactPoint>
    </telcom>
    <!--General address for this specific person-->
    <address>
        <use value="work"/>
        <type value="both"/>
        <line value="311 Main St."/>
        <line value=""/>
        <city value="Austin"/>
        <postalCode value="2472"/>
        <country value="US"/>
    </address>
</contact>
<!--General organizational physical and mailing address-->
<address>
    <use value="work"/>
    <type value="both"/>
    <line value="311 Main St. "/>
    <city value="Austin"/>
    <state value="TX"/>
    <postalCode value="2472"/>
    <country value="US"/>
```

```xml
                    <position>
                            <longitude value="-71.1320964"/>
                            <latitude value="42.3985314"/>
                    </position>
            </address>
            <!--If this is a Carequality Connection, then the partOf object points
to the Carequality Implementer-->
            <!--If this is a eHealth Exchange Sub-Participant, then the partOf
object points to the eHealth Exchange Participant-->
            <!--If this is a lower-level organization, then the partOf object
points to the immediate parent organization-->
            <!--If this is a top-level organization, then the partOf object is not
specified-->
            <!--Not specified-->
            <managingOrg>
                    <reference
value="org.sequoiaproject.fhir.stu3/Organization/ehrgatewayvendor"/>
            </managingOrg>
            <!--The Endpoints are represented as contained resources and are
repeated as needed-->
            <contained>
                    <Endpoint>
                            <!--Home Community ID-->
                            <identifier>
                                    <use value="official"/>
                                    <type value="HCID"/>
                                    <system value="http://www.hl7.org/oid/"/>
                                    <value value="2.16.840.1.113883.3.564.1"/>
                            </identifier>
                            <!--Assigning Authority ID-->
                            <identifier>
                                    <use value="official"/>
                                    <type value="AAID"/>
                                    <system value="http://www.hl7.org/oid/"/>
                            </identifier>
                            <connectionType>
                                    <system value="http://hl7.org/fhir/subscription-
channel-type"/>
                                    <code value="IHE-XCA"/>
                            </connectionType>
                            <name value="Patient Discovery"/>
                            <managingOrganization/>
                            <address value="https://carequality.health.com/xcpd/>
                            <payloadMimeFormat value="text/xml"/>
                            <payloadType>
                                    <coding>
                                            <system
value="urn:oid:1.3.6.1.4.1.19376.1.2.3"/>
                                            <code value=""/>
                                    </coding>
                            </payloadType>
                            <extension
url="https://sequoiaproject.org/StructureDefinition/Endpoint/main/1.0.0">
                                    <extension url="Transaction">
                                            <valueString value="XCPD ITI-55"/>
```

```xml
                                    </extension>
                                    <!--Is this gateway an initiator or responder actor--
>
                                    <extension url="Actor">
                                        <valueCodeableConcept>
                                            <coding>
                                                <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Actor/1.0.0"/>
                                                <value value="Responding Gateway"/>
                                            </coding>
                                        </valueCodeableConcept>
                                    </extension>
                                    <!--Version of the service as per the eHealth
Exchange specifications-->
                                    <extension url="Version">
                                        <valueCodeableConcept>
                                            <coding>
                                                <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Version/1.0.0"
/>
                                                <value value="2.0"/>
                                            </coding>
                                        </valueCodeableConcept>
                                    </extension>
                                    <!--Initiative specific list of use cases supported--
>
                                    <extension url="UseCases">
                                        <valueCodeableConcept>
                                            <coding>
                                                <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/UseCases/1.0.0
"/>
                                                <value
value="QueryBasedDocumentExchange"/>
                                            </coding>
                                        </valueCodeableConcept>
                                    </extension>
                                    <!--PurposesOfUse Value Set for SAML header and/or
access control-->
                                    <extension url="PurposesOfUse">
                                        <valueCodeableConcept>
                                            <coding>
                                                <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/PurposesOfUse/
1.0.0"/>
                                                <value value="Treatment"/>
                                            </coding>
                                        </valueCodeableConcept>
                                    </extension>
                                    <!--Roles Value Set for SAML header and/or access
control-->
                                    <extension url="Roles">
                                        <valueCodeableConcept>
                                            <coding>
```

```xml
                                <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Roles/1.0.0"/>
                                        <value value="All"/>
                                </coding>
                        </valueCodeableConcept>
                </extension>
                <!--IPAs of gateway, may repeat-->
                <extension url="IPA">
                        <valueCodeableConcept>
                                <coding>
                                        <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/IPA/1.0.0"/>
                                        <value value=""/>
                                </coding>
                        </valueCodeableConcept>
                </extension>
            </extension>
        </Endpoint>
    </contained>
    <contained>
        <Endpoint>
                <!--Home Community ID-->
                <identifier>
                        <use value="official"/>
                        <type value="HCID"/>
                        <system value="http://www.hl7.org/oid/"/>
                        <value value="2.16.840.1.113883.3.564.1"/>
                </identifier>
                <!--Assigning Authority ID-->
                <identifier>
                        <use value="official"/>
                        <type value="AAID"/>
                        <system value="http://www.hl7.org/oid/"/>
                </identifier>
                <connectionType>
                        <system value="http://hl7.org/fhir/subscription-
channel-type"/>
                        <code value="IHE-XCA"/>
                </connectionType>
                <name value="XCA: Query for documents"/>
                <managingOrganization/>
                <address value="https://carequality.health.com/xca"/>
                <payloadMimeFormat value="text/xml"/>
                <payloadType>
                        <coding>
                                <system
value="urn:oid:1.3.6.1.4.1.19376.1.2.3"/>
                                <code value=""/>
                        </coding>
                </payloadType>
                <extension
url="https://sequoiaproject.org/StructureDefinition/Endpoint/main/1.0.0">
                        <extension url="Transaction">
                                <valueString value="XCA ITI-38"/>
                        </extension>
```

```xml
                                  <!--Is this gateway an initiator or responder actor-->
                                  <extension url="Actor">
                                      <valueCodeableConcept>
                                          <coding>
                                              <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Actor/1.0.0"/>
                                              <value value="Responding Gateway"/>
                                          </coding>
                                      </valueCodeableConcept>
                                  </extension>
                                  <!--Version of the service as per the eHealth
Exchange specifications-->
                                  <extension url="Version">
                                      <valueCodeableConcept>
                                          <coding>
                                              <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Version/1.0.0"
/>
                                              <value value="2.0"/>
                                          </coding>
                                      </valueCodeableConcept>
                                  </extension>
                                  <!--Initiative specific list of use cases supported-->
                                  <extension url="UseCases">
                                      <valueCodeableConcept>
                                          <coding>
                                              <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/UseCases/1.0.0
"/>
                                              <value
value="QueryBasedDocumentExchange"/>
                                          </coding>
                                      </valueCodeableConcept>
                                  </extension>
                                  <!--PurposesOfUse Value Set for SAML header and/or
access control-->
                                  <extension url="PurposesOfUse">
                                      <valueCodeableConcept>
                                          <coding>
                                              <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/PurposesOfUse/
1.0.0"/>
                                              <value value="Treatment"/>
                                          </coding>
                                      </valueCodeableConcept>
                                  </extension>
                                  <!--Roles Value Set for SAML header and/or access
control-->
                                  <extension url="Roles">
                                      <valueCodeableConcept>
                                          <coding>
                                              <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Roles/1.0.0"/>
```

```xml
                                        <value value="All"/>
                                </coding>
                        </valueCodeableConcept>
                </extension>
                <!--IPAs of gateway, may repeat-->
                <extension url="IPA">
                        <valueCodeableConcept>
                                <coding>
                                        <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/IPA/1.0.0"/>
                                        <value value=""/>
                                </coding>
                        </valueCodeableConcept>
                </extension>
        </extension>
    </Endpoint>
</contained>
<contained>
    <Endpoint>
                <!--Home Community ID-->
                <identifier>
                        <use value="official"/>
                        <type value="HCID"/>
                        <system value="http://www.hl7.org/oid/"/>
                        <value value="2.16.840.1.113883.3.564.1"/>
                </identifier>
                <!--Assigning Authority ID-->
                <identifier>
                        <use value="official"/>
                        <type value="AAID"/>
                        <system value="http://www.hl7.org/oid/"/>
                </identifier>
                <connectionType>
                        <system value="http://hl7.org/fhir/subscription-
channel-type"/>
                        <code value="IHE-XCA"/>
                </connectionType>
                <name value="XCA: Retrieve documents"/>
                <managingOrganization/>
                <address value="https://carequality.health.com/xca"/>
                <payloadMimeFormat value="text/xml"/>
                <payloadType>
                        <coding>
                                <system
value="urn:oid:1.3.6.1.4.1.19376.1.2.3"/>
                                <code value=""/>
                        </coding>
                </payloadType>
                <extension
url="https://sequoiaproject.org/StructureDefinition/Endpoint/main/1.0.0">
                        <extension url="Transaction">
                                <valueString value="XCA ITI-39"/>
                        </extension>
                        <!--Is this gateway an initiator or responder actor--
>
```

```xml
                    <extension url="Actor">
                        <valueCodeableConcept>
                            <coding>
                                <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Actor/1.0.0"/>
                                <value value="Responding Gateway"/>
                            </coding>
                        </valueCodeableConcept>
                    </extension>
                    <!--Version of the service as per the eHealth
Exchange specifications-->
                    <extension url="Version">
                        <valueCodeableConcept>
                            <coding>
                                <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Version/1.0.0"
/>
                                <value value="2.0"/>
                            </coding>
                        </valueCodeableConcept>
                    </extension>
                    <!--Initiative specific list of use cases supported--
>
                    <extension url="UseCases">
                        <valueCodeableConcept>
                            <coding>
                                <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/UseCases/1.0.0
"/>
                                <value
value="QueryBasedDocumentExchange"/>
                            </coding>
                        </valueCodeableConcept>
                    </extension>
                    <!--PurposesOfUse Value Set for SAML header and/or
access control-->
                    <extension url="PurposesOfUse">
                        <valueCodeableConcept>
                            <coding>
                                <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/PurposesOfUse/
1.0.0"/>
                                <value value="Treatment"/>
                            </coding>
                        </valueCodeableConcept>
                    </extension>
                    <!--Roles Value Set for SAML header and/or access
control-->
                    <extension url="Roles">
                        <valueCodeableConcept>
                            <coding>
                                <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Roles/1.0.0"/>
                                <value value="All"/>
                            </coding>
```

```xml
                                </valueCodeableConcept>
                            </extension>
                            <!--IPAs of gateway, may repeat-->
                            <extension url="IPA">
                                    <valueCodeableConcept>
                                            <coding>
                                                    <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/IPA/1.0.0"/>
                                                    <value value=""/>
                                            </coding>
                                    </valueCodeableConcept>
                            </extension>
                    </extension>
            </Endpoint>
        </contained>
</Organization>


        Sample 2
<Organization>
        <!--The ID value is internal only and subject to change for each
directory data refresh and should not be used as a persistent ID-->
        <id value="3"/>
        <meta>
                <versionId value="1"/>
                <lastUpdated value="2017-10-27T15:18:23+03:00"/>
        </meta>
        <!--This is the XCA/XCPD HomeCommunityID OID in URN format-->
        <identifier>
                <use value="official"/>
                <system value="http://www.hl7.org/oid/"/>
                <value value="urn:oid:2.16.840.1.113883.3.596"/>
        </identifier>
        <description value="EHR Gateway Vendor2"/>
        <active value="Active"/>
        <name value="EHR Gateway Vendor2"/>
        <!--The contact object is repeated for each person listed in the
directory-->
        <contact>
                <purpose value="Systems Administrator"/>
                <name>
                        <use value="official"/>
                        <text>John Smit </text>
                        <given value="John"/>
                        <family value="Smit"/>
                </name>
                <telcom>
                        <ContactPoint>
                                <system value="email"/>
                                <value value="abc@testmail.edu"/>
                                <use value="work"/>
                        </ContactPoint>
                        <ContactPoint>
                                <system value="phone"/>
                                <value value="555-571-0458"/>
                                <use value="work"/>
```

```xml
                    </ContactPoint>
            </telcom>
            <!--General address for this specific person-->
            <address/>
    </contact>
    <contact>
            <purpose value="Director of IT"/>
            <name>
                    <use value="official"/>
                    <text>Taylor To</text>
                    <given value="Taylor"/>
                    <family value="To"/>
            </name>
            <telcom>
                    <ContactPoint>
                            <system value="email"/>
                            <value value="taylor@testmail.edu"/>
                            <use value="work"/>
                    </ContactPoint>
                    <ContactPoint>
                            <system value="phone"/>
                            <value value="555-462-1910"/>
                            <use value="work"/>
                    </ContactPoint>
            </telcom>
            <!--General address for this specific person-->
            <address/>
    </contact>
    <!--General organizational physical and mailing address-->
    <address>
            <use value="work"/>
            <type value="both"/>
            <line value=""/>
            <city value=""/>
            <state value="MD"/>
            <postalCode value=""/>
            <country value="US"/>
            <position>
                    <longitude value="-76.64127119999999"/>
                    <latitude value="39.0457549"/>
            </position>
    </address>
    <!--If this is a Carequality Connection, then the partOf object points
to the Carequality Implementer-->
    <!--If this is a eHealth Exchange Sub-Participant, then the partOf
object points to the eHealth Exchange Participant-->
    <!--If this is a lower-level organization, then the partOf object
points to the immediate parent organization-->
    <!--If this is a top-level organization, then the partOf object is not
specified-->
    <partOf>
            <Reference>
                    <!--Home Community ID of parent org, if any-->
                    <identifier>
                            <use value="official"/>
```

```xml
                                <type value="HCID"/>
                                <system value="http://www.hl7.org/oid/"/>
                                <value value=""/>
                        </identifier>
                </Reference>
        </partOf>
        <!--Managing Organization Not Specified-->
        <!--The Endpoints are represented as contained resources and are
repeated as needed-->
        <contained>
                <Endpoint>
                        <!--Home Community ID-->
                        <identifier>
                                <use value="official"/>
                                <type value="HCID"/>
                                <system value="http://www.hl7.org/oid/"/>
                        </identifier>
                        <!--Assigning Authority ID-->
                        <identifier>
                                <use value="official"/>
                                <type value="AAID"/>
                                <system value="http://www.hl7.org/oid/"/>
                                <value value="urn:oid:1.2.3.4.3"/>
                        </identifier>
                        <connectionType>
                                <system value="http://hl7.org/fhir/subscription-
channel-type"/>
                                <code value="IHE-XCA"/>
                        </connectionType>
                        <name value="PatientDiscovery"/>
                        <managingOrganization/>
                        <address
value="https://conformance.xyz.com:443/CONNECTGateway/NhinService/NhinPatient
Discovery"/>
                        <payloadMimeFormat value="text/xml"/>
                        <payloadType>
                                <coding>
                                        <system
value="urn:oid:1.3.6.1.4.1.19376.1.2.3"/>
                                        <code value="All"/>
                                </coding>
                        </payloadType>
                        <extension
url="https://sequoiaproject.org/StructureDefinition/Endpoint/main/1.0.0">
                                <extension url="Transaction">
                                        <valueString value="XCA ITI-39"/>
                                </extension>
                                <!--Is this gateway an initiator or responder actor--
>
                                <extension url="Actor">
                                        <valueCodeableConcept>
                                                <coding>
                                                        <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Actor/1.0.0"/>
                                                        <value value="Responding Gateway"/>
```

```xml
                                        </coding>
                                </valueCodeableConcept>
                        </extension>
                        <!--Version of the service as per the eHealth
Exchange specifications-->
                        <extension url="Version">
                                <valueCodeableConcept>
                                        <coding>
                                                <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Version/1.0.0"
/>
                                                <value value="2.0"/>
                                        </coding>
                                </valueCodeableConcept>
                        </extension>
                        <!--Initiative specific list of use cases supported--
>
                        <extension url="UseCases">
                                <valueCodeableConcept>
                                        <coding>
                                                <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/UseCases/1.0.0
"/>
                                                <value
value="QueryBasedDocumentExchange"/>
                                        </coding>
                                </valueCodeableConcept>
                        </extension>
                        <!--PurposesOfUse Value Set for SAML header and/or
access control-->
                        <extension url="PurposesOfUse">
                                <valueCodeableConcept>
                                        <coding>
                                                <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/PurposesOfUse/
1.0.0"/>
                                                <value value="Treatment"/>
                                        </coding>
                                </valueCodeableConcept>
                        </extension>
                        <!--Roles Value Set for SAML header and/or access
control-->
                        <extension url="Roles">
                                <valueCodeableConcept>
                                        <coding>
                                                <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Roles/1.0.0"/>
                                                <value value="All"/>
                                        </coding>
                                </valueCodeableConcept>
                        </extension>
                        <!--IPAs of gateway, may repeat-->
                        <extension url="IPA">
                                <valueCodeableConcept>
                                        <coding>
```

```xml
                                        <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/IPA/1.0.0"/>
                                    </coding>
                                </valueCodeableConcept>
                            </extension>
                    </extension>
            </Endpoint>
        </contained>
        <contained>
            <Endpoint>
                    <!--Home Community ID-->
                    <identifier>
                            <use value="official"/>
                            <type value="HCID"/>
                            <system value="http://www.hl7.org/oid/"/>
                    </identifier>
                    <!--Assigning Authority ID-->
                    <identifier>
                            <use value="official"/>
                            <type value="AAID"/>
                            <system value="http://www.hl7.org/oid/"/>
                            <value value="urn:oid:1.2.3.4.3"/>
                    </identifier>
                    <connectionType>
                            <system value="http://hl7.org/fhir/subscription-
channel-type"/>
                            <code value="IHE-XCA"/>
                    </connectionType>
                    <name value="QueryForDocuments"/>
                    <managingOrganization/>
                    <address
value="https://conformance.xyz.com:443/CONNECTGateway/NhinService/RespondingG
ateway_Query_Service/DocQuery"/>
                    <payloadMimeFormat value="text/xml"/>
                    <payloadType>
                            <coding>
                                    <system
value="urn:oid:1.3.6.1.4.1.19376.1.2.3"/>
                                    <code value="All"/>
                            </coding>
                    </payloadType>
                    <extension
url="https://sequoiaproject.org/StructureDefinition/Endpoint/main/1.0.0">
                            <extension url="Transaction">
                                    <valueString value="XCA ITI-39"/>
                            </extension>
                            <!--Is this gateway an initiator or responder actor--
>
                            <extension url="Actor">
                                    <valueCodeableConcept>
                                            <coding>
                                                    <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Actor/1.0.0"/>
                                                    <value value="Responding Gateway"/>
                                            </coding>
```

```xml
					</valueCodeableConcept>
				</extension>
				<!--Version of the service as per the eHealth
Exchange specifications-->
				<extension url="Version">
					<valueCodeableConcept>
						<coding>
							<system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Version/1.0.0"
/>
								<value value="2.0"/>
						</coding>
					</valueCodeableConcept>
				</extension>
				<!--Initiative specific list of use cases supported--
>
				<extension url="UseCases">
					<valueCodeableConcept>
						<coding>
							<system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/UseCases/1.0.0
"/>
								<value
value="QueryBasedDocumentExchange"/>
						</coding>
					</valueCodeableConcept>
				</extension>
				<!--PurposesOfUse Value Set for SAML header and/or
access control-->
				<extension url="PurposesOfUse">
					<valueCodeableConcept>
						<coding>
							<system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/PurposesOfUse/
1.0.0"/>
								<value value="Treatment"/>
						</coding>
					</valueCodeableConcept>
				</extension>
				<!--Roles Value Set for SAML header and/or access
control-->
				<extension url="Roles">
					<valueCodeableConcept>
						<coding>
							<system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Roles/1.0.0"/>
								<value value="All"/>
						</coding>
					</valueCodeableConcept>
				</extension>
				<!--IPAs of gateway, may repeat-->
				<extension url="IPA">
					<valueCodeableConcept>
						<coding>
```

```xml
                                <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/IPA/1.0.0"/>
                                    </coding>
                                </valueCodeableConcept>
                        </extension>
                    </extension>
            </Endpoint>
        </contained>
        <contained>
            <Endpoint>
                    <!--Home Community ID-->
                    <identifier>
                            <use value="official"/>
                            <type value="HCID"/>
                            <system value="http://www.hl7.org/oid/"/>
                    </identifier>
                    <!--Assigning Authority ID-->
                    <identifier>
                            <use value="official"/>
                            <type value="AAID"/>
                            <system value="http://www.hl7.org/oid/"/>
                            <value value="urn:oid:1.2.3.4.3"/>
                    </identifier>
                    <connectionType>
                            <system value="http://hl7.org/fhir/subscription-
channel-type"/>
                            <code value="IHE-XCA"/>
                    </connectionType>
                    <name value="RetrieveDocuments"/>
                    <managingOrganization/>
                    <address
value="https://conformance.xyz.com:443/CONNECTGateway/NhinService/RespondingG
ateway_Retrieve_Service/DocRetrieve"/>
                    <payloadMimeFormat value="text/xml"/>
                    <payloadType>
                            <coding>
                                    <system
value="urn:oid:1.3.6.1.4.1.19376.1.2.3"/>
                                    <code value="All"/>
                            </coding>
                    </payloadType>
                    <extension
url="https://sequoiaproject.org/StructureDefinition/Endpoint/main/1.0.0">
                            <extension url="Transaction">
                                    <valueString value="XCA ITI-39"/>
                            </extension>
                            <!--Is this gateway an initiator or responder actor--
>
                            <extension url="Actor">
                                    <valueCodeableConcept>
                                            <coding>
                                                    <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Actor/1.0.0"/>
                                                    <value value="Responding Gateway"/>
                                            </coding>
```

```xml
                                            </valueCodeableConcept>
                                        </extension>
                                        <!--Version of the service as per the eHealth
Exchange specifications-->
                                        <extension url="Version">
                                            <valueCodeableConcept>
                                                <coding>
                                                    <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Version/1.0.0"
/>
                                                    <value value="2.0"/>
                                                </coding>
                                            </valueCodeableConcept>
                                        </extension>
                                        <!--Initiative specific list of use cases supported--
>
                                        <extension url="UseCases">
                                            <valueCodeableConcept>
                                                <coding>
                                                    <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/UseCases/1.0.0
"/>
                                                    <value
value="QueryBasedDocumentExchange"/>
                                                </coding>
                                            </valueCodeableConcept>
                                        </extension>
                                        <!--PurposesOfUse Value Set for SAML header and/or
access control-->
                                        <extension url="PurposesOfUse">
                                            <valueCodeableConcept>
                                                <coding>
                                                    <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/PurposesOfUse/
1.0.0"/>
                                                    <value value="Treatment"/>
                                                </coding>
                                            </valueCodeableConcept>
                                        </extension>
                                        <!--Roles Value Set for SAML header and/or access
control-->
                                        <extension url="Roles">
                                            <valueCodeableConcept>
                                                <coding>
                                                    <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Roles/1.0.0"/>
                                                    <value value="All"/>
                                                </coding>
                                            </valueCodeableConcept>
                                        </extension>
                                        <!--IPAs of gateway, may repeat-->
                                        <extension url="IPA">
                                            <valueCodeableConcept>
                                                <coding>
```

```xml
                                        <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/IPA/1.0.0"/>
                                    </coding>
                                </valueCodeableConcept>
                            </extension>
                    </extension>
            </Endpoint>
        </contained>
        <contained>
            <Endpoint>
                    <!--Home Community ID-->
                    <identifier>
                            <use value="official"/>
                            <type value="HCID"/>
                            <system value="http://www.hl7.org/oid/"/>
                    </identifier>
                    <!--Assigning Authority ID-->
                    <identifier>
                            <use value="official"/>
                            <type value="AAID"/>
                            <system value="http://www.hl7.org/oid/"/>
                            <value value="urn:oid:1.2.3.4.3"/>
                    </identifier>
                    <connectionType>
                            <system value="http://hl7.org/fhir/subscription-
channel-type"/>
                            <code value="IHE-XCA"/>
                    </connectionType>
                    <name value="HIEMSubscription"/>
                    <managingOrganization/>
                    <address
value="https://conformance.xyz.com:443/CONNECTGateway/NhinService/Notificatio
nProducerService/HiemSubscription"/>
                    <payloadMimeFormat value="text/xml"/>
                    <payloadType>
                            <coding>
                                    <system
value="urn:oid:1.3.6.1.4.1.19376.1.2.3"/>
                                    <code value="All"/>
                            </coding>
                    </payloadType>
                    <extension
url="https://sequoiaproject.org/StructureDefinition/Endpoint/main/1.0.0">
                            <extension url="Transaction">
                                    <valueString value="XCA ITI-39"/>
                            </extension>
                            <!--Is this gateway an initiator or responder actor--
>
                            <extension url="Actor">
                                    <valueCodeableConcept>
                                            <coding>
                                                    <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Actor/1.0.0"/>
                                                    <value value="Responding Gateway"/>
                                            </coding>
```

```xml
                                </valueCodeableConcept>
                        </extension>
                        <!--Version of the service as per the eHealth
Exchange specifications-->
                        <extension url="Version">
                                <valueCodeableConcept>
                                        <coding>
                                                <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Version/1.0.0"
/>
                                                <value value="2.0"/>
                                        </coding>
                                </valueCodeableConcept>
                        </extension>
                        <!--Initiative specific list of use cases supported--
>
                        <extension url="UseCases">
                                <valueCodeableConcept>
                                        <coding>
                                                <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/UseCases/1.0.0
"/>
                                                <value
value="QueryBasedDocumentExchange"/>
                                        </coding>
                                </valueCodeableConcept>
                        </extension>
                        <!--PurposesOfUse Value Set for SAML header and/or
access control-->
                        <extension url="PurposesOfUse">
                                <valueCodeableConcept>
                                        <coding>
                                                <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/PurposesOfUse/
1.0.0"/>
                                                <value value="Treatment"/>
                                        </coding>
                                </valueCodeableConcept>
                        </extension>
                        <!--Roles Value Set for SAML header and/or access
control-->
                        <extension url="Roles">
                                <valueCodeableConcept>
                                        <coding>
                                                <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Roles/1.0.0"/>
                                                <value value="All"/>
                                        </coding>
                                </valueCodeableConcept>
                        </extension>
                        <!--IPAs of gateway, may repeat-->
                        <extension url="IPA">
                                <valueCodeableConcept>
                                        <coding>
```

```xml
                                        <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/IPA/1.0.0"/>
                                    </coding>
                                </valueCodeableConcept>
                            </extension>
                        </extension>
                </Endpoint>
            </contained>
            <contained>
                <Endpoint>
                        <!--Home Community ID-->
                        <identifier>
                                <use value="official"/>
                                <type value="HCID"/>
                                <system value="http://www.hl7.org/oid/"/>
                        </identifier>
                        <!--Assigning Authority ID-->
                        <identifier>
                                <use value="official"/>
                                <type value="AAID"/>
                                <system value="http://www.hl7.org/oid/"/>
                                <value value="urn:oid:1.2.3.4.3"/>
                        </identifier>
                        <connectionType>
                                <system value="http://hl7.org/fhir/subscription-
channel-type"/>
                                <code value="IHE-XCA"/>
                        </connectionType>
                        <name value="HIEMNotify"/>
                        <managingOrganization/>
                        <address
value="https://conformance.xyz.com:443/CONNECTGateway/NhinService/Notificatio
nConsumerService/HiemNotify"/>
                        <payloadMimeFormat value="text/xml"/>
                        <payloadType>
                                <coding>
                                        <system
value="urn:oid:1.3.6.1.4.1.19376.1.2.3"/>
                                        <code value="All"/>
                                </coding>
                        </payloadType>
                        <extension
url="https://sequoiaproject.org/StructureDefinition/Endpoint/main/1.0.0">
                                <extension url="Transaction">
                                        <valueString value="XCA ITI-39"/>
                                </extension>
                                <!--Is this gateway an initiator or responder actor--
>
                                <extension url="Actor">
                                        <valueCodeableConcept>
                                                <coding>
                                                        <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Actor/1.0.0"/>
                                                        <value value="Responding Gateway"/>
                                                </coding>
```

```xml
                                                </valueCodeableConcept>
                                        </extension>
                                        <!--Version of the service as per the eHealth
Exchange specifications-->
                                        <extension url="Version">
                                                <valueCodeableConcept>
                                                        <coding>
                                                                <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Version/1.0.0"
/>
                                                                <value value="2.0"/>
                                                        </coding>
                                                </valueCodeableConcept>
                                        </extension>
                                        <!--Initiative specific list of use cases supported--
>
                                        <extension url="UseCases">
                                                <valueCodeableConcept>
                                                        <coding>
                                                                <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/UseCases/1.0.0
"/>
                                                                <value
value="QueryBasedDocumentExchange"/>
                                                        </coding>
                                                </valueCodeableConcept>
                                        </extension>
                                        <!--PurposesOfUse Value Set for SAML header and/or
access control-->
                                        <extension url="PurposesOfUse">
                                                <valueCodeableConcept>
                                                        <coding>
                                                                <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/PurposesOfUse/
1.0.0"/>
                                                                <value value="Treatment"/>
                                                        </coding>
                                                </valueCodeableConcept>
                                        </extension>
                                        <!--Roles Value Set for SAML header and/or access
control-->
                                        <extension url="Roles">
                                                <valueCodeableConcept>
                                                        <coding>
                                                                <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Roles/1.0.0"/>
                                                                <value value="All"/>
                                                        </coding>
                                                </valueCodeableConcept>
                                        </extension>
                                        <!--IPAs of gateway, may repeat-->
                                        <extension url="IPA">
                                                <valueCodeableConcept>
                                                        <coding>
```

```xml
                                        <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/IPA/1.0.0"/>
                                    </coding>
                                </valueCodeableConcept>
                            </extension>
                        </extension>
                </Endpoint>
        </contained>
        <contained>
                <Endpoint>
                        <!--Home Community ID-->
                        <identifier>
                                <use value="official"/>
                                <type value="HCID"/>
                                <system value="http://www.hl7.org/oid/"/>
                        </identifier>
                        <!--Assigning Authority ID-->
                        <identifier>
                                <use value="official"/>
                                <type value="AAID"/>
                                <system value="http://www.hl7.org/oid/"/>
                                <value value="urn:oid:1.2.3.4.3"/>
                        </identifier>
                        <connectionType>
                                <system value="http://hl7.org/fhir/subscription-
channel-type"/>
                                <code value="IHE-XCA"/>
                        </connectionType>
                        <name value="HIEMUnsubscribe"/>
                        <managingOrganization/>
                        <address
value="https://conformance.xyz.com:443/CONNECTGateway/NhinService/Subscriptio
nManagerService/HiemUnsubscribe"/>
                        <payloadMimeFormat value="text/xml"/>
                        <payloadType>
                                <coding>
                                        <system
value="urn:oid:1.3.6.1.4.1.19376.1.2.3"/>
                                        <code value="All"/>
                                </coding>
                        </payloadType>
                        <extension
url="https://sequoiaproject.org/StructureDefinition/Endpoint/main/1.0.0">
                                <extension url="Transaction">
                                        <valueString value="XCA ITI-39"/>
                                </extension>
                                <!--Is this gateway an initiator or responder actor--
>
                                <extension url="Actor">
                                        <valueCodeableConcept>
                                                <coding>
                                                        <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Actor/1.0.0"/>
                                                        <value value="Responding Gateway"/>
                                                </coding>
```

```xml
								</valueCodeableConcept>
							</extension>
							<!--Version of the service as per the eHealth
Exchange specifications-->
							<extension url="Version">
								<valueCodeableConcept>
									<coding>
										<system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Version/1.0.0"
/>
										<value value="2.0"/>
									</coding>
								</valueCodeableConcept>
							</extension>
							<!--Initiative specific list of use cases supported--
>
							<extension url="UseCases">
								<valueCodeableConcept>
									<coding>
										<system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/UseCases/1.0.0
"/>
										<value
value="QueryBasedDocumentExchange"/>
									</coding>
								</valueCodeableConcept>
							</extension>
							<!--PurposesOfUse Value Set for SAML header and/or
access control-->
							<extension url="PurposesOfUse">
								<valueCodeableConcept>
									<coding>
										<system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/PurposesOfUse/
1.0.0"/>
										<value value="Treatment"/>
									</coding>
								</valueCodeableConcept>
							</extension>
							<!--Roles Value Set for SAML header and/or access
control-->
							<extension url="Roles">
								<valueCodeableConcept>
									<coding>
										<system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Roles/1.0.0"/>
										<value value="All"/>
									</coding>
								</valueCodeableConcept>
							</extension>
							<!--IPAs of gateway, may repeat-->
							<extension url="IPA">
								<valueCodeableConcept>
									<coding>
```

```xml
                                <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/IPA/1.0.0"/>
                                </coding>
                            </valueCodeableConcept>
                        </extension>
                    </extension>
                </Endpoint>
        </contained>
</Organization>


        Sample 3
<Organization>
        <!--The ID value is internal only and subject to change for each
directory data refresh and should not be used as a persistent ID-->
        <id value="4"/>
        <meta>
                <versionId value="1"/>
                <lastUpdated value="2017-10-27T15:18:23+03:00"/>
        </meta>
        <!--This is the XCA/XCPD HomeCommunityID OID in URN format-->
        <identifier>
                <use value="official"/>
                <system value="http://www.hl7.org/oid/"/>
                <value value="2.16.840.1.113883.3.614"/>
        </identifier>
        <description value="The manual conformance lab used to validate
conformance to the Nationwide Health Information Network specifications
during the onboarding process."/>
        <active value="Active"/>
        <name value="EHR Gateway Vendor"/>
        <!--The contact object is repeated for each person listed in the
directory-->
        <contact>
                <purpose value="System Administrator"/>
                <name>
                        <use value="official"/>
                        <text>Taylor To</text>
                        <given value="Taylor"/>
                        <family value="To"/>
                </name>
                <telcom>
                        <ContactPoint>
                                <system value="email"/>
                                <value value="taylor@testmail.edu"/>
                                <use value="work"/>
                        </ContactPoint>
                        <ContactPoint>
                                <system value="phone"/>
                                <value value="(555) 526-6042"/>
                                <use value="work"/>
                        </ContactPoint>
                        <ContactPoint>
                                <system value="phone"/>
                                <value value="(555) 526-6042"/>
                                <use value="work"/>
```

```xml
                </ContactPoint>
            </telcom>
            <!--General address for this specific person-->
            <address/>
    </contact>
    <!--General organizational physical and mailing address-->
    <address>
            <use value="work"/>
            <type value="both"/>
            <line value=""/>
            <city value=""/>
            <state value="MD"/>
            <postalCode value=""/>
            <country value="US"/>
            <position>
                    <longitude value="-76.64127119999999"/>
                    <latitude value="39.0457549"/>
            </position>
    </address>
    <!--If this is a Carequality Connection, then the partOf object points
to the Carequality Implementer-->
    <!--If this is a eHealth Exchange Sub-Participant, then the partOf
object points to the eHealth Exchange Participant-->
    <!--If this is a lower-level organization, then the partOf object
points to the immediate parent organization-->
    <!--If this is a top-level organization, then the partOf object is not
specified-->
    <partOf>
            <Reference>
                    <!--Home Community ID of parent org, if any-->
                    <identifier>
                            <use value="official"/>
                            <type value="HCID"/>
                            <system value="http://www.hl7.org/oid/"/>
                            <value value=""/>
                    </identifier>
            </Reference>
    </partOf>
    <!--Managing Organization Not Specified-->
    <!--The Endpoints are represented as contained resources and are
repeated as needed-->
    <contained>
            <Endpoint>
                    <!--Home Community ID-->
                    <identifier>
                            <use value="official"/>
                            <type value="HCID"/>
                            <system value="http://www.hl7.org/oid/"/>
                    </identifier>
                    <!--Assigning Authority ID-->
                    <identifier>
                            <use value="official"/>
                            <type value="AAID"/>
                            <system value="http://www.hl7.org/oid/"/>
                            <value value="urn:oid:1.2.3.4.3"/>
```

```xml
                            </identifier>
                            <connectionType>
                                    <system value="http://hl7.org/fhir/subscription-
channel-type"/>
                                    <code value="IHE-XCA"/>
                            </connectionType>
                            <name value="Patient Discovery"/>
                            <managingOrganization/>
                            <address
value="https://conformance2.xya.com/CONNECTGateway/NhinService/NhinPatientDis
covery"/>
                            <payloadMimeFormat value="text/xml"/>
                            <payloadType>
                                    <coding>
                                            <system
value="urn:oid:1.3.6.1.4.1.19376.1.2.3"/>
                                            <code value="All"/>
                                    </coding>
                            </payloadType>
                            <extension
url="https://sequoiaproject.org/StructureDefinition/Endpoint/main/1.0.0">
                                    <extension url="Transaction">
                                            <valueString value="XCA ITI-39"/>
                                    </extension>
                                    <!--Is this gateway an initiator or responder actor--
>
                                    <extension url="Actor">
                                            <valueCodeableConcept>
                                                    <coding>
                                                            <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Actor/1.0.0"/>
                                                            <value value="Responding Gateway"/>
                                                    </coding>
                                            </valueCodeableConcept>
                                    </extension>
                                    <!--Version of the service as per the eHealth
Exchange specifications-->
                                    <extension url="Version">
                                            <valueCodeableConcept>
                                                    <coding>
                                                            <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Version/1.0.0"
/>
                                                            <value value="2.0"/>
                                                    </coding>
                                            </valueCodeableConcept>
                                    </extension>
                                    <!--Initiative specific list of use cases supported--
>
                                    <extension url="UseCases">
                                            <valueCodeableConcept>
                                                    <coding>
                                                            <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/UseCases/1.0.0
"/>
```

```xml
                                        <value
value="QueryBasedDocumentExchange"/>
                                    </coding>
                                </valueCodeableConcept>
                            </extension>
                            <!--PurposesOfUse Value Set for SAML header and/or
access control-->
                            <extension url="PurposesOfUse">
                                <valueCodeableConcept>
                                    <coding>
                                        <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/PurposesOfUse/
1.0.0"/>
                                        <value value="Treatment"/>
                                    </coding>
                                </valueCodeableConcept>
                            </extension>
                            <!--Roles Value Set for SAML header and/or access
control-->
                            <extension url="Roles">
                                <valueCodeableConcept>
                                    <coding>
                                        <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Roles/1.0.0"/>
                                        <value value="All"/>
                                    </coding>
                                </valueCodeableConcept>
                            </extension>
                            <!--IPAs of gateway, may repeat-->
                            <extension url="IPA">
                                <valueCodeableConcept>
                                    <coding>
                                        <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/IPA/1.0.0"/>
                                    </coding>
                                </valueCodeableConcept>
                            </extension>
                        </extension>
                </Endpoint>
        </contained>
        <contained>
                <Endpoint>
                        <!--Home Community ID-->
                        <identifier>
                                <use value="official"/>
                                <type value="HCID"/>
                                <system value="http://www.hl7.org/oid/"/>
                        </identifier>
                        <!--Assigning Authority ID-->
                        <identifier>
                                <use value="official"/>
                                <type value="AAID"/>
                                <system value="http://www.hl7.org/oid/"/>
                                <value value="urn:oid:1.2.3.4.3"/>
                        </identifier>
```

```xml
                    <connectionType>
                            <system value="http://hl7.org/fhir/subscription-
channel-type"/>
                            <code value="IHE-XCA"/>
                    </connectionType>
                    <name value="Query for Documents"/>
                    <managingOrganization/>
                    <address
value="https://conformance2.xyz.com/CONNECTGateway/NhinService/RespondingGate
way_Query_Service/DocQuery"/>
                    <payloadMimeFormat value="text/xml"/>
                    <payloadType>
                            <coding>
                                    <system
value="urn:oid:1.3.6.1.4.1.19376.1.2.3"/>
                                    <code value="All"/>
                            </coding>
                    </payloadType>
                    <extension
url="https://sequoiaproject.org/StructureDefinition/Endpoint/main/1.0.0">
                            <extension url="Transaction">
                                    <valueString value="XCA ITI-39"/>
                            </extension>
                            <!--Is this gateway an initiator or responder actor--
>
                            <extension url="Actor">
                                    <valueCodeableConcept>
                                            <coding>
                                                    <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Actor/1.0.0"/>
                                                    <value value="Responding Gateway"/>
                                            </coding>
                                    </valueCodeableConcept>
                            </extension>
                            <!--Version of the service as per the eHealth
Exchange specifications-->
                            <extension url="Version">
                                    <valueCodeableConcept>
                                            <coding>
                                                    <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Version/1.0.0"
/>
                                                    <value value="2.0"/>
                                            </coding>
                                    </valueCodeableConcept>
                            </extension>
                            <!--Initiative specific list of use cases supported--
>
                            <extension url="UseCases">
                                    <valueCodeableConcept>
                                            <coding>
                                                    <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/UseCases/1.0.0
"/>
```

```xml
                                                <value
value="QueryBasedDocumentExchange"/>
                                        </coding>
                                </valueCodeableConcept>
                        </extension>
                        <!--PurposesOfUse Value Set for SAML header and/or
access control-->
                        <extension url="PurposesOfUse">
                                <valueCodeableConcept>
                                        <coding>
                                                <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/PurposesOfUse/
1.0.0"/>
                                                <value value="Treatment"/>
                                        </coding>
                                </valueCodeableConcept>
                        </extension>
                        <!--Roles Value Set for SAML header and/or access
control-->
                        <extension url="Roles">
                                <valueCodeableConcept>
                                        <coding>
                                                <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Roles/1.0.0"/>
                                                <value value="All"/>
                                        </coding>
                                </valueCodeableConcept>
                        </extension>
                        <!--IPAs of gateway, may repeat-->
                        <extension url="IPA">
                                <valueCodeableConcept>
                                        <coding>
                                                <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/IPA/1.0.0"/>
                                        </coding>
                                </valueCodeableConcept>
                        </extension>
                </extension>
        </Endpoint>
    </contained>
    <contained>
        <Endpoint>
                <!--Home Community ID-->
                <identifier>
                        <use value="official"/>
                        <type value="HCID"/>
                        <system value="http://www.hl7.org/oid/"/>
                </identifier>
                <!--Assigning Authority ID-->
                <identifier>
                        <use value="official"/>
                        <type value="AAID"/>
                        <system value="http://www.hl7.org/oid/"/>
                        <value value="urn:oid:1.2.3.4.3"/>
                </identifier>
```

```xml
                    <connectionType>
                        <system value="http://hl7.org/fhir/subscription-
channel-type"/>
                        <code value="IHE-XCA"/>
                    </connectionType>
                    <name value="Retrieve Documents"/>
                    <managingOrganization/>
                    <address
value="https://conformance2.xyz.com/CONNECTGateway/NhinService/RespondingGate
way_Retrieve_Service/DocRetrieve"/>
                    <payloadMimeFormat value="text/xml"/>
                    <payloadType>
                        <coding>
                            <system
value="urn:oid:1.3.6.1.4.1.19376.1.2.3"/>
                            <code value="All"/>
                        </coding>
                    </payloadType>
                    <extension
url="https://sequoiaproject.org/StructureDefinition/Endpoint/main/1.0.0">
                        <extension url="Transaction">
                            <valueString value="XCA ITI-39"/>
                        </extension>
                        <!--Is this gateway an initiator or responder actor--
>
                        <extension url="Actor">
                            <valueCodeableConcept>
                                <coding>
                                    <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Actor/1.0.0"/>
                                    <value value="Responding Gateway"/>
                                </coding>
                            </valueCodeableConcept>
                        </extension>
                        <!--Version of the service as per the eHealth
Exchange specifications-->
                        <extension url="Version">
                            <valueCodeableConcept>
                                <coding>
                                    <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Version/1.0.0"
/>
                                    <value value="2.0"/>
                                </coding>
                            </valueCodeableConcept>
                        </extension>
                        <!--Initiative specific list of use cases supported--
>
                        <extension url="UseCases">
                            <valueCodeableConcept>
                                <coding>
                                    <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/UseCases/1.0.0
"/>
```

```xml
                                        <value
value="QueryBasedDocumentExchange"/>
                                    </coding>
                                </valueCodeableConcept>
                            </extension>
                            <!--PurposesOfUse Value Set for SAML header and/or
access control-->
                            <extension url="PurposesOfUse">
                                <valueCodeableConcept>
                                    <coding>
                                        <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/PurposesOfUse/
1.0.0"/>
                                        <value value="Treatment"/>
                                    </coding>
                                </valueCodeableConcept>
                            </extension>
                            <!--Roles Value Set for SAML header and/or access
control-->
                            <extension url="Roles">
                                <valueCodeableConcept>
                                    <coding>
                                        <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Roles/1.0.0"/>
                                        <value value="All"/>
                                    </coding>
                                </valueCodeableConcept>
                            </extension>
                            <!--IPAs of gateway, may repeat-->
                            <extension url="IPA">
                                <valueCodeableConcept>
                                    <coding>
                                        <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/IPA/1.0.0"/>
                                    </coding>
                                </valueCodeableConcept>
                            </extension>
                        </extension>
                </Endpoint>
            </contained>
</Organization>

        Sample 4
<Organization>
    <!--The ID value is internal only and subject to change for each
directory data refresh and should not be used as a persistent ID-->
    <id value="5"/>
    <meta>
        <versionId value="1"/>
        <lastUpdated value="2017-10-27T15:18:23+03:00"/>
    </meta>
    <!--This is the XCA/XCPD HomeCommunityID OID in URN format-->
    <identifier>
        <use value="official"/>
        <system value="http://www.hl7.org/oid/"/>
```

```xml
                <value value="2.16.840.1.113883.3.333"/>
        </identifier>
        <description value="EHR Gateway Vendor4"/>
        <active value="Active"/>
        <name value="EHR Gateway Vendor4"/>
        <!--The contact object is repeated for each person listed in the
directory-->
        <contact>
                <purpose value=""/>
                <name>
                        <use value="official"/>
                        <text>Steve Jo</text>
                        <given value="Steve"/>
                        <family value="Jo"/>
                </name>
                <telcom>
                        <ContactPoint>
                                <system value="email"/>
                                <value value="steve@testmail.edu"/>
                                <use value="work"/>
                        </ContactPoint>
                </telcom>
                <!--General address for this specific person-->
                <address/>
        </contact>
        <!--General organizational physical and mailing address-->
        <address>
                <use value="work"/>
                <type value="both"/>
                <line value=""/>
                <city value=""/>
                <state value="TX"/>
                <postalCode value=""/>
                <country value="US"/>
                <position>
                        <longitude value="-99.9018131"/>
                        <latitude value="31.9685988"/>
                </position>
        </address>
        <!--If this is a Carequality Connection, then the partOf object points
to the Carequality Implementer-->
        <!--If this is a eHealth Exchange Sub-Participant, then the partOf
object points to the eHealth Exchange Participant-->
        <!--If this is a lower-level organization, then the partOf object
points to the immediate parent organization-->
        <!--If this is a top-level organization, then the partOf object is not
specified-->
        <partOf>
                <Reference>
                        <!--Home Community ID of parent org, if any-->
                        <identifier>
                                <use value="official"/>
                                <type value="HCID"/>
                                <system value="http://www.hl7.org/oid/"/>
                                <value value=""/>
```

```xml
                </identifier>
            </Reference>
    </partOf>
    <!--Managing Organization Not Specified-->
    <!--The Endpoints are represented as contained resources and are
repeated as needed-->
    <contained>
        <Endpoint>
                <!--Home Community ID-->
                <identifier>
                        <use value="official"/>
                        <type value="HCID"/>
                        <system value="http://www.hl7.org/oid/"/>
                </identifier>
                <!--Assigning Authority ID-->
                <identifier>
                        <use value="official"/>
                        <type value="AAID"/>
                        <system value="http://www.hl7.org/oid/"/>
                        <value value="urn:oid:1.2.3.4.3"/>
                </identifier>
                <connectionType>
                        <system value="http://hl7.org/fhir/subscription-
channel-type"/>
                        <code value="IHE-XCA"/>
                </connectionType>
                <name value="Patient Discovery"/>
                <managingOrganization/>
                <address value="https://test/xcpd"/>
                <payloadMimeFormat value="text/xml"/>
                <payloadType>
                        <coding>
                                <system
value="urn:oid:1.3.6.1.4.1.19376.1.2.3"/>
                                <code value="All"/>
                        </coding>
                </payloadType>
                <extension
url="https://sequoiaproject.org/StructureDefinition/Endpoint/main/1.0.0">
                        <extension url="Transaction">
                                <valueString value="XCA ITI-39"/>
                        </extension>
                        <!--Is this gateway an initiator or responder actor--
>
                        <extension url="Actor">
                                <valueCodeableConcept>
                                        <coding>
                                                <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Actor/1.0.0"/>
                                                <value value="Responding Gateway"/>
                                        </coding>
                                </valueCodeableConcept>
                        </extension>
                        <!--Version of the service as per the eHealth
Exchange specifications-->
```

```xml
                            <extension url="Version">
                                    <valueCodeableConcept>
                                            <coding>
                                                    <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Version/1.0.0"
/>
                                                    <value value="2.0"/>
                                            </coding>
                                    </valueCodeableConcept>
                            </extension>
                            <!--Initiative specific list of use cases supported--
>
                            <extension url="UseCases">
                                    <valueCodeableConcept>
                                            <coding>
                                                    <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/UseCases/1.0.0
"/>
                                                    <value
value="QueryBasedDocumentExchange"/>
                                            </coding>
                                    </valueCodeableConcept>
                            </extension>
                            <!--PurposesOfUse Value Set for SAML header and/or
access control-->
                            <extension url="PurposesOfUse">
                                    <valueCodeableConcept>
                                            <coding>
                                                    <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/PurposesOfUse/
1.0.0"/>
                                                    <value value="Treatment"/>
                                            </coding>
                                    </valueCodeableConcept>
                            </extension>
                            <!--Roles Value Set for SAML header and/or access
control-->
                            <extension url="Roles">
                                    <valueCodeableConcept>
                                            <coding>
                                                    <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Roles/1.0.0"/>
                                                    <value value="All"/>
                                            </coding>
                                    </valueCodeableConcept>
                            </extension>
                            <!--IPAs of gateway, may repeat-->
                            <extension url="IPA">
                                    <valueCodeableConcept>
                                            <coding>
                                                    <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/IPA/1.0.0"/>
                                            </coding>
                                    </valueCodeableConcept>
                            </extension>
```

```xml
                    </extension>
            </Endpoint>
    </contained>
    <contained>
            <Endpoint>
                    <!--Home Community ID-->
                    <identifier>
                            <use value="official"/>
                            <type value="HCID"/>
                            <system value="http://www.hl7.org/oid/"/>
                    </identifier>
                    <!--Assigning Authority ID-->
                    <identifier>
                            <use value="official"/>
                            <type value="AAID"/>
                            <system value="http://www.hl7.org/oid/"/>
                            <value value="urn:oid:1.2.3.4.3"/>
                    </identifier>
                    <connectionType>
                            <system value="http://hl7.org/fhir/subscription-
channel-type"/>
                            <code value="IHE-XCA"/>
                    </connectionType>
                    <name value="Query for Documents"/>
                    <managingOrganization/>
                    <address value="https://test/xca"/>
                    <payloadMimeFormat value="text/xml"/>
                    <payloadType>
                            <coding>
                                    <system
value="urn:oid:1.3.6.1.4.1.19376.1.2.3"/>
                                    <code value="All"/>
                            </coding>
                    </payloadType>
                    <extension
url="https://sequoiaproject.org/StructureDefinition/Endpoint/main/1.0.0">
                            <extension url="Transaction">
                                    <valueString value="XCA ITI-39"/>
                            </extension>
                            <!--Is this gateway an initiator or responder actor--
>
                            <extension url="Actor">
                                    <valueCodeableConcept>
                                            <coding>
                                                    <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Actor/1.0.0"/>
                                                    <value value="Responding Gateway"/>
                                            </coding>
                                    </valueCodeableConcept>
                            </extension>
                            <!--Version of the service as per the eHealth
Exchange specifications-->
                            <extension url="Version">
                                    <valueCodeableConcept>
                                            <coding>
```

```xml
                                                <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Version/1.0.0"
/>
                                                <value value="2.0"/>
                                        </coding>
                                </valueCodeableConcept>
                        </extension>
                        <!--Initiative specific list of use cases supported--
>
                        <extension url="UseCases">
                                <valueCodeableConcept>
                                        <coding>
                                                <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/UseCases/1.0.0
"/>
                                                <value
value="QueryBasedDocumentExchange"/>
                                        </coding>
                                </valueCodeableConcept>
                        </extension>
                        <!--PurposesOfUse Value Set for SAML header and/or
access control-->
                        <extension url="PurposesOfUse">
                                <valueCodeableConcept>
                                        <coding>
                                                <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/PurposesOfUse/
1.0.0"/>
                                                <value value="Treatment"/>
                                        </coding>
                                </valueCodeableConcept>
                        </extension>
                        <!--Roles Value Set for SAML header and/or access
control-->
                        <extension url="Roles">
                                <valueCodeableConcept>
                                        <coding>
                                                <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Roles/1.0.0"/>
                                                <value value="All"/>
                                        </coding>
                                </valueCodeableConcept>
                        </extension>
                        <!--IPAs of gateway, may repeat-->
                        <extension url="IPA">
                                <valueCodeableConcept>
                                        <coding>
                                                <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/IPA/1.0.0"/>
                                        </coding>
                                </valueCodeableConcept>
                        </extension>
                </extension>
        </Endpoint>
    </contained>
```

```xml
<contained>
        <Endpoint>
                <!--Home Community ID-->
                <identifier>
                        <use value="official"/>
                        <type value="HCID"/>
                        <system value="http://www.hl7.org/oid/"/>
                </identifier>
                <!--Assigning Authority ID-->
                <identifier>
                        <use value="official"/>
                        <type value="AAID"/>
                        <system value="http://www.hl7.org/oid/"/>
                        <value value="urn:oid:1.2.3.4.3"/>
                </identifier>
                <connectionType>
                        <system value="http://hl7.org/fhir/subscription-
channel-type"/>
                        <code value="IHE-XCA"/>
                </connectionType>
                <name value="Retrieve Documents"/>
                <managingOrganization/>
                <address value="https://test/xca"/>
                <payloadMimeFormat value="text/xml"/>
                <payloadType>
                        <coding>
                                <system
value="urn:oid:1.3.6.1.4.1.19376.1.2.3"/>
                                <code value="All"/>
                        </coding>
                </payloadType>
                <extension
url="https://sequoiaproject.org/StructureDefinition/Endpoint/main/1.0.0">
                        <extension url="Transaction">
                                <valueString value="XCA ITI-39"/>
                        </extension>
                        <!--Is this gateway an initiator or responder actor--
>
                        <extension url="Actor">
                                <valueCodeableConcept>
                                        <coding>
                                                <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Actor/1.0.0"/>
                                                <value value="Responding Gateway"/>
                                        </coding>
                                </valueCodeableConcept>
                        </extension>
                        <!--Version of the service as per the eHealth
Exchange specifications-->
                        <extension url="Version">
                                <valueCodeableConcept>
                                        <coding>
                                                <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Version/1.0.0"
/>
```

```xml
                                    <value value="2.0"/>
                                </coding>
                            </valueCodeableConcept>
                        </extension>
                        <!--Initiative specific list of use cases supported-->
                        <extension url="UseCases">
                            <valueCodeableConcept>
                                <coding>
                                    <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/UseCases/1.0.0
"/>
                                    <value
value="QueryBasedDocumentExchange"/>
                                </coding>
                            </valueCodeableConcept>
                        </extension>
                        <!--PurposesOfUse Value Set for SAML header and/or
access control-->
                        <extension url="PurposesOfUse">
                            <valueCodeableConcept>
                                <coding>
                                    <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/PurposesOfUse/
1.0.0"/>
                                    <value value="Treatment"/>
                                </coding>
                            </valueCodeableConcept>
                        </extension>
                        <!--Roles Value Set for SAML header and/or access
control-->
                        <extension url="Roles">
                            <valueCodeableConcept>
                                <coding>
                                    <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Roles/1.0.0"/>
                                    <value value="All"/>
                                </coding>
                            </valueCodeableConcept>
                        </extension>
                        <!--IPAs of gateway, may repeat-->
                        <extension url="IPA">
                            <valueCodeableConcept>
                                <coding>
                                    <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/IPA/1.0.0"/>
                                </coding>
                            </valueCodeableConcept>
                        </extension>
                    </extension>
                </Endpoint>
            </contained>
</Organization>


        Sample 5
```

138

```xml
<Organization>
      <!--The ID value is internal only and subject to change for each
directory data refresh and should not be used as a persistent ID-->
      <id value="6"/>
      <meta>
            <versionId value="1"/>
            <lastUpdated value="2017-10-27T15:18:23+03:00"/>
      </meta>
      <!--This is the XCA/XCPD HomeCommunityID OID in URN format-->
      <identifier>
            <use value="official"/>
            <system value="http://www.hl7.org/oid/"/>
            <value value="2.16.840.1.113883.3.787.0.0"/>
      </identifier>
      <description value="EHR Gateway Vendor"/>
      <active value="Active"/>
      <name value="EHR Gateway Vendor"/>
      <!--The contact object is repeated for each person listed in the
directory-->
      <contact>
            <purpose value=""/>
            <name>
                  <use value="official"/>
                  <text>John Smit</text>
                  <given value="John"/>
                  <family value="Smit"/>
            </name>
            <telcom>
                  <ContactPoint>
                        <system value="email"/>
                        <value value="john@testmail.edu"/>
                        <use value="work"/>
                  </ContactPoint>
                  <ContactPoint>
                        <system value="phone"/>
                        <value value="+1-555-201-2760"/>
                        <use value="work"/>
                  </ContactPoint>
                  <ContactPoint>
                        <system value="phone"/>
                        <value value="+1-555-201-2760"/>
                        <use value="work"/>
                  </ContactPoint>
            </telcom>
            <!--General address for this specific person-->
            <address/>
      </contact>
      <contact>
            <purpose value=""/>
            <name>
                  <use value="official"/>
                  <text>Yurii Apple</text>
                  <given value="Yurii"/>
                  <family value="Apple"/>
            </name>
```

```xml
            <telcom>
                    <ContactPoint>
                            <system value="email"/>
                            <value value="joe@testmail.edu"/>
                            <use value="work"/>
                    </ContactPoint>
                    <ContactPoint>
                            <system value="phone"/>
                            <value value="+1-555-201-9985"/>
                            <use value="work"/>
                    </ContactPoint>
                    <ContactPoint>
                            <system value="phone"/>
                            <value value="+1-555-201-9985"/>
                            <use value="work"/>
                    </ContactPoint>
            </telcom>
            <!--General address for this specific person-->
            <address/>
        </contact>
        <!--General organizational physical and mailing address-->
        <address>
                <use value="work"/>
                <type value="both"/>
                <line value=""/>
                <city value=""/>
                <state value="FL"/>
                <postalCode value=""/>
                <country value="US"/>
                <position>
                        <longitude value="-81.5157535"/>
                        <latitude value="27.6648274"/>
                </position>
        </address>
        <!--If this is a Carequality Connection, then the partOf object points
to the Carequality Implementer-->
        <!--If this is a eHealth Exchange Sub-Participant, then the partOf
object points to the eHealth Exchange Participant-->
        <!--If this is a lower-level organization, then the partOf object
points to the immediate parent organization-->
        <!--If this is a top-level organization, then the partOf object is not
specified-->
        <partOf>
                <Reference>
                        <!--Home Community ID of parent org, if any-->
                        <identifier>
                                <use value="official"/>
                                <type value="HCID"/>
                                <system value="http://www.hl7.org/oid/"/>
                                <value value=""/>
                        </identifier>
                </Reference>
        </partOf>
        <!--Managing Organization Not Specified-->
```

```xml
        <!--The Endpoints are represented as contained resources and are
repeated as needed-->
        <contained>
            <Endpoint>
                <!--Home Community ID-->
                <identifier>
                    <use value="official"/>
                    <type value="HCID"/>
                    <system value="http://www.hl7.org/oid/"/>
                </identifier>
                <!--Assigning Authority ID-->
                <identifier>
                    <use value="official"/>
                    <type value="AAID"/>
                    <system value="http://www.hl7.org/oid/"/>
                    <value value="urn:oid:1.2.3.4.3"/>
                </identifier>
                <connectionType>
                    <system value="http://hl7.org/fhir/subscription-
channel-type"/>
                    <code value="IHE-XCA"/>
                </connectionType>
                <name value="Patient Discovery"/>
                <managingOrganization/>
                <address value="https://xyz.org:4437/ihe/services/xcpdrg"/>
                <payloadMimeFormat value="text/xml"/>
                <payloadType>
                    <coding>
                        <system
value="urn:oid:1.3.6.1.4.1.19376.1.2.3"/>
                        <code value="All"/>
                    </coding>
                </payloadType>
                <extension
url="https://sequoiaproject.org/StructureDefinition/Endpoint/main/1.0.0">
                    <extension url="Transaction">
                        <valueString value="XCA ITI-39"/>
                    </extension>
                    <!--Is this gateway an initiator or responder actor--
>
                    <extension url="Actor">
                        <valueCodeableConcept>
                            <coding>
                                <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Actor/1.0.0"/>
                                <value value="Responding Gateway"/>
                            </coding>
                        </valueCodeableConcept>
                    </extension>
                    <!--Version of the service as per the eHealth
Exchange specifications-->
                    <extension url="Version">
                        <valueCodeableConcept>
                            <coding>
```

```xml
                                        <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Version/1.0.0"
/>
                                            <value value="2.0"/>
                                    </coding>
                            </valueCodeableConcept>
                    </extension>
                    <!--Initiative specific list of use cases supported--
>
                    <extension url="UseCases">
                            <valueCodeableConcept>
                                    <coding>
                                        <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/UseCases/1.0.0
"/>
                                            <value
value="QueryBasedDocumentExchange"/>
                                    </coding>
                            </valueCodeableConcept>
                    </extension>
                    <!--PurposesOfUse Value Set for SAML header and/or
access control-->
                    <extension url="PurposesOfUse">
                            <valueCodeableConcept>
                                    <coding>
                                        <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/PurposesOfUse/
1.0.0"/>
                                            <value value="Treatment"/>
                                    </coding>
                            </valueCodeableConcept>
                    </extension>
                    <!--Roles Value Set for SAML header and/or access
control-->
                    <extension url="Roles">
                            <valueCodeableConcept>
                                    <coding>
                                        <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Roles/1.0.0"/>
                                            <value value="All"/>
                                    </coding>
                            </valueCodeableConcept>
                    </extension>
                    <!--IPAs of gateway, may repeat-->
                    <extension url="IPA">
                            <valueCodeableConcept>
                                    <coding>
                                        <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/IPA/1.0.0"/>
                                    </coding>
                            </valueCodeableConcept>
                    </extension>
                </extension>
            </Endpoint>
        </contained>
```

```xml
<contained>
     <Endpoint>
          <!--Home Community ID-->
          <identifier>
               <use value="official"/>
               <type value="HCID"/>
               <system value="http://www.hl7.org/oid/"/>
          </identifier>
          <!--Assigning Authority ID-->
          <identifier>
               <use value="official"/>
               <type value="AAID"/>
               <system value="http://www.hl7.org/oid/"/>
               <value value="urn:oid:1.2.3.4.3"/>
          </identifier>
          <connectionType>
               <system value="http://hl7.org/fhir/subscription-
channel-type"/>
               <code value="IHE-XCA"/>
          </connectionType>
          <name value="Query for Documents"/>
          <managingOrganization/>
          <address value="https://xyz.org:4437/ihe/services/xcarg"/>
          <payloadMimeFormat value="text/xml"/>
          <payloadType>
               <coding>
                    <system
value="urn:oid:1.3.6.1.4.1.19376.1.2.3"/>
                    <code value="All"/>
               </coding>
          </payloadType>
          <extension
url="https://sequoiaproject.org/StructureDefinition/Endpoint/main/1.0.0">
               <extension url="Transaction">
                    <valueString value="XCA ITI-39"/>
               </extension>
               <!--Is this gateway an initiator or responder actor--
>
               <extension url="Actor">
                    <valueCodeableConcept>
                         <coding>
                              <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Actor/1.0.0"/>
                              <value value="Responding Gateway"/>
                         </coding>
                    </valueCodeableConcept>
               </extension>
               <!--Version of the service as per the eHealth
Exchange specifications-->
               <extension url="Version">
                    <valueCodeableConcept>
                         <coding>
                              <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Version/1.0.0"
/>
```

```xml
                                <value value="2.0"/>
                            </coding>
                        </valueCodeableConcept>
                    </extension>
                    <!--Initiative specific list of use cases supported-->
                    <extension url="UseCases">
                        <valueCodeableConcept>
                            <coding>
                                <system value="https://sequoiaproject.org/StructureDefinition/Endpoint/UseCases/1.0.0"/>
                                <value value="QueryBasedDocumentExchange"/>
                            </coding>
                        </valueCodeableConcept>
                    </extension>
                    <!--PurposesOfUse Value Set for SAML header and/or access control-->
                    <extension url="PurposesOfUse">
                        <valueCodeableConcept>
                            <coding>
                                <system value="https://sequoiaproject.org/StructureDefinition/Endpoint/PurposesOfUse/1.0.0"/>
                                <value value="Treatment"/>
                            </coding>
                        </valueCodeableConcept>
                    </extension>
                    <!--Roles Value Set for SAML header and/or access control-->
                    <extension url="Roles">
                        <valueCodeableConcept>
                            <coding>
                                <system value="https://sequoiaproject.org/StructureDefinition/Endpoint/Roles/1.0.0"/>
                                <value value="All"/>
                            </coding>
                        </valueCodeableConcept>
                    </extension>
                    <!--IPAs of gateway, may repeat-->
                    <extension url="IPA">
                        <valueCodeableConcept>
                            <coding>
                                <system value="https://sequoiaproject.org/StructureDefinition/Endpoint/IPA/1.0.0"/>
                            </coding>
                        </valueCodeableConcept>
                    </extension>
                </extension>
            </Endpoint>
        </contained>
        <contained>
            <Endpoint>
                <!--Home Community ID-->
```

```xml
                    <identifier>
                            <use value="official"/>
                            <type value="HCID"/>
                            <system value="http://www.hl7.org/oid/"/>
                    </identifier>
                    <!--Assigning Authority ID-->
                    <identifier>
                            <use value="official"/>
                            <type value="AAID"/>
                            <system value="http://www.hl7.org/oid/"/>
                            <value value="urn:oid:1.2.3.4.3"/>
                    </identifier>
                    <connectionType>
                            <system value="http://hl7.org/fhir/subscription-
channel-type"/>
                            <code value="IHE-XCA"/>
                    </connectionType>
                    <name value="Retrieve Documents"/>
                    <managingOrganization/>
                    <address value="https://xyz.org:4437/ihe/services/xcarg"/>
                    <payloadMimeFormat value="text/xml"/>
                    <payloadType>
                            <coding>
                                    <system
value="urn:oid:1.3.6.1.4.1.19376.1.2.3"/>
                                    <code value="All"/>
                            </coding>
                    </payloadType>
                    <extension
url="https://sequoiaproject.org/StructureDefinition/Endpoint/main/1.0.0">
                            <extension url="Transaction">
                                    <valueString value="XCA ITI-39"/>
                            </extension>
                            <!--Is this gateway an initiator or responder actor--
>
                            <extension url="Actor">
                                    <valueCodeableConcept>
                                            <coding>
                                                    <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Actor/1.0.0"/>
                                                    <value value="Responding Gateway"/>
                                            </coding>
                                    </valueCodeableConcept>
                            </extension>
                            <!--Version of the service as per the eHealth
Exchange specifications-->
                            <extension url="Version">
                                    <valueCodeableConcept>
                                            <coding>
                                                    <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Version/1.0.0"
/>
                                                    <value value="2.0"/>
                                            </coding>
                                    </valueCodeableConcept>
```

```xml
            </extension>
            <!--Initiative specific list of use cases supported-->
            <extension url="UseCases">
                <valueCodeableConcept>
                    <coding>
                        <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/UseCases/1.0.0
"/>
                        <value
value="QueryBasedDocumentExchange"/>
                    </coding>
                </valueCodeableConcept>
            </extension>
            <!--PurposesOfUse Value Set for SAML header and/or
access control-->
            <extension url="PurposesOfUse">
                <valueCodeableConcept>
                    <coding>
                        <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/PurposesOfUse/
1.0.0"/>
                        <value value="Treatment"/>
                    </coding>
                </valueCodeableConcept>
            </extension>
            <!--Roles Value Set for SAML header and/or access
control-->
            <extension url="Roles">
                <valueCodeableConcept>
                    <coding>
                        <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Roles/1.0.0"/>
                        <value value="All"/>
                    </coding>
                </valueCodeableConcept>
            </extension>
            <!--IPAs of gateway, may repeat-->
            <extension url="IPA">
                <valueCodeableConcept>
                    <coding>
                        <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/IPA/1.0.0"/>
                    </coding>
                </valueCodeableConcept>
            </extension>
        </extension>
    </Endpoint>
  </contained>
</Organization>
```

- Response

For create:

```xml
<OperationOutcome xmlns="http://hl7.org/fhir">
    <text>
        <status value="generated"/>
        <div xmlns="http://www.w3.org/1999/xhtml">
            <h1>Operation Outcome</h1>
            <table border="0">
                <tr>
                    <td style="font-weight: bold;">success</td>
                    <td>[]</td>
                    <td>
                        <pre>New organization was added successfully.</pre>
                    </td>
                </tr>
            </table>
        </div>
    </text>
    <issue>
        <severity value="information"/>
        <code value="processing"/>
        <diagnostics value="New organization was added successfully."/>
    </issue>
</OperationOutcome>
```

For update:

```xml
<OperationOutcome xmlns="http://hl7.org/fhir">
    <text>
        <status value="generated"/>
        <div xmlns="http://www.w3.org/1999/xhtml">
            <h1>Operation Outcome</h1>
            <table border="0">
                <tr>
                    <td style="font-weight: bold;">success</td>
                    <td>[]</td>
                    <td>
                        <pre>Organization with id:4 has been updated
successfully.</pre>
                    </td>
                </tr>
            </table>
        </div>
    </text>
    <issue>
        <severity value="information"/>
        <code value="processing"/>
        <diagnostics value="Organization with id:4 has been updated
successfully."/>
    </issue>
</OperationOutcome>
```

(2) Failed Request Body and Response

147

- Missing Contact Element(Create and Update)
  Request Body:

```xml
<Organization>
      <!--The ID value is internal only and subject to change for each
directory data refresh and should not be used as a persistent ID-->
      <id value="4"/>
      <meta>
            <versionId value="1"/>
            <lastUpdated value="2017-10-27T15:18:23+03:00"/>
      </meta>
      <!--This is the XCA/XCPD HomeCommunityID OID in URN format-->
      <identifier>
            <use value="official"/>
            <system value="http://www.hl7.org/oid/"/>
            <value value="2.16.840.1.113883.3.614"/>
      </identifier>
      <description value=" EHR Gateway Vendor"/>
      <active value="Active"/>
      <name value=" EHR Gateway Vendor"/>
      <!--General organizational physical and mailing address-->
      <address>
            <use value="work"/>
            <type value="both"/>
            <line value=""/>
            <city value=""/>
            <state value="MD"/>
            <postalCode value=""/>
            <country value="US"/>
            <position>
                  <longitude value="-76.64127119999999"/>
                  <latitude value="39.0457549"/>
            </position>
      </address>
      <!--If this is a Carequality Connection, then the partOf object points
to the Carequality Implementer-->
      <!--If this is a eHealth Exchange Sub-Participant, then the partOf
object points to the eHealth Exchange Participant-->
      <!--If this is a lower-level organization, then the partOf object
points to the immediate parent organization-->
      <!--If this is a top-level organization, then the partOf object is not
specified-->
      <partOf>
            <Reference>
                  <!--Home Community ID of parent org, if any-->
                  <identifier>
                        <use value="official"/>
                        <type value="HCID"/>
                        <system value="http://www.hl7.org/oid/"/>
                        <value value=""/>
                  </identifier>
            </Reference>
      </partOf>
      <!--Managing Organization Not Specified-->
```

```xml
        <!--The Endpoints are represented as contained resources and are
repeated as needed-->
        <contained>
            <Endpoint>
                <!--Home Community ID-->
                <identifier>
                    <use value="official"/>
                    <type value="HCID"/>
                    <system value="http://www.hl7.org/oid/"/>
                </identifier>
                <!--Assigning Authority ID-->
                <identifier>
                    <use value="official"/>
                    <type value="AAID"/>
                    <system value="http://www.hl7.org/oid/"/>
                    <value value="urn:oid:1.2.3.4.3"/>
                </identifier>
                <connectionType>
                    <system value="http://hl7.org/fhir/subscription-
channel-type"/>
                    <code value="IHE-XCA"/>
                </connectionType>
                <name value="Patient Discovery"/>
                <managingOrganization/>
                <address
value="https://conformance2.xyz.com/CONNECTGateway/NhinService/NhinPatientDis
covery"/>
                <payloadMimeFormat value="text/xml"/>
                <payloadType>
                    <coding>
                        <system
value="urn:oid:1.3.6.1.4.1.19376.1.2.3"/>
                        <code value="All"/>
                    </coding>
                </payloadType>
                <extension
url="https://sequoiaproject.org/StructureDefinition/Endpoint/main/1.0.0">
                    <extension url="Transaction">
                        <valueString value="XCA ITI-39"/>
                    </extension>
                    <!--Is this gateway an initiator or responder actor--
>
                    <extension url="Actor">
                        <valueCodeableConcept>
                            <coding>
                                <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Actor/1.0.0"/>
                                <value value="Responding Gateway"/>
                            </coding>
                        </valueCodeableConcept>
                    </extension>
                    <!--Version of the service as per the eHealth
Exchange specifications-->
                    <extension url="Version">
                        <valueCodeableConcept>
```

```xml
                                        <coding>
                                                <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Version/1.0.0"
/>
                                                <value value="2.0"/>
                                        </coding>
                                </valueCodeableConcept>
                        </extension>
                        <!--Initiative specific list of use cases supported--
>
                        <extension url="UseCases">
                                <valueCodeableConcept>
                                        <coding>
                                                <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/UseCases/1.0.0
"/>
                                                <value
value="QueryBasedDocumentExchange"/>
                                        </coding>
                                </valueCodeableConcept>
                        </extension>
                        <!--PurposesOfUse Value Set for SAML header and/or
access control-->
                        <extension url="PurposesOfUse">
                                <valueCodeableConcept>
                                        <coding>
                                                <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/PurposesOfUse/
1.0.0"/>
                                                <value value="Treatment"/>
                                        </coding>
                                </valueCodeableConcept>
                        </extension>
                        <!--Roles Value Set for SAML header and/or access
control-->
                        <extension url="Roles">
                                <valueCodeableConcept>
                                        <coding>
                                                <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Roles/1.0.0"/>
                                                <value value="All"/>
                                        </coding>
                                </valueCodeableConcept>
                        </extension>
                        <!--IPAs of gateway, may repeat-->
                        <extension url="IPA">
                                <valueCodeableConcept>
                                        <coding>
                                                <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/IPA/1.0.0"/>
                                        </coding>
                                </valueCodeableConcept>
                        </extension>
                </extension>
        </Endpoint>
```

```xml
            </contained>
            <contained>
                <Endpoint>
                    <!--Home Community ID-->
                    <identifier>
                        <use value="official"/>
                        <type value="HCID"/>
                        <system value="http://www.hl7.org/oid/"/>
                    </identifier>
                    <!--Assigning Authority ID-->
                    <identifier>
                        <use value="official"/>
                        <type value="AAID"/>
                        <system value="http://www.hl7.org/oid/"/>
                        <value value="urn:oid:1.2.3.4.3"/>
                    </identifier>
                    <connectionType>
                        <system value="http://hl7.org/fhir/subscription-channel-type"/>
                        <code value="IHE-XCA"/>
                    </connectionType>
                    <name value="Query for Documents"/>
                    <managingOrganization/>
                    <address value="https://conformance2.xyz.com/CONNECTGateway/NhinService/RespondingGateway_Query_Service/DocQuery"/>
                    <payloadMimeFormat value="text/xml"/>
                    <payloadType>
                        <coding>
                            <system value="urn:oid:1.3.6.1.4.1.19376.1.2.3"/>
                            <code value="All"/>
                        </coding>
                    </payloadType>
                    <extension url="https://sequoiaproject.org/StructureDefinition/Endpoint/main/1.0.0">
                        <extension url="Transaction">
                            <valueString value="XCA ITI-39"/>
                        </extension>
                        <!--Is this gateway an initiator or responder actor-->
                        <extension url="Actor">
                            <valueCodeableConcept>
                                <coding>
                                    <system value="https://sequoiaproject.org/StructureDefinition/Endpoint/Actor/1.0.0"/>
                                    <value value="Responding Gateway"/>
                                </coding>
                            </valueCodeableConcept>
                        </extension>
                        <!--Version of the service as per the eHealth Exchange specifications-->
                        <extension url="Version">
                            <valueCodeableConcept>
                                <coding>
```

```xml
                                        <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Version/1.0.0"
/>
                                            <value value="2.0"/>
                                    </coding>
                            </valueCodeableConcept>
                    </extension>
                    <!--Initiative specific list of use cases supported--
>
                    <extension url="UseCases">
                            <valueCodeableConcept>
                                    <coding>
                                        <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/UseCases/1.0.0
"/>
                                            <value
value="QueryBasedDocumentExchange"/>
                                    </coding>
                            </valueCodeableConcept>
                    </extension>
                    <!--PurposesOfUse Value Set for SAML header and/or
access control-->
                    <extension url="PurposesOfUse">
                            <valueCodeableConcept>
                                    <coding>
                                        <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/PurposesOfUse/
1.0.0"/>
                                            <value value="Treatment"/>
                                    </coding>
                            </valueCodeableConcept>
                    </extension>
                    <!--Roles Value Set for SAML header and/or access
control-->
                    <extension url="Roles">
                            <valueCodeableConcept>
                                    <coding>
                                        <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Roles/1.0.0"/>
                                            <value value="All"/>
                                    </coding>
                            </valueCodeableConcept>
                    </extension>
                    <!--IPAs of gateway, may repeat-->
                    <extension url="IPA">
                            <valueCodeableConcept>
                                    <coding>
                                        <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/IPA/1.0.0"/>
                                    </coding>
                            </valueCodeableConcept>
                    </extension>
            </extension>
        </Endpoint>
    </contained>
```

```xml
<contained>
      <Endpoint>
            <!--Home Community ID-->
            <identifier>
                  <use value="official"/>
                  <type value="HCID"/>
                  <system value="http://www.hl7.org/oid/"/>
            </identifier>
            <!--Assigning Authority ID-->
            <identifier>
                  <use value="official"/>
                  <type value="AAID"/>
                  <system value="http://www.hl7.org/oid/"/>
                  <value value="urn:oid:1.2.3.4.3"/>
            </identifier>
            <connectionType>
                  <system value="http://hl7.org/fhir/subscription-
channel-type"/>
                  <code value="IHE-XCA"/>
            </connectionType>
            <name value="Retrieve Documents"/>
            <managingOrganization/>
            <address
value="https://conformance2.xyz.com/CONNECTGateway/NhinService/RespondingGate
way_Retrieve_Service/DocRetrieve"/>
            <payloadMimeFormat value="text/xml"/>
            <payloadType>
                  <coding>
                        <system
value="urn:oid:1.3.6.1.4.1.19376.1.2.3"/>
                        <code value="All"/>
                  </coding>
            </payloadType>
            <extension
url="https://sequoiaproject.org/StructureDefinition/Endpoint/main/1.0.0">
                  <extension url="Transaction">
                        <valueString value="XCA ITI-39"/>
                  </extension>
                  <!--Is this gateway an initiator or responder actor--
>
                  <extension url="Actor">
                        <valueCodeableConcept>
                              <coding>
                                    <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Actor/1.0.0"/>
                                    <value value="Responding Gateway"/>
                              </coding>
                        </valueCodeableConcept>
                  </extension>
                  <!--Version of the service as per the eHealth
Exchange specifications-->
                  <extension url="Version">
                        <valueCodeableConcept>
                              <coding>
```

```xml
                                        <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Version/1.0.0"
/>
                                        <value value="2.0"/>
                                </coding>
                        </valueCodeableConcept>
                </extension>
                <!--Initiative specific list of use cases supported--
>
                <extension url="UseCases">
                        <valueCodeableConcept>
                                <coding>
                                        <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/UseCases/1.0.0
"/>
                                        <value
value="QueryBasedDocumentExchange"/>
                                </coding>
                        </valueCodeableConcept>
                </extension>
                <!--PurposesOfUse Value Set for SAML header and/or
access control-->
                <extension url="PurposesOfUse">
                        <valueCodeableConcept>
                                <coding>
                                        <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/PurposesOfUse/
1.0.0"/>
                                        <value value="Treatment"/>
                                </coding>
                        </valueCodeableConcept>
                </extension>
                <!--Roles Value Set for SAML header and/or access
control-->
                <extension url="Roles">
                        <valueCodeableConcept>
                                <coding>
                                        <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Roles/1.0.0"/>
                                        <value value="All"/>
                                </coding>
                        </valueCodeableConcept>
                </extension>
                <!--IPAs of gateway, may repeat-->
                <extension url="IPA">
                        <valueCodeableConcept>
                                <coding>
                                        <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/IPA/1.0.0"/>
                                </coding>
                        </valueCodeableConcept>
                </extension>
        </extension>
    </Endpoint>
</contained>
```

```xml
</Organization>
```

Response:

```xml
<OperationOutcome xmlns="http://hl7.org/fhir">
    <text>
        <status value="generated"/>
        <div xmlns="http://www.w3.org/1999/xhtml">
            <h1>Operation Outcome</h1>
            <table border="0">
                <tr>
                    <td style="font-weight: bold;">error</td>
                    <td>[]</td>
                    <td>
                        <pre>Failed to parse request body as XML resource
because your request body has to contain at least one Contact element.</pre>
                    </td>
                </tr>
            </table>
        </div>
    </text>
    <issue>
        <severity value="error"/>
        <code value="processing"/>
        <diagnostics value="Failed to parse request body as XML resource."/>
    </issue>
</OperationOutcome>
```

- Missing Identifier Element(Create and Update)
  Request Body

```xml
<Organization>
    <!--The ID value is internal only and subject to change for each
directory data refresh and should not be used as a persistent ID-->
    <id value="3"/>
    <meta>
        <versionId value="1"/>
        <lastUpdated value="2017-10-27T15:18:23+03:00"/>
    </meta>

    <description value="Conformance1-5AM"/>
    <active value="Active"/>
    <name value=" EHR Gateway Vendor"/>
    <!--The contact object is repeated for each person listed in the
directory-->
    <contact>
        <purpose value="Systems Administrator"/>
        <name>
            <use value="official"/>
            <text>Steve Jo</text>
            <given value="Steve"/>
            <family value="Jo"/>
        </name>
```

```xml
            <telcom>
                    <ContactPoint>
                            <system value="email"/>
                            <value value="steve@testmail.edu"/>
                            <use value="work"/>
                    </ContactPoint>
                    <ContactPoint>
                            <system value="phone"/>
                            <value value="555-571-0458"/>
                            <use value="work"/>
                    </ContactPoint>
            </telcom>
            <!--General address for this specific person-->
            <address/>
    </contact>
    <contact>
            <purpose value="Director of IT"/>
            <name>
                    <use value="official"/>
                    <text>Yurii Apple</text>
                    <given value="Yurii"/>
                    <family value="Apple"/>
            </name>
            <telcom>
                    <ContactPoint>
                            <system value="email"/>
                            <value value="john@testmail.edu"/>
                            <use value="work"/>
                    </ContactPoint>
                    <ContactPoint>
                            <system value="phone"/>
                            <value value="555-462-1910"/>
                            <use value="work"/>
                    </ContactPoint>
            </telcom>
            <!--General address for this specific person-->
            <address/>
    </contact>
    <!--General organizational physical and mailing address-->
    <address>
            <use value="work"/>
            <type value="both"/>
            <line value=""/>
            <city value=""/>
            <state value="MD"/>
            <postalCode value=""/>
            <country value="US"/>
            <position>
                    <longitude value="-76.64127119999999"/>
                    <latitude value="39.0457549"/>
            </position>
    </address>
    <!--If this is a Carequality Connection, then the partOf object points
  to the Carequality Implementer-->
```

```xml
      <!--If this is a eHealth Exchange Sub-Participant, then the partOf
object points to the eHealth Exchange Participant-->
      <!--If this is a lower-level organization, then the partOf object
points to the immediate parent organization-->
      <!--If this is a top-level organization, then the partOf object is not
specified-->
      <partOf>
            <Reference>
                  <!--Home Community ID of parent org, if any-->
                  <identifier>
                        <use value="official"/>
                        <type value="HCID"/>
                        <system value="http://www.hl7.org/oid/"/>
                        <value value=""/>
                  </identifier>
            </Reference>
      </partOf>
      <!--Managing Organization Not Specified-->
      <!--The Endpoints are represented as contained resources and are
repeated as needed-->
      <contained>
            <Endpoint>
                  <!--Home Community ID-->
                  <identifier>
                        <use value="official"/>
                        <type value="HCID"/>
                        <system value="http://www.hl7.org/oid/"/>
                  </identifier>
                  <!--Assigning Authority ID-->
                  <identifier>
                        <use value="official"/>
                        <type value="AAID"/>
                        <system value="http://www.hl7.org/oid/"/>
                        <value value="urn:oid:1.2.3.4.3"/>
                  </identifier>
                  <connectionType>
                        <system value="http://hl7.org/fhir/subscription-
channel-type"/>
                        <code value="IHE-XCA"/>
                  </connectionType>
                  <name value="PatientDiscovery"/>
                  <managingOrganization/>
                  <address
value="https://conformance1.xyz.com:443/CONNECTGateway/NhinService/NhinPatien
tDiscovery"/>
                  <payloadMimeFormat value="text/xml"/>
                  <payloadType>
                        <coding>
                              <system
value="urn:oid:1.3.6.1.4.1.19376.1.2.3"/>
                              <code value="All"/>
                        </coding>
                  </payloadType>
                  <extension
url="https://sequoiaproject.org/StructureDefinition/Endpoint/main/1.0.0">
```

```xml
                            <extension url="Transaction">
                                    <valueString value="XCA ITI-39"/>
                            </extension>
                            <!--Is this gateway an initiator or responder actor-->
                            <extension url="Actor">
                                    <valueCodeableConcept>
                                            <coding>
                                                    <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Actor/1.0.0"/>
                                                    <value value="Responding Gateway"/>
                                            </coding>
                                    </valueCodeableConcept>
                            </extension>
                            <!--Version of the service as per the eHealth
Exchange specifications-->
                            <extension url="Version">
                                    <valueCodeableConcept>
                                            <coding>
                                                    <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Version/1.0.0"
/>
                                                    <value value="2.0"/>
                                            </coding>
                                    </valueCodeableConcept>
                            </extension>
                            <!--Initiative specific list of use cases supported-->
                            <extension url="UseCases">
                                    <valueCodeableConcept>
                                            <coding>
                                                    <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/UseCases/1.0.0
"/>
                                                    <value
value="QueryBasedDocumentExchange"/>
                                            </coding>
                                    </valueCodeableConcept>
                            </extension>
                            <!--PurposesOfUse Value Set for SAML header and/or
access control-->
                            <extension url="PurposesOfUse">
                                    <valueCodeableConcept>
                                            <coding>
                                                    <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/PurposesOfUse/
1.0.0"/>
                                                    <value value="Treatment"/>
                                            </coding>
                                    </valueCodeableConcept>
                            </extension>
                            <!--Roles Value Set for SAML header and/or access
control-->
                            <extension url="Roles">
                                    <valueCodeableConcept>
```

```xml
                                <coding>
                                        <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Roles/1.0.0"/>
                                        <value value="All"/>
                                </coding>
                        </valueCodeableConcept>
                </extension>
                <!--IPAs of gateway, may repeat-->
                <extension url="IPA">
                        <valueCodeableConcept>
                                <coding>
                                        <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/IPA/1.0.0"/>
                                </coding>
                        </valueCodeableConcept>
                </extension>
        </extension>
</Endpoint>
</contained>
<contained>
        <Endpoint>
                <!--Home Community ID-->
                <identifier>
                        <use value="official"/>
                        <type value="HCID"/>
                        <system value="http://www.hl7.org/oid/"/>
                </identifier>
                <!--Assigning Authority ID-->
                <identifier>
                        <use value="official"/>
                        <type value="AAID"/>
                        <system value="http://www.hl7.org/oid/"/>
                        <value value="urn:oid:1.2.3.4.3"/>
                </identifier>
                <connectionType>
                        <system value="http://hl7.org/fhir/subscription-
channel-type"/>
                        <code value="IHE-XCA"/>
                </connectionType>
                <name value="QueryForDocuments"/>
                <managingOrganization/>
                <address
value="https://conformance1.xyz.com:443/CONNECTGateway/NhinService/Responding
Gateway_Query_Service/DocQuery"/>
                <payloadMimeFormat value="text/xml"/>
                <payloadType>
                        <coding>
                                <system
value="urn:oid:1.3.6.1.4.1.19376.1.2.3"/>
                                <code value="All"/>
                        </coding>
                </payloadType>
                <extension
url="https://sequoiaproject.org/StructureDefinition/Endpoint/main/1.0.0">
                        <extension url="Transaction">
```

```xml
                                <valueString value="XCA ITI-39"/>
                        </extension>
                        <!--Is this gateway an initiator or responder actor--
>
                        <extension url="Actor">
                                <valueCodeableConcept>
                                        <coding>
                                                <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Actor/1.0.0"/>
                                                <value value="Responding Gateway"/>
                                        </coding>
                                </valueCodeableConcept>
                        </extension>
                        <!--Version of the service as per the eHealth
Exchange specifications-->
                        <extension url="Version">
                                <valueCodeableConcept>
                                        <coding>
                                                <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Version/1.0.0"
/>
                                                <value value="2.0"/>
                                        </coding>
                                </valueCodeableConcept>
                        </extension>
                        <!--Initiative specific list of use cases supported--
>
                        <extension url="UseCases">
                                <valueCodeableConcept>
                                        <coding>
                                                <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/UseCases/1.0.0
"/>
                                                <value
value="QueryBasedDocumentExchange"/>
                                        </coding>
                                </valueCodeableConcept>
                        </extension>
                        <!--PurposesOfUse Value Set for SAML header and/or
access control-->
                        <extension url="PurposesOfUse">
                                <valueCodeableConcept>
                                        <coding>
                                                <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/PurposesOfUse/
1.0.0"/>
                                                <value value="Treatment"/>
                                        </coding>
                                </valueCodeableConcept>
                        </extension>
                        <!--Roles Value Set for SAML header and/or access
control-->
                        <extension url="Roles">
                                <valueCodeableConcept>
                                        <coding>
```

```xml
                                                <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Roles/1.0.0"/>
                                                <value value="All"/>
                                            </coding>
                                        </valueCodeableConcept>
                                    </extension>
                                    <!--IPAs of gateway, may repeat-->
                                    <extension url="IPA">
                                        <valueCodeableConcept>
                                            <coding>
                                                <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/IPA/1.0.0"/>
                                            </coding>
                                        </valueCodeableConcept>
                                    </extension>
                                </extension>
                            </Endpoint>
                </contained>
                <contained>
                            <Endpoint>
                                <!--Home Community ID-->
                                <identifier>
                                        <use value="official"/>
                                        <type value="HCID"/>
                                        <system value="http://www.hl7.org/oid/"/>
                                </identifier>
                                <!--Assigning Authority ID-->
                                <identifier>
                                        <use value="official"/>
                                        <type value="AAID"/>
                                        <system value="http://www.hl7.org/oid/"/>
                                        <value value="urn:oid:1.2.3.4.3"/>
                                </identifier>
                                <connectionType>
                                        <system value="http://hl7.org/fhir/subscription-
channel-type"/>
                                        <code value="IHE-XCA"/>
                                </connectionType>
                                <name value="RetrieveDocuments"/>
                                <managingOrganization/>
                                <address
value="https://conformance1.xyz.com:443/CONNECTGateway/NhinService/Responding
Gateway_Retrieve_Service/DocRetrieve"/>
                                <payloadMimeFormat value="text/xml"/>
                                <payloadType>
                                        <coding>
                                                <system
value="urn:oid:1.3.6.1.4.1.19376.1.2.3"/>
                                                <code value="All"/>
                                        </coding>
                                </payloadType>
                                <extension
url="https://sequoiaproject.org/StructureDefinition/Endpoint/main/1.0.0">
                                        <extension url="Transaction">
                                                <valueString value="XCA ITI-39"/>
```

```xml
                    </extension>
                    <!--Is this gateway an initiator or responder actor-->
                    <extension url="Actor">
                        <valueCodeableConcept>
                            <coding>
                                <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Actor/1.0.0"/>
                                <value value="Responding Gateway"/>
                            </coding>
                        </valueCodeableConcept>
                    </extension>
                    <!--Version of the service as per the eHealth
Exchange specifications-->
                    <extension url="Version">
                        <valueCodeableConcept>
                            <coding>
                                <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Version/1.0.0"
/>
                                <value value="2.0"/>
                            </coding>
                        </valueCodeableConcept>
                    </extension>
                    <!--Initiative specific list of use cases supported--
>
                    <extension url="UseCases">
                        <valueCodeableConcept>
                            <coding>
                                <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/UseCases/1.0.0
"/>
                                <value
value="QueryBasedDocumentExchange"/>
                            </coding>
                        </valueCodeableConcept>
                    </extension>
                    <!--PurposesOfUse Value Set for SAML header and/or
access control-->
                    <extension url="PurposesOfUse">
                        <valueCodeableConcept>
                            <coding>
                                <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/PurposesOfUse/
1.0.0"/>
                                <value value="Treatment"/>
                            </coding>
                        </valueCodeableConcept>
                    </extension>
                    <!--Roles Value Set for SAML header and/or access
control-->
                    <extension url="Roles">
                        <valueCodeableConcept>
                            <coding>
```

```xml
                                <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Roles/1.0.0"/>
                                        <value value="All"/>
                                </coding>
                        </valueCodeableConcept>
                </extension>
                <!--IPAs of gateway, may repeat-->
                <extension url="IPA">
                        <valueCodeableConcept>
                                <coding>
                                        <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/IPA/1.0.0"/>
                                </coding>
                        </valueCodeableConcept>
                </extension>
        </extension>
    </Endpoint>
</contained>
<contained>
        <Endpoint>
                <!--Home Community ID-->
                <identifier>
                        <use value="official"/>
                        <type value="HCID"/>
                        <system value="http://www.hl7.org/oid/"/>
                </identifier>
                <!--Assigning Authority ID-->
                <identifier>
                        <use value="official"/>
                        <type value="AAID"/>
                        <system value="http://www.hl7.org/oid/"/>
                        <value value="urn:oid:1.2.3.4.3"/>
                </identifier>
                <connectionType>
                        <system value="http://hl7.org/fhir/subscription-
channel-type"/>
                        <code value="IHE-XCA"/>
                </connectionType>
                <name value="HIEMSubscription"/>
                <managingOrganization/>
                <address
value="https://conformance1.xyz.com:443/CONNECTGateway/NhinService/Notificati
onProducerService/HiemSubscription"/>
                <payloadMimeFormat value="text/xml"/>
                <payloadType>
                        <coding>
                                <system
value="urn:oid:1.3.6.1.4.1.19376.1.2.3"/>
                                <code value="All"/>
                        </coding>
                </payloadType>
                <extension
url="https://sequoiaproject.org/StructureDefinition/Endpoint/main/1.0.0">
                        <extension url="Transaction">
                                <valueString value="XCA ITI-39"/>
```

```xml
                            </extension>
                            <!--Is this gateway an initiator or responder actor--
>
                            <extension url="Actor">
                                <valueCodeableConcept>
                                    <coding>
                                        <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Actor/1.0.0"/>
                                        <value value="Responding Gateway"/>
                                    </coding>
                                </valueCodeableConcept>
                            </extension>
                            <!--Version of the service as per the eHealth
Exchange specifications-->
                            <extension url="Version">
                                <valueCodeableConcept>
                                    <coding>
                                        <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Version/1.0.0"
/>
                                        <value value="2.0"/>
                                    </coding>
                                </valueCodeableConcept>
                            </extension>
                            <!--Initiative specific list of use cases supported--
>
                            <extension url="UseCases">
                                <valueCodeableConcept>
                                    <coding>
                                        <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/UseCases/1.0.0
"/>
                                        <value
value="QueryBasedDocumentExchange"/>
                                    </coding>
                                </valueCodeableConcept>
                            </extension>
                            <!--PurposesOfUse Value Set for SAML header and/or
access control-->
                            <extension url="PurposesOfUse">
                                <valueCodeableConcept>
                                    <coding>
                                        <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/PurposesOfUse/
1.0.0"/>
                                        <value value="Treatment"/>
                                    </coding>
                                </valueCodeableConcept>
                            </extension>
                            <!--Roles Value Set for SAML header and/or access
control-->
                            <extension url="Roles">
                                <valueCodeableConcept>
                                    <coding>
```

```xml
                                <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Roles/1.0.0"/>
                                        <value value="All"/>
                                </coding>
                        </valueCodeableConcept>
                </extension>
                <!--IPAs of gateway, may repeat-->
                <extension url="IPA">
                        <valueCodeableConcept>
                                <coding>
                                        <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/IPA/1.0.0"/>
                                </coding>
                        </valueCodeableConcept>
                </extension>
        </extension>
</Endpoint>
</contained>
<contained>
        <Endpoint>
                <!--Home Community ID-->
                <identifier>
                        <use value="official"/>
                        <type value="HCID"/>
                        <system value="http://www.hl7.org/oid/"/>
                </identifier>
                <!--Assigning Authority ID-->
                <identifier>
                        <use value="official"/>
                        <type value="AAID"/>
                        <system value="http://www.hl7.org/oid/"/>
                        <value value="urn:oid:1.2.3.4.3"/>
                </identifier>
                <connectionType>
                        <system value="http://hl7.org/fhir/subscription-
channel-type"/>
                        <code value="IHE-XCA"/>
                </connectionType>
                <name value="HIEMNotify"/>
                <managingOrganization/>
                <address
value="https://conformance1.xyz.com:443/CONNECTGateway/NhinService/Notificati
onConsumerService/HiemNotify"/>
                <payloadMimeFormat value="text/xml"/>
                <payloadType>
                        <coding>
                                <system
value="urn:oid:1.3.6.1.4.1.19376.1.2.3"/>
                                <code value="All"/>
                        </coding>
                </payloadType>
                <extension
url="https://sequoiaproject.org/StructureDefinition/Endpoint/main/1.0.0">
                        <extension url="Transaction">
                                <valueString value="XCA ITI-39"/>
```

```xml
                                </extension>
                                <!--Is this gateway an initiator or responder actor--
>
                                <extension url="Actor">
                                        <valueCodeableConcept>
                                                <coding>
                                                        <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Actor/1.0.0"/>
                                                        <value value="Responding Gateway"/>
                                                </coding>
                                        </valueCodeableConcept>
                                </extension>
                                <!--Version of the service as per the eHealth
Exchange specifications-->
                                <extension url="Version">
                                        <valueCodeableConcept>
                                                <coding>
                                                        <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Version/1.0.0"
/>
                                                        <value value="2.0"/>
                                                </coding>
                                        </valueCodeableConcept>
                                </extension>
                                <!--Initiative specific list of use cases supported--
>
                                <extension url="UseCases">
                                        <valueCodeableConcept>
                                                <coding>
                                                        <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/UseCases/1.0.0
"/>
                                                        <value
value="QueryBasedDocumentExchange"/>
                                                </coding>
                                        </valueCodeableConcept>
                                </extension>
                                <!--PurposesOfUse Value Set for SAML header and/or
access control-->
                                <extension url="PurposesOfUse">
                                        <valueCodeableConcept>
                                                <coding>
                                                        <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/PurposesOfUse/
1.0.0"/>
                                                        <value value="Treatment"/>
                                                </coding>
                                        </valueCodeableConcept>
                                </extension>
                                <!--Roles Value Set for SAML header and/or access
control-->
                                <extension url="Roles">
                                        <valueCodeableConcept>
                                                <coding>
```

```xml
                                        <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Roles/1.0.0"/>
                                        <value value="All"/>
                                </coding>
                        </valueCodeableConcept>
                    </extension>
                    <!--IPAs of gateway, may repeat-->
                    <extension url="IPA">
                            <valueCodeableConcept>
                                    <coding>
                                        <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/IPA/1.0.0"/>
                                    </coding>
                            </valueCodeableConcept>
                    </extension>
                </extension>
        </Endpoint>
    </contained>
    <contained>
        <Endpoint>
                <!--Home Community ID-->
                <identifier>
                        <use value="official"/>
                        <type value="HCID"/>
                        <system value="http://www.hl7.org/oid/"/>
                </identifier>
                <!--Assigning Authority ID-->
                <identifier>
                        <use value="official"/>
                        <type value="AAID"/>
                        <system value="http://www.hl7.org/oid/"/>
                        <value value="urn:oid:1.2.3.4.3"/>
                </identifier>
                <connectionType>
                        <system value="http://hl7.org/fhir/subscription-
channel-type"/>
                        <code value="IHE-XCA"/>
                </connectionType>
                <name value="HIEMUnsubscribe"/>
                <managingOrganization/>
                <address
value="https://conformance1.xyz.com:443/CONNECTGateway/NhinService/Subscripti
onManagerService/HiemUnsubscribe"/>
                <payloadMimeFormat value="text/xml"/>
                <payloadType>
                        <coding>
                                <system
value="urn:oid:1.3.6.1.4.1.19376.1.2.3"/>
                                <code value="All"/>
                        </coding>
                </payloadType>
                <extension
url="https://sequoiaproject.org/StructureDefinition/Endpoint/main/1.0.0">
                        <extension url="Transaction">
                                <valueString value="XCA ITI-39"/>
```

```xml
                    </extension>
                    <!--Is this gateway an initiator or responder actor-->
                    <extension url="Actor">
                        <valueCodeableConcept>
                            <coding>
                                <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Actor/1.0.0"/>
                                <value value="Responding Gateway"/>
                            </coding>
                        </valueCodeableConcept>
                    </extension>
                    <!--Version of the service as per the eHealth
Exchange specifications-->
                    <extension url="Version">
                        <valueCodeableConcept>
                            <coding>
                                <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Version/1.0.0"
/>
                                <value value="2.0"/>
                            </coding>
                        </valueCodeableConcept>
                    </extension>
                    <!--Initiative specific list of use cases supported--
>
                    <extension url="UseCases">
                        <valueCodeableConcept>
                            <coding>
                                <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/UseCases/1.0.0
"/>
                                <value
value="QueryBasedDocumentExchange"/>
                            </coding>
                        </valueCodeableConcept>
                    </extension>
                    <!--PurposesOfUse Value Set for SAML header and/or
access control-->
                    <extension url="PurposesOfUse">
                        <valueCodeableConcept>
                            <coding>
                                <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/PurposesOfUse/
1.0.0"/>
                                <value value="Treatment"/>
                            </coding>
                        </valueCodeableConcept>
                    </extension>
                    <!--Roles Value Set for SAML header and/or access
control-->
                    <extension url="Roles">
                        <valueCodeableConcept>
                            <coding>
```

```xml
                                    <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Roles/1.0.0"/>
                                        <value value="All"/>
                                </coding>
                            </valueCodeableConcept>
                        </extension>
                        <!--IPAs of gateway, may repeat-->
                        <extension url="IPA">
                                <valueCodeableConcept>
                                        <coding>
                                            <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/IPA/1.0.0"/>
                                        </coding>
                                </valueCodeableConcept>
                        </extension>
                    </extension>
                </Endpoint>
        </contained>
</Organization>
```

Response

```xml
<OperationOutcome xmlns="http://hl7.org/fhir">
    <text>
        <status value="generated"/>
        <div xmlns="http://www.w3.org/1999/xhtml">
            <h1>Operation Outcome</h1>
            <table border="0">
                <tr>
                    <td style="font-weight: bold;">error</td>
                    <td>[]</td>
                    <td>
                        <pre>Failed to parse request body as XML resource
because your request body has to contain at least one identifier
element.</pre>
                    </td>
                </tr>
            </table>
        </div>
    </text>
    <issue>
        <severity value="error"/>
        <code value="processing"/>
        <diagnostics value="Failed to parse request body as XML resource."/>
    </issue>
</OperationOutcome>
```

- Missing EndPoint Element(Create and Update)
  Request Body:

```xml
<Organization>
    <!--The ID value is internal only and subject to change for each
directory data refresh and should not be used as a persistent ID-->
```

```xml
        <id value="5"/>
        <meta>
                <versionId value="1"/>
                <lastUpdated value="2017-10-27T15:18:23+03:00"/>
        </meta>
        <!--This is the XCA/XCPD HomeCommunityID OID in URN format-->
        <identifier>
                <use value="official"/>
                <system value="http://www.hl7.org/oid/"/>
                <value value="2.16.840.1.113883.3.333"/>
        </identifier>
        <description value="OID:2.16.840.1.113883.3.333 Test Entry"/>
        <active value="Active"/>
        <name value=" EHR Gateway Vendor"/>
        <!--The contact object is repeated for each person listed in the
directory-->
        <contact>
                <purpose value=""/>
                <name>
                        <use value="official"/>
                        <text>Steve Jo</text>
                        <given value="Steve"/>
                        <family value="Jo"/>
                </name>
                <telcom>
                        <ContactPoint>
                                <system value="email"/>
                                <value value="test@test.com"/>
                                <use value="work"/>
                        </ContactPoint>
                </telcom>
                <!--General address for this specific person-->
                <address/>
        </contact>
        <!--General organizational physical and mailing address-->
        <address>
                <use value="work"/>
                <type value="both"/>
                <line value=""/>
                <city value=""/>
                <state value="TX"/>
                <postalCode value=""/>
                <country value="US"/>
                <position>
                        <longitude value="-99.9018131"/>
                        <latitude value="31.9685988"/>
                </position>
        </address>
        <!--If this is a Carequality Connection, then the partOf object points
to the Carequality Implementer-->
        <!--If this is a eHealth Exchange Sub-Participant, then the partOf
object points to the eHealth Exchange Participant-->
        <!--If this is a lower-level organization, then the partOf object
points to the immediate parent organization-->
```

```xml
        <!--If this is a top-level organization, then the partOf object is not
specified-->
        <partOf>
            <Reference>
                <!--Home Community ID of parent org, if any-->
                <identifier>
                    <use value="official"/>
                    <type value="HCID"/>
                    <system value="http://www.hl7.org/oid/"/>
                    <value value=""/>
                </identifier>
            </Reference>
        </partOf>
        <!--Managing Organization Not Specified-->
        <!--The Endpoints are represented as contained resources and are
repeated as needed-->
</Organization>
```

Response

```xml
<OperationOutcome xmlns="http://hl7.org/fhir">
    <text>
        <status value="generated"/>
        <div xmlns="http://www.w3.org/1999/xhtml">
            <h1>Operation Outcome</h1>
            <table border="0">
                <tr>
                    <td style="font-weight: bold;">error</td>
                    <td>[]</td>
                    <td>
                        <pre>Failed to parse request body as XML resource
because your request body has to contain at least one EndPoint element.</pre>
                    </td>
                </tr>
            </table>
        </div>
    </text>
    <issue>
        <severity value="error"/>
        <code value="processing"/>
        <diagnostics value="Failed to parse request body as XML resource."/>
    </issue>
</OperationOutcome>
```

- Not Matching Content Type(Create and Update)
  Response

```xml
<OperationOutcome xmlns="http://hl7.org/fhir">
    <text>
        <status value="generated"/>
        <div xmlns="http://www.w3.org/1999/xhtml">
            <h1>Operation Outcome</h1>
            <table border="0">
```

```xml
            <tr>
                <td style="font-weight: bold;">error</td>
                <td>[]</td>
                <td>
                    <pre>Failed to parse request body as XML resource
because your request body is not valid format. Content_Type should be one of
["xml", "text/xml", "application/xml", "application/fhir+xml", "json",
"application/json", "application/fhir+json"]</pre>
                </td>
            </tr>
        </table>
    </div>
    </text>
    <issue>
        <severity value="error"/>
        <code value="processing"/>
        <diagnostics value="Failed to parse request body as XML resource."/>
    </issue>
</OperationOutcome>
```

- Not valid id(only for Update)
  Sample Url:
  put fhir-stu3/1.0.0/Organization/-1?apikey={your apikey}&_format=xml
  put fhir-stu3/1.0.0/Organization/10000?apikey={your apikey}&_format=xml
  (imagine that 10000 is bigger than number of organizations)

  Response

```xml
<OperationOutcome xmlns="http://hl7.org/fhir">
    <text>
        <status value="generated"/>
        <div xmlns="http://www.w3.org/1999/xhtml">
            <h1>Operation Outcome</h1>
            <table border="0">
                <tr>
                    <td style="font-weight: bold;">error</td>
                    <td>[]</td>
                    <td>
                        <pre>id:-1 is not valid.</pre>
                    </td>
                </tr>
            </table>
        </div>
    </text>
    <issue>
        <severity value="error"/>
        <code value="processing"/>
        <diagnostics value="id:-1 is not valid."/>
    </issue>
</OperationOutcome>
```

- Not allowed apikey(Create and Update)
  Response

```xml
<OperationOutcome xmlns="http://hl7.org/fhir">
    <text>
        <status value="generated"/>
        <div xmlns="http://www.w3.org/1999/xhtml">
            <h1>Operation Outcome</h1>
            <table border="0">
                <tr>
                    <td style="font-weight: bold;">error</td>
                    <td>[]</td>
                    <td>
                        <pre>Api Key is not valid for create(update)
operation.</pre>
                    </td>
                </tr>
            </table>
        </div>
    </text>
    <issue>
        <severity value="error"/>
        <code value="processing"/>
        <diagnostics value="Api Key is not valid for delete operation."/>
    </issue>
</OperationOutcome>
```

2) Delete
   - Url

     delete fhir-stu3/1.0.0/Organization/1?apikey={your apikey}&_format=xml
   - Success Response

```xml
<OperationOutcome xmlns="http://hl7.org/fhir">
    <text>
        <status value="generated"/>
        <div xmlns="http://www.w3.org/1999/xhtml">
            <h1>Operation Outcome</h1>
            <table border="0">
                <tr>
                    <td style="font-weight: bold;">success</td>
                    <td>[]</td>
                    <td>
                        <pre>Organization with id:1 is deleted
successfully.</pre>
                    </td>
                </tr>
            </table>
        </div>
    </text>
    <issue>
        <severity value="information"/>
        <code value="processing"/>
```

```xml
            <diagnostics value="Organization with id:1 is deleted
successfully."/>
        </issue>
</OperationOutcome>
```

- Failed Response
  1) Not valid id(only for Update)

```xml
<OperationOutcome xmlns="http://hl7.org/fhir">

    <text>
        <status value="generated"/>
        <div xmlns="http://www.w3.org/1999/xhtml">
            <h1>Operation Outcome</h1>
            <table border="0">
                <tr>
                    <td style="font-weight: bold;">error</td>
                    <td>[]</td>
                    <td>
                        <pre>id:-1 is not valid.</pre>
                    </td>
                </tr>
            </table>
        </div>
    </text>
    <issue>
        <severity value="error"/>
        <code value="processing"/>
        <diagnostics value="id:-1 is not valid."/>
    </issue>
</OperationOutcome>
```

  2) Not allowed apikey
```xml
<OperationOutcome xmlns="http://hl7.org/fhir">
    <text>
        <status value="generated"/>
        <div xmlns="http://www.w3.org/1999/xhtml">
            <h1>Operation Outcome</h1>
            <table border="0">
                <tr>
                    <td style="font-weight: bold;">error</td>
                    <td>[]</td>
                    <td>
                        <pre>Api Key is not valid for delete operation.</pre>
                    </td>
                </tr>
            </table>
        </div>
    </text>
    <issue>
        <severity value="error"/>
        <code value="processing"/>
        <diagnostics value="Api Key is not valid for delete operation."/>
```

```
        </issue>
</OperationOutcome>
```

3) Read
   - Retrieve from id
   Url:
   /fhir-stu3/1.0.0/Organization/1?apikey={apikey}&_format=xml

   Response: (Important: Response is only one organization. It is not a bundle)

```xml
<?xml version="1.0"?>
<!--The Sequoia Project Healthcare Directory. Copyright(c) 2015-2018 The
Sequoia Project.  All rights reserved.  Business confidential.-->
<Organization xmlns="http://hl7.org/fhir">
    <id value="1"/>
    <meta>
        <versionId value="1"/>
        <lastUpdated value="2017-10-27T15:18:23+03:00"/>
    </meta>
    <!--This is the XCA/XCPD HomeCommunityID OID in URN format-->
    <identifier>
        <use value="official"/>
        <system value="http://www.hl7.org/oid/"/>
        <value value="2.16.840.1.113883.3.787.0.0"/>
    </identifier>
    <active value="Active"/>
    <name value=" EHR Gateway Vendor"/>
    <!--The contact object is repeated for each person listed in the
directory-->
    <contact>
        <purpose value=""/>
        <name>
            <use value="official"/>
            <text>John</text>
            <given value="John"/>
        </name>
        <telcom>
            <ContactPoint>
                <system value="email"/>
                <value value="john@testmail.edu"/>
                <use value="work"/>
            </ContactPoint>
            <ContactPoint>
                <system value="phone"/>
                <value value="+1-555-201-9985"/>
                <use value="work"/>
            </ContactPoint>
            <ContactPoint>
                <system value="phone"/>
                <value value="+1-555-201-9985"/>
                <use value="work"/>
```

```xml
                </ContactPoint>
            </telcom>
            <!--General address for this specific person-->
            <address/>
        </contact>
        <!--General organizational physical and mailing address-->
        <address>
            <use value="work"/>
            <type value="both"/>
            <line value=""/>
            <city value=""/>
            <state value="FL"/>
            <postalCode value=""/>
            <country value="US"/>
            <position>
                <longitude value="-81.5157535"/>
                <latitude value="27.6648274"/>
            </position>
        </address>
        <!--If this is a Carequality Connection, then the partOf object points to
the Carequality Implementer-->
        <!--If this is a eHealth Exchange Sub-Participant, then the partOf object
points to the eHealth Exchange Participant-->
        <!--If this is a lower-level organization, then the partOf object points
to the immediate parent organization-->
        <!--If this is a top-level organization, then the partOf object is not
specified-->
        <!--Not specified-->
        <managingOrg>
            <reference value="org.sequoiaproject.fhir.stu3/Organization/
ehrvendor"/>
        </managingOrg>
        <!--The Endpoints are represented as contained resources and are repeated
as needed-->
        <contained>
            <Endpoint>
                <!--Home Community ID-->
                <identifier>
                    <use value="official"/>
                    <type value="HCID"/>
                    <system value="http://www.hl7.org/oid/"/>
                </identifier>
                <!--Assigning Authority ID-->
                <identifier>
                    <use value="official"/>
                    <type type="AAID"/>
                    <system value="http://www.hl7.org/oid/"/>
                    <value value="urn:oid:1.2.3.4.3"/>
                </identifier>
                <connectionType>
                    <system value="http://hl7.org/fhir/subscription-channel-
type"/>
                    <code value="IHE-XCA"/>
                </connectionType>
                <name value="Patient Discovery"/>
```

```xml
            <managingOrganization/>
            <address value="https://xyz.org:4437/ihe/services/xcpdrg"/>
            <payloadMimeFormat value="text/xml"/>
            <payloadType>
                <coding>
                    <system value="urn:oid:1.3.6.1.4.1.19376.1.2.3"/>
                    <code value="All"/>
                </coding>
            </payloadType>
            <extension
url="https://sequoiaproject.org/StructureDefinition/Endpoint/main/1.0.0">
                <extension url="Transaction">
                    <valueString value="XCA ITI-39"/>
                </extension>
                <!--Is this gateway an initiator or responder actor-->
                <extension url="Actor">
                    <valueCodeableConcept>
                        <coding>
                            <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Actor/1.0.0"/>
                            <value value="Responding Gateway"/>
                        </coding>
                    </valueCodeableConcept>
                </extension>
                <!--Version of the service as per the eHealth Exchange
specifications-->
                <extension url="Version">
                    <valueCodeableConcept>
                        <coding>
                            <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Version/1.0.0"
/>
                            <value value="2.0"/>
                        </coding>
                    </valueCodeableConcept>
                </extension>
                <!--Initiative specific list of use cases supported-->
                <extension url="UseCases">
                    <valueCodeableConcept>
                        <coding>
                            <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/UseCases/1.0.0
"/>
                            <value value="QueryBasedDocumentExchange"/>
                        </coding>
                    </valueCodeableConcept>
                </extension>
                <!--PurposesOfUse Value Set for SAML header and/or access
control-->
                <extension url="PurposesOfUse">
                    <valueCodeableConcept>
                        <coding>
                            <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/PurposesOfUse/
1.0.0"/>
```

```xml
                            <value value="Treatment"/>
                        </coding>
                    </valueCodeableConcept>
                </extension>
                <!--Roles Value Set for SAML header and/or access control-->
                <extension url="Roles">
                    <valueCodeableConcept>
                        <coding>
                            <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Roles/1.0.0"/>
                            <value value="All"/>
                        </coding>
                    </valueCodeableConcept>
                </extension>
                <!--IPAs of gateway, may repeat-->
                <extension url="IPA">
                    <valueCodeableConcept>
                        <coding>
                            <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/IPA/1.0.0"/>
                            <value value=""/>
                        </coding>
                    </valueCodeableConcept>
                </extension>
            </extension>
        </Endpoint>
    </contained>
    <contained>
        <Endpoint>
            <!--Home Community ID-->
            <identifier>
                <use value="official"/>
                <type value="HCID"/>
                <system value="http://www.hl7.org/oid/"/>
            </identifier>
            <!--Assigning Authority ID-->
            <identifier>
                <use value="official"/>
                <type type="AAID"/>
                <system value="http://www.hl7.org/oid/"/>
                <value value="urn:oid:1.2.3.4.3"/>
            </identifier>
            <connectionType>
                <system value="http://hl7.org/fhir/subscription-channel-
type"/>
                <code value="IHE-XCA"/>
            </connectionType>
            <name value="Query for Documents"/>
            <managingOrganization/>
            <address value="https://xyz.org:4437/ihe/services/xcarg"/>
            <payloadMimeFormat value="text/xml"/>
            <payloadType>
                <coding>
                    <system value="urn:oid:1.3.6.1.4.1.19376.1.2.3"/>
                    <code value="All"/>
```

```xml
                    </coding>
                </payloadType>
                <extension
url="https://sequoiaproject.org/StructureDefinition/Endpoint/main/1.0.0">
                    <extension url="Transaction">
                        <valueString value="XCA ITI-39"/>
                    </extension>
                    <!--Is this gateway an initiator or responder actor-->
                    <extension url="Actor">
                        <valueCodeableConcept>
                            <coding>
                                <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Actor/1.0.0"/>
                                <value value="Responding Gateway"/>
                            </coding>
                        </valueCodeableConcept>
                    </extension>
                    <!--Version of the service as per the eHealth Exchange
specifications-->
                    <extension url="Version">
                        <valueCodeableConcept>
                            <coding>
                                <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Version/1.0.0"
/>
                                <value value="2.0"/>
                            </coding>
                        </valueCodeableConcept>
                    </extension>
                    <!--Initiative specific list of use cases supported-->
                    <extension url="UseCases">
                        <valueCodeableConcept>
                            <coding>
                                <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/UseCases/1.0.0
"/>
                                <value value="QueryBasedDocumentExchange"/>
                            </coding>
                        </valueCodeableConcept>
                    </extension>
                    <!--PurposesOfUse Value Set for SAML header and/or access
control-->
                    <extension url="PurposesOfUse">
                        <valueCodeableConcept>
                            <coding>
                                <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/PurposesOfUse/
1.0.0"/>
                                <value value="Treatment"/>
                            </coding>
                        </valueCodeableConcept>
                    </extension>
                    <!--Roles Value Set for SAML header and/or access control-->
                    <extension url="Roles">
                        <valueCodeableConcept>
```

```xml
                    <coding>
                        <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Roles/1.0.0"/>
                        <value value="All"/>
                    </coding>
                </valueCodeableConcept>
            </extension>
            <!--IPAs of gateway, may repeat-->
            <extension url="IPA">
                <valueCodeableConcept>
                    <coding>
                        <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/IPA/1.0.0"/>
                        <value value=""/>
                    </coding>
                </valueCodeableConcept>
            </extension>
        </extension>
    </Endpoint>
</contained>
<contained>
    <Endpoint>
        <!--Home Community ID-->
        <identifier>
            <use value="official"/>
            <type value="HCID"/>
            <system value="http://www.hl7.org/oid/"/>
        </identifier>
        <!--Assigning Authority ID-->
        <identifier>
            <use value="official"/>
            <type type="AAID"/>
            <system value="http://www.hl7.org/oid/"/>
            <value value="urn:oid:1.2.3.4.3"/>
        </identifier>
        <connectionType>
            <system value="http://hl7.org/fhir/subscription-channel-
type"/>
            <code value="IHE-XCA"/>
        </connectionType>
        <name value="Retrieve Documents"/>
        <managingOrganization/>
        <address value="https://xyz.org:4437/ihe/services/xcarg"/>
        <payloadMimeFormat value="text/xml"/>
        <payloadType>
            <coding>
                <system value="urn:oid:1.3.6.1.4.1.19376.1.2.3"/>
                <code value="All"/>
            </coding>
        </payloadType>
        <extension
url="https://sequoiaproject.org/StructureDefinition/Endpoint/main/1.0.0">
            <extension url="Transaction">
                <valueString value="XCA ITI-39"/>
            </extension>
```

```xml
                    <!--Is this gateway an initiator or responder actor-->
                    <extension url="Actor">
                        <valueCodeableConcept>
                            <coding>
                                <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Actor/1.0.0"/>
                                <value value="Responding Gateway"/>
                            </coding>
                        </valueCodeableConcept>
                    </extension>
                    <!--Version of the service as per the eHealth Exchange
specifications-->
                    <extension url="Version">
                        <valueCodeableConcept>
                            <coding>
                                <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Version/1.0.0"
/>
                                <value value="2.0"/>
                            </coding>
                        </valueCodeableConcept>
                    </extension>
                    <!--Initiative specific list of use cases supported-->
                    <extension url="UseCases">
                        <valueCodeableConcept>
                            <coding>
                                <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/UseCases/1.0.0
"/>
                                <value value="QueryBasedDocumentExchange"/>
                            </coding>
                        </valueCodeableConcept>
                    </extension>
                    <!--PurposesOfUse Value Set for SAML header and/or access
control-->
                    <extension url="PurposesOfUse">
                        <valueCodeableConcept>
                            <coding>
                                <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/PurposesOfUse/
1.0.0"/>
                                <value value="Treatment"/>
                            </coding>
                        </valueCodeableConcept>
                    </extension>
                    <!--Roles Value Set for SAML header and/or access control-->
                    <extension url="Roles">
                        <valueCodeableConcept>
                            <coding>
                                <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/Roles/1.0.0"/>
                                <value value="All"/>
                            </coding>
                        </valueCodeableConcept>
                    </extension>
```

```xml
                        <!--IPAs of gateway, may repeat-->
                        <extension url="IPA">
                            <valueCodeableConcept>
                                <coding>
                                    <system
value="https://sequoiaproject.org/StructureDefinition/Endpoint/IPA/1.0.0"/>
                                    <value value=""/>
                                </coding>
                            </valueCodeableConcept>
                        </extension>
                    </extension>
                </Endpoint>
            </contained>
        </Organization>
```

- Retrieve from query
  Sample Queries:
  1) /fhir-stu3/1.0.0/Organization/1?apikey={apikey}&_format=xml& _city=mckinney
  2) /fhir-stu3/1.0.0/Organization?apikey={apikey}&_format=xml& _identifier=urn:oid:2.16.840.1.113883.3.564.1
  3) /fhir-stu3/1.0.0/Organization/1?apikey={apikey}&_format=xml&_state=tx
  4) /fhir-stu3/1.0.0/Organization/1?apikey={apikey}&_format=xml&_zip=75069-3234&_radius=20
  5) /fhir-stu3/1.0.0/Organization/1?apikey={apikey}&_format=xml&_state=tx& _count=1
  6) /fhir-stu3/1.0.0/Organization?apikey={apikey}&_format=xml& _name:contains=lth, Inc
  7) /fhir-stu3/1.0.0/Organization?apikey={apikey}&_format=xml& _name:exact= EHR Gateway Vendor
  8) /fhir-stu3/1.0.0/Organization?apikey={apikey}&_format=xml& _name=HER
  9) /fhir-stu3/1.0.0/Organization?apikey={apikey}&_format=xml& _lastUpdated=gt2017-09
  10) /fhir-stu3/1.0.0/Organization?apikey={apikey}&_format=xml& _lastUpdated=gt2017
  11) /fhir-stu3/1.0.0/Organization?apikey={apikey}&_format=xml& _lastUpdated=gt2017-06-29

  Sample Response

```xml
<?xml version="1.0"?>
<!--The Sequoia Project Healthcare Directory. Copyright(c) 2015-2018 The
Sequoia Project.  All rights reserved.  Business confidential.-->
<Bundle xmlns="http://hl7.org/fhir">
```

```xml
    <!--Start of header elements-->
    <id value="642dd3f0-a1ad-0135-c867-0a5612c1bb1e"/>
    <meta>
        <lastUpdated value="2017-11-02T05:39:44+02:00"/>
    </meta>
    <type value="searchset"/>
    <total value="2"/>
    <link>
        <relation value="self"/>
        <url value="/Organization?_format=xml"/>
    </link>
    <!--The entry object is repeated for each organization listed in the
directory-->
    <entry>
        <fullUrl value="/Organization/0"/>
        <resource>
            <Organization>
                <!--The ID value is internal only and subject to change for
each directory data refresh and should not be used as a persistent ID-->
                <id value="0"/>
                <meta>
                    <versionId value="1"/>
                    <lastUpdated value="2017-06-27T00:00:00.000+0000"/>
                </meta>
                <!--This is the XCA/XCPD HomeCommunityID OID in URN format-->
                <identifier>
                    <use value="official"/>
                    <system value="http://www.hl7.org/oid/"/>
                    <value value="urn:oid:2.16.840.1.113883.3.564.7652"/>
                </identifier>
                <description value=""/>
                <active value="Active"/>
                <name value=" EHR Gateway Vendor1"/>
                <!--The contact object is repeated for each person listed in
the directory-->
                <!--General organizational physical and mailing address-->
                <address>
                    <use value="work"/>
                    <type value="both"/>
                    <line value="1441 REDBUD BLVD STE 231"/>
                    <city value="MCKINNEY"/>
                    <state value="TX"/>
                    <postalCode value="75069-3234"/>
                    <country value="US"/>
                    <position>
                        <longitude value="-96.5890166"/>
                        <latitude value="33.1632842"/>
                    </position>
                </address>
                <!--If this is a Carequality Connection, then the partOf
object points to the Carequality Implementer-->
                <!--If this is a eHealth Exchange Sub-Participant, then the
partOf object points to the eHealth Exchange Participant-->
                <!--If this is a lower-level organization, then the partOf
object points to the immediate parent organization-->
```

```xml
                    <!--If this is a top-level organization, then the partOf
object is not specified-->
                    <partOf>
                        <Reference>
                            <!--Home Community ID of parent org, if any-->
                            <identifier>
                                <use value="official"/>
                                <type value="HCID"/>
                                <system value="http://www.hl7.org/oid/"/>
                                <value
value="urn:oid:2.16.840.1.113883.3.564.1"/>
                            </identifier>
                        </Reference>
                    </partOf>
                    <!--Managing Organization Not Specified-->
                    <!--The Endpoints are represented as contained resources and
are repeated as needed-->

            </Organization>
        </resource>
    </entry>
    <!--The entry object is repeated for each organization listed in the
directory-->
    <entry>
        <fullUrl value="/Organization/1"/>
        <resource>
            <Organization>
                <!--The ID value is internal only and subject to change for
each directory data refresh and should not be used as a persistent ID-->
                <id value="1"/>
                <meta>
                    <versionId value="1"/>
                    <lastUpdated value="2017-06-27T00:00:00.000+0000"/>
                </meta>
                <!--This is the XCA/XCPD HomeCommunityID OID in URN format-->
                <identifier>
                    <use value="official"/>
                    <system value="http://www.hl7.org/oid/"/>
                    <value value="urn:oid:2.16.840.1.113883.3.564.7652"/>
                </identifier>
                <description value=""/>
                <active value="Active"/>
                <name value=" EHR Gateway Vendor2"/>
                <!--The contact object is repeated for each person listed in
the directory-->
                <!--General organizational physical and mailing address-->
                <address>
                    <use value="work"/>
                    <type value="both"/>
                    <line value="1441 REDBUD BLVD STE 231"/>
                    <city value="MCKINNEY"/>
                    <state value="TX"/>
                    <postalCode value="75069-3234"/>
                    <country value="US"/>
                    <position>
```

```xml
                                    <longitude value="-96.5890166"/>
                                    <latitude value="33.1632842"/>
                                </position>
                            </address>
                            <!--If this is a Carequality Connection, then the partOf
object points to the Carequality Implementer-->
                            <!--If this is a eHealth Exchange Sub-Participant, then the
partOf object points to the eHealth Exchange Participant-->
                            <!--If this is a lower-level organization, then the partOf
object points to the immediate parent organization-->
                            <!--If this is a top-level organization, then the partOf
object is not specified-->
                            <partOf>
                                <Reference>
                                    <!--Home Community ID of parent org, if any-->
                                    <identifier>
                                        <use value="official"/>
                                        <type value="HCID"/>
                                        <system value="http://www.hl7.org/oid/"/>
                                        <value
value="urn:oid:2.16.840.1.113883.3.564.1"/>
                                    </identifier>
                                </Reference>
                            </partOf>
                            <!--Managing Organization Not Specified-->
                            <!--The Endpoints are represented as contained resources and
are repeated as needed-->

                    </Organization>
                </resource>
            </entry>
</Bundle>
```

23.2.UDDI Example

- Create / Update
  Url:
  Create: post /uddi/create?apikey={apikey}&_format=xml
  Update: put /uddi/update/1? apikey={apikey}&_format=xml

  1) Success
     Request Body

```xml
<businessEntity
businessKey="uddi:ehrgatewayvendor:urn:oid:2.16.840.1.113883.3.564.1">
        <name>uddi:ehrgatewayvendor:urn:oid:2.16.840.1.113883.3.564.1</name>
        <description>EHR Gateway Vendor</description>
        <contacts>
                <contact useType="">
```

```xml
                    <personName xml:lang="en">Eric Heflin</personName>
                    <phone>555-555-1212</phone>
                    <email>eh@test.com</email>
                    <address xml:lang="en" useType="" sortCode="">
                            <addressLine>EHR Gateway Vendor</addressLine>
                            <addressLine>311 Main St.,Austin,TX,US
78737</addressLine>
                    </address>
            </contact>
            <contact useType="">
                    <personName xml:lang="en">Steve</personName>
                    <phone>555-555-1212</phone>
                    <email>steve@testmail.edu</email>
                    <address xml:lang="en" useType="" sortCode="">
                            <addressLine>EHR Gateway Vendor</addressLine>
                            <addressLine>311 Main St., Austin, TX
78737</addressLine>
                    </address>
            </contact>
    </contacts>
    <businessServices>
            <businessService serviceKey="uddi: ehrgatewayvendor:Patient
Discovery" businessKey="uddi:
ehrgatewayvendor:urn:oid:2.16.840.1.113883.3.564.1">
                    <name xml:lang="en">Patient Discovery</name>
                    <description xml:lang="en">This is an implementation of the
eHealth Exchange Patient Discovery Specification</description>
                    <bindingTemplates>
                            <bindingTemplate
bindingKey="uddi:78f9b1108b5701355788051a174da845" serviceKey="uddi:
ehrgatewayvendor:Patient Discovery">
                                    <accessPoint
useType="endPoint">https://abc.def/123/abc</accessPoint>
                                    <categoryBag>
                                            <keyedReference
tModelKey="uddi:nhin:versionofservice" keyName="" keyValue="2.0"/>
                                    </categoryBag>
                            </bindingTemplate>
                    </bindingTemplates>
                    <categoryBag>
                            <keyedReference tModelKey="uddi:nhin:standard-
servicenames" keyName="PatientDiscovery" keyValue="PatientDiscovery"/>
                    </categoryBag>
            </businessService>
            <businessService serviceKey="uddi: ehrgatewayvendor:XCA: Query
for documents" businessKey="uddi:
ehrgatewayvendor:urn:oid:2.16.840.1.113883.3.564.1">
                    <name xml:lang="en">XCA: Query for documents</name>
                    <description xml:lang="en">This is an implementation of the
eHealth Exchange XCA: Query for documents Specification</description>
                    <bindingTemplates>
                            <bindingTemplate
bindingKey="uddi:78faafb08b5701355788051a174da845" serviceKey="uddi:
ehrgatewayvendor:XCA: Query for documents">
```

```xml
                                <accessPoint
useType="endPoint">https://abc.def/123</accessPoint>
                                    <categoryBag>
                                        <keyedReference
tModelKey="uddi:nhin:versionofservice" keyName="" keyValue="3.0"/>
                                    </categoryBag>
                            </bindingTemplate>
                    </bindingTemplates>
                    <categoryBag>
                            <keyedReference tModelKey="uddi:nhin:standard-
servicenames" keyName="XCA:Queryfordocuments"
keyValue="XCA:Queryfordocuments"/>
                    </categoryBag>
            </businessService>
            <businessService serviceKey="uddi: ehrgatewayvendor:XCA: Retrieve
documents" businessKey="uddi:
ehrgatewayvendor:urn:oid:2.16.840.1.113883.3.564.1">
                    <name xml:lang="en">XCA: Retrieve documents</name>
                    <description xml:lang="en">This is an implementation of the
eHealth Exchange XCA: Retrieve documents Specification</description>
                    <bindingTemplates>
                            <bindingTemplate
bindingKey="uddi:78fac3408b5701355788051a174da845" serviceKey="uddi:
ehrgatewayvendor:XCA: Retrieve documents">
                                <accessPoint
useType="endPoint">https://abc.def/123</accessPoint>
                                    <categoryBag>
                                        <keyedReference
tModelKey="uddi:nhin:versionofservice" keyName="" keyValue="3.0"/>
                                    </categoryBag>
                            </bindingTemplate>
                    </bindingTemplates>
                    <categoryBag>
                            <keyedReference tModelKey="uddi:nhin:standard-
servicenames" keyName="XCA:Retrievedocuments"
keyValue="XCA:Retrievedocuments"/>
                    </categoryBag>
            </businessService>
        </businessServices>
        <identifierBag>
            <keyedReference tModelKey="uddi:nhin:nhie:homecommunityid"
keyName="" keyValue="2.16.840.1.113883.3.564.1"/>
        </identifierBag>
        <categoryBag>
            <keyedReference
tModelKey="uddi:uddi.org:ubr:categorization:iso3166" keyName="" keyValue="US-
TX"/>
        </categoryBag>
</businessEntity>
```

Response

(1) Create

```xml
<OperationOutcome xmlns="http://hl7.org/fhir">
    <text>
        <status value="generated"/>
        <div xmlns="http://www.w3.org/1999/xhtml">
            <h1>Operation Outcome</h1>
            <table border="0">
                <tr>
                    <td style="font-weight: bold;">success</td>
                    <td>[]</td>
                    <td>
                        <pre>New UDDI entries are created successfully.</pre>
                    </td>
                </tr>
            </table>
        </div>
    </text>
    <issue>
        <severity value="information"/>
        <code value="processing"/>
        <diagnostics value="New UDDI entries are created successfully."/>
    </issue>
</OperationOutcome>
```

(2) Update

```xml
<OperationOutcome xmlns="http://hl7.org/fhir">
    <text>
        <status value="generated"/>
        <div xmlns="http://www.w3.org/1999/xhtml">
            <h1>Operation Outcome</h1>
            <table border="0">
                <tr>
                    <td style="font-weight: bold;">success</td>
                    <td>[]</td>
                    <td>
                        <pre>UDDI entry with id:1 has been updated successfully.</pre>
                    </td>
                </tr>
            </table>
        </div>
    </text>
    <issue>
        <severity value="information"/>
        <code value="processing"/>
        <diagnostics value="UDDI entry with id:1 has been updated successfully."/>
    </issue>
</OperationOutcome>
```

2) Fail

    (1) Hommunityid missing error

        Request Body:

Response:

```xml
<OperationOutcome xmlns="http://hl7.org/fhir">
    <text>
        <status value="generated"/>
        <div xmlns="http://www.w3.org/1999/xhtml">
            <h1>Operation Outcome</h1>
            <table border="0">
                <tr>
                    <td style="font-weight: bold;">error</td>
                    <td>[]</td>
                    <td>
                        <pre>EHR Gateway Vedor has no homecommunity id field
required!</pre>
                    </td>
                </tr>
            </table>
        </div>
    </text>
    <issue>
        <severity value="error"/>
        <code value="processing"/>
        <diagnostics value="EHR Gateway Vendor has no homecommunity id field
required!"/>
    </issue>
</OperationOutcome>
```

(2) Country of state info missing error

Request Body

```xml
<businessEntity
businessKey="uddi:ehrgatewayvendor:urn:oid:2.16.840.1.113883.3.564.1">
    <name>uddi:ehrgatewayvendor:urn:oid:2.16.840.1.113883.3.564.1</name>
    <description>EHR Gateway Vendor</description>
    <contacts>
        <contact useType="">
            <personName xml:lang="en">John Smit</personName>
            <phone>555-402-1025</phone>
            <email>john@testmail.edu</email>
            <address xml:lang="en" useType="" sortCode="">
                <addressLine>EHR Gateway Vendor</addressLine>
                <addressLine>311 Main St.,Austin,TX ,US
2472</addressLine>
            </address>
        </contact>
        <contact useType="">
            <personName xml:lang="en">Steve</personName>
            <phone>555-402-8751</phone>
            <email>steve@testmail.edu</email>
            <address xml:lang="en" useType="" sortCode="">
                <addressLine>EHR Gateway Vendor</addressLine>
                <addressLine>311 Main St.,Austin,TX,US
2472</addressLine>
```

```xml
                    </address>
                </contact>
            </contacts>
            <businessServices>
                    <businessService serviceKey="uddi: ehrgatewayvendor:Patient
Discovery" businessKey="uddi:
ehrgatewayvendor:urn:oid:2.16.840.1.113883.3.564.1">
                        <name xml:lang="en">Patient Discovery</name>
                        <description xml:lang="en">This is an implementation of the
eHealth Exchange Patient Discovery Specification</description>
                        <bindingTemplates>
                            <bindingTemplate
bindingKey="uddi:78f9b1108b5701355788051a174da845" serviceKey="uddi:
ehrgatewayvendor:Patient Discovery">
                                <accessPoint
useType="endPoint">https://carequality.health.com/xcpd</accessPoint>
                                <categoryBag>
                                    <keyedReference
tModelKey="uddi:nhin:versionofservice" keyName="" keyValue="2.0"/>
                                </categoryBag>
                            </bindingTemplate>
                        </bindingTemplates>
                        <categoryBag>
                            <keyedReference tModelKey="uddi:nhin:standard-
servicenames" keyName="PatientDiscovery" keyValue="PatientDiscovery"/>
                        </categoryBag>
                    </businessService>
                    <businessService serviceKey="uddi: ehrgatewayvendor:XCA: Query
for documents" businessKey="uddi:
ehrgatewayvendor:urn:oid:2.16.840.1.113883.3.564.1">
                        <name xml:lang="en">XCA: Query for documents</name>
                        <description xml:lang="en">This is an implementation of the
eHealth Exchange XCA: Query for documents Specification</description>
                        <bindingTemplates>
                            <bindingTemplate
bindingKey="uddi:78faafb08b5701355788051a174da845" serviceKey="uddi:
ehrgatewayvendor:XCA: Query for documents">
                                <accessPoint
useType="endPoint">https://carequality.health.com/xca</accessPoint>
                                <categoryBag>
                                    <keyedReference
tModelKey="uddi:nhin:versionofservice" keyName="" keyValue="3.0"/>
                                </categoryBag>
                            </bindingTemplate>
                        </bindingTemplates>
                        <categoryBag>
                            <keyedReference tModelKey="uddi:nhin:standard-
servicenames" keyName="XCA:Queryfordocuments"
keyValue="XCA:Queryfordocuments"/>
                        </categoryBag>
                    </businessService>
                    <businessService serviceKey="uddi: ehrgatewayvendor:XCA: Retrieve
documents" businessKey="uddi:
ehrgatewayvendor:urn:oid:2.16.840.1.113883.3.564.1">
                        <name xml:lang="en">XCA: Retrieve documents</name>
```

```xml
                            <description xml:lang="en">This is an implementation of the
eHealth Exchange XCA: Retrieve documents Specification</description>
                            <bindingTemplates>
                                <bindingTemplate
bindingKey="uddi:78fac3408b5701355788051a174da845" serviceKey="uddi:
ehrgatewayvendor:XCA: Retrieve documents">
                                    <accessPoint
useType="endPoint">https://carequality.health.com/xca</accessPoint>
                                    <categoryBag>
                                        <keyedReference
tModelKey="uddi:nhin:versionofservice" keyName="" keyValue="3.0"/>
                                    </categoryBag>
                                </bindingTemplate>
                            </bindingTemplates>
                            <categoryBag>
                                <keyedReference tModelKey="uddi:nhin:standard-
servicenames" keyName="XCA:Retrievedocuments"
keyValue="XCA:Retrievedocuments"/>
                            </categoryBag>
                        </businessService>
                    </businessServices>
                    <identifierBag>
                        <keyedReference tModelKey="uddi:nhin:nhie:homecommunityid"
keyName="" keyValue="2.16.840.1.113883.3.564.1"/>
                    </identifierBag>
                </businessEntity>
```

Response

```xml
<OperationOutcome xmlns="http://hl7.org/fhir">
    <text>
        <status value="generated"/>
        <div xmlns="http://www.w3.org/1999/xhtml">
            <h1>Operation Outcome</h1>
            <table border="0">
                <tr>
                    <td style="font-weight: bold;">error</td>
                    <td>[]</td>
                    <td>
                        <pre> EHR Gateway Vendor has no State or
Country</pre>
                    </td>
                </tr>
            </table>
        </div>
    </text>
    <issue>
        <severity value="error"/>
        <code value="processing"/>
        <diagnostics value="EHR Gateway Vendor has no State or Country"/>
    </issue>
</OperationOutcome>
```

(3) Id not valid

Url: put /uddi/update/-1?apikey={your apikey}&_format=xml
Response:

```xml
<OperationOutcome xmlns="http://hl7.org/fhir">
    <text>
        <status value="generated"/>
        <div xmlns="http://www.w3.org/1999/xhtml">
            <h1>Operation Outcome</h1>
            <table border="0">
                <tr>
                    <td style="font-weight: bold;">error</td>
                    <td>[]</td>
                    <td>
                        <pre>id:-1 is not valid.</pre>
                    </td>
                </tr>
            </table>
        </div>
    </text>
    <issue>
        <severity value="error"/>
        <code value="processing"/>
        <diagnostics value="id:-1 is not valid."/>
    </issue>
</OperationOutcome>
```

- Delete
  1) Sample 1
  Url: delete /uddi/delete/1?apikey={apikey}&_format=xml
  Response
    (1) Success

```xml
<OperationOutcome xmlns="http://hl7.org/fhir">
    <text>
        <status value="generated"/>
        <div xmlns="http://www.w3.org/1999/xhtml">
            <h1>Operation Outcome</h1>
            <table border="0">
                <tr>
                    <td style="font-weight: bold;">success</td>
                    <td>[]</td>
                    <td>
                        <pre>UDDI entry with id:1 has been deleted
successfully.</pre>
                    </td>
                </tr>
            </table>
        </div>
    </text>
    <issue>
        <severity value="information"/>
        <code value="processing"/>
```

```
            <diagnostics value="UDDI entry with id:1 has been delete
successfully."/>
        </issue>
</OperationOutcome>
```

(2) Api Key not acceptable

```
<OperationOutcome xmlns="http://hl7.org/fhir">
    <text>
        <status value="generated"/>
        <div xmlns="http://www.w3.org/1999/xhtml">
            <h1>Operation Outcome</h1>
            <table border="0">
                <tr>
                    <td style="font-weight: bold;">error</td>
                    <td>[]</td>
                    <td>
                        <pre>Api Key is not acceptable.</pre>
                    </td>
                </tr>
            </table>
        </div>
    </text>
    <issue>
        <severity value="error"/>
        <code value="processing"/>
        <diagnostics value="Api Key is not acceptable"/>
    </issue>
</OperationOutcome>
```

(3) Api Key is not allowed to do delete operation

```
<OperationOutcome xmlns="http://hl7.org/fhir">
    <text>
        <status value="generated"/>
        <div xmlns="http://www.w3.org/1999/xhtml">
            <h1>Operation Outcome</h1>
            <table border="0">
                <tr>
                    <td style="font-weight: bold;">error</td>
                    <td>[]</td>
                    <td>
                        <pre>Api Key is not valid for delete operation.</pre>
                    </td>
                </tr>
            </table>
        </div>
    </text>
    <issue>
        <severity value="error"/>
        <code value="processing"/>
        <diagnostics value="Api Key is not valid for create operation."/>
    </issue>
</OperationOutcome>
```

2) Sample 2

Url: delete /uddi/delete/-1?apikey={your apikey}&_format=xml

Response:

```xml
<OperationOutcome xmlns="http://hl7.org/fhir">
    <text>
        <status value="generated"/>
        <div xmlns="http://www.w3.org/1999/xhtml">
            <h1>Operation Outcome</h1>
            <table border="0">
                <tr>
                    <td style="font-weight: bold;">error</td>
                    <td>[]</td>
                    <td>
                        <pre>id:-1 is not valid.</pre>
                    </td>
                </tr>
            </table>
        </div>
    </text>
    <issue>
        <severity value="error"/>
        <code value="processing"/>
        <diagnostics value="id:-1 is not valid."/>
    </issue>
</OperationOutcome>
```

-    Read(find_business, get_businessDetail)

  Url: post /uddi/inquiry?apikey={your apikey}&_format=xml

1) find_business

  Request Body:

```xml
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:urn="urn:uddi-org:api_v3">
   <soapenv:Header/>
   <soapenv:Body>
      <urn:find_business>
         <urn:name>EHR Gateway Vendor</urn:name>
      </urn:find_business>
   </soapenv:Body>
</soapenv:Envelope>
```

Response:

(1) Success

```xml
<?xml version="1.0"?>
<Envelope xmlns="http://schemas.xmlsoap.org/soap/envelope/">
    <Body>
        <businessList xmlns="urn:uddi-org:api_v3">
            <listDescription>
                <includeCount>1</includeCount>
                <actualCount>1</actualCount>
                <listHead>1</listHead>
            </listDescription>
            <businessInfos>
                <businessInfo
businessKey="uddi:ehrgatewayvendor:urn:oid:2.16.840.1.113883.3.564.1">
                    <name xml:lang="en">EHR Gateway Vendor </name>
                    <serviceInfos>
                        <serviceInfo serviceKey="uddi: ehrgatewayvendor
:Patient Discovery" businessKey="uddi:
ehrgatewayvendor:urn:oid:2.16.840.1.113883.3.564.1">
                            <name xml:lang="en">Patient Discovery</name>
                        </serviceInfo>
                        <serviceInfo serviceKey="uddi: ehrgatewayvendor:XCA:
Query for documents" businessKey="uddi:
ehrgatewayvendor:urn:oid:2.16.840.1.113883.3.564.1">
                            <name xml:lang="en">XCA: Query for
documents</name>
                        </serviceInfo>
                        <serviceInfo serviceKey="uddi: ehrgatewayvendor:XCA:
Retrieve documents" businessKey="uddi:
ehrgatewayvendor:urn:oid:2.16.840.1.113883.3.564.1">
                            <name xml:lang="en">XCA: Retrieve
documents</name>
                        </serviceInfo>
                    </serviceInfos>
                </businessInfo>
            </businessInfos>
        </businessList>
    </Body>
</Envelope>
```

(2) Api Key not acceptable

```xml
<OperationOutcome xmlns="http://hl7.org/fhir">
    <text>
        <status value="generated"/>
        <div xmlns="http://www.w3.org/1999/xhtml">
            <h1>Operation Outcome</h1>
            <table border="0">
                <tr>
                    <td style="font-weight: bold;">error</td>
```

```xml
                    <td>[]</td>
                    <td>
                            <pre>Api Key is not acceptable.</pre>
                    </td>
                </tr>
            </table>
        </div>
    </text>
    <issue>
        <severity value="error"/>
        <code value="processing"/>
        <diagnostics value="Api Key is not acceptable"/>
    </issue>
</OperationOutcome>
```

(3) Duplicate BusinessKey or ServiceKey Error

```xml
<OperationOutcome xmlns="http://hl7.org/fhir">
    <text>
        <status value="generated"/>
        <div xmlns="http://www.w3.org/1999/xhtml">
            <h1>Operation Outcome</h1>
            <table border="0">
                <tr>
                    <td style="font-weight: bold;">success</td>
                    <td>[]</td>
                    <td>
                            <pre>Your Organization Source contains duplicate
businessKey(uddi:ehrgatewayvendor:2.16.840.1.113883.3.787.0.0)!</pre>
                    </td>
                </tr>
            </table>
        </div>
    </text>
    <issue>
        <severity value="information"/>
        <code value="processing"/>
        <diagnostics value="Your Organization Source contains duplicate
business!(uddi:ehrgatewayvendor:2.16.840.1.113883.3.787.0.0)"/>
    </issue>
</OperationOutcome>
```

2) get_businessDetail
   Request Body:

```xml
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:urn="urn:uddi-org:api_v3">
   <soapenv:Header/>
   <soapenv:Body>
      <urn:get_businessDetail>
```

```
<urn:businessKey>uddi:ehrgatewayvendor:urn:oid:2.16.840.1.113883.3.564.1</urn
:businessKey>
      </urn:get_businessDetail>
   </soapenv:Body>
</soapenv:Envelope>
```

Response:

(1) Success

```
<businessEntity
businessKey="uddi:ehrgatewayvendor:urn:oid:2.16.840.1.113883.3.564.1">
      <name>uddi:ehrgatewayvendor:urn:oid:2.16.840.1.113883.3.564.1</name>
      <description>EHR Gateway Vendor</description>
      <contacts>
            <contact useType="">
                  <personName xml:lang="en">John Smit</personName>
                  <phone>555-402-1025</phone>
                  <email>john@testmail.edu</email>
                  <address xml:lang="en" useType="" sortCode="">
                        <addressLine>EHR Gateway Vendor</addressLine>
                        <addressLine>311 Main St.,Austin,TX ,US
2472</addressLine>
                  </address>
            </contact>
            <contact useType="">
                  <personName xml:lang="en">Steve Jo</personName>
                  <phone>555-402-8751</phone>
                  <email>steve@testmail.edu</email>
                  <address xml:lang="en" useType="" sortCode="">
                        <addressLine>EHR Gateway Vendor</addressLine>
                        <addressLine>311 Main St.,Austin,TX,US
2472</addressLine>
                  </address>
            </contact>
      </contacts>
      <businessServices>
            <businessService serviceKey="uddi: ehrgatewayvendor:Patient
Discovery" businessKey="uddi:
ehrgatewayvendor:urn:oid:2.16.840.1.113883.3.564.1">
                  <name xml:lang="en">Patient Discovery</name>
                  <description xml:lang="en">This is an implementation of the
eHealth Exchange Patient Discovery Specification</description>
                  <bindingTemplates>
                        <bindingTemplate
bindingKey="uddi:78f9b1108b5701355788051a174da845" serviceKey="uddi:
ehrgatewayvendor:Patient Discovery">
                              <accessPoint
useType="endPoint">https://carequality.health.com/xcpd</accessPoint>
                              <categoryBag>
                                    <keyedReference
tModelKey="uddi:nhin:versionofservice" keyName="" keyValue="2.0"/>
                              </categoryBag>
```

```xml
                        </bindingTemplate>
                    </bindingTemplates>
                    <categoryBag>
                        <keyedReference tModelKey="uddi:nhin:standard-
servicenames" keyName="PatientDiscovery" keyValue="PatientDiscovery"/>
                    </categoryBag>
                </businessService>
                <businessService serviceKey="uddi: ehrgatewayvendor:XCA: Query
for documents" businessKey="uddi:
ehrgatewayvendor:urn:oid:2.16.840.1.113883.3.564.1">
                    <name xml:lang="en">XCA: Query for documents</name>
                    <description xml:lang="en">This is an implementation of the
eHealth Exchange XCA: Query for documents Specification</description>
                    <bindingTemplates>
                        <bindingTemplate
bindingKey="uddi:78faafb08b5701355788051a174da845" serviceKey="uddi:
ehrgatewayvendor:XCA: Query for documents">
                            <accessPoint
useType="endPoint">https://carequality.health.com/xca</accessPoint>
                            <categoryBag>
                                <keyedReference
tModelKey="uddi:nhin:versionofservice" keyName="" keyValue="3.0"/>
                            </categoryBag>
                        </bindingTemplate>
                    </bindingTemplates>
                    <categoryBag>
                        <keyedReference tModelKey="uddi:nhin:standard-
servicenames" keyName="XCA:Queryfordocuments"
keyValue="XCA:Queryfordocuments"/>
                    </categoryBag>
                </businessService>
                <businessService serviceKey="uddi: ehrgatewayvendor:XCA: Retrieve
documents" businessKey="uddi:
ehrgatewayvendor:urn:oid:2.16.840.1.113883.3.564.1">
                    <name xml:lang="en">XCA: Retrieve documents</name>
                    <description xml:lang="en">This is an implementation of the
eHealth Exchange XCA: Retrieve documents Specification</description>
                    <bindingTemplates>
                        <bindingTemplate
bindingKey="uddi:78fac3408b5701355788051a174da845" serviceKey="uddi:
ehrgatewayvendor:XCA: Retrieve documents">
                            <accessPoint
useType="endPoint">https://carequality.health.com/xca</accessPoint>
                            <categoryBag>
                                <keyedReference
tModelKey="uddi:nhin:versionofservice" keyName="" keyValue="3.0"/>
                            </categoryBag>
                        </bindingTemplate>
                    </bindingTemplates>
                    <categoryBag>
                        <keyedReference tModelKey="uddi:nhin:standard-
servicenames" keyName="XCA:Retrievedocuments"
keyValue="XCA:Retrievedocuments"/>
                    </categoryBag>
                </businessService>
```

```xml
        </businessServices>
        <identifierBag>
                <keyedReference tModelKey="uddi:nhin:nhie:homecommunityid"
keyName="" keyValue="2.16.840.1.113883.3.564.1"/>
        </identifierBag>
        <categoryBag>
                <keyedReference
tModelKey="uddi:uddi.org:ubr:categorization:iso3166" keyName="" keyValue="US-
TX"/>
        </categoryBag>
</businessEntity>
```

(2) Api Key not acceptable

```xml
<OperationOutcome xmlns="http://hl7.org/fhir">
    <text>
        <status value="generated"/>
        <div xmlns="http://www.w3.org/1999/xhtml">
            <h1>Operation Outcome</h1>
            <table border="0">
                <tr>
                    <td style="font-weight: bold;">error</td>
                    <td>[]</td>
                    <td>
                        <pre>Api Key is not acceptable.</pre>
                    </td>
                </tr>
            </table>
        </div>
    </text>
    <issue>
        <severity value="error"/>
        <code value="processing"/>
        <diagnostics value="Api Key is not acceptable"/>
    </issue>
</OperationOutcome>
```

(3) Duplicate BusinessKey or ServiceKey Error

```xml
<OperationOutcome xmlns="http://hl7.org/fhir">
    <text>
        <status value="generated"/>
        <div xmlns="http://www.w3.org/1999/xhtml">
            <h1>Operation Outcome</h1>
            <table border="0">
                <tr>
                    <td style="font-weight: bold;">success</td>
                    <td>[]</td>
                    <td>
                        <pre>Your Organization Source contains duplicate
businessKey(uddi:ehrgatewayvendor:2.16.840.1.113883.3.787.0.0)!</pre>
                    </td>
                </tr>
            </table>
```

```
        </div>
    </text>
    <issue>
        <severity value="information"/>
        <code value="processing"/>
        <diagnostics value="Your Organization Source contains duplicate
business!(uddi:ehrgatewayvendor:2.16.840.1.113883.3.787.0.0)"/>
    </issue>
</OperationOutcome>
```

24. MASTER-SERVER ARCHITECTURE

24.1. Server Requirement

- Master Server (Tested Environment)
  CPU: 3.6G, 2 cores
  RAM: 2GB
  Hard Drive Capacity: 30GB
  Linux (Red Hat Enterprise Linux 7.4 tested)
- Slave Server (Tested Environment)
  CPU: 3.6G, 2 cores
  RAM: 2GB
  Hard Drive Capacity: 30GB
  Linux (Red Hat Enterprise Linux 7.4 tested)

24.2. Server Configuration

You can configure to make the server run in three different modes as described more below:
1) Open server.ini file in edit mode.
2) Change the ServerMainOperatingMode in Default section to either:
    1: Master Server
    2: Slave Server
    3: WordPress Server
3) For slave server, cron jobs should be configured to obtain regular updates from the master server.
    To configure cron jobs, you need to edit Cron Job section.
    - MasterServerHost

Master server hostname. It can be either a domain or IP address
- MasterServerPort

  Port number on which master server is running and listening.
- Use_TLS

  True if master server is running in TLS mode, or false otherwise. Note that running in TLS mode is strongly encouraged and will require acquisition of an appropriate x.509 certificate.
- CronIntervalInMin

  Time interval to get updates from master server.
- RetryWriteIntervalInSec

  Time interval to retry write operation when other thread is reading from/writing to org_directory file. This is intended to accomidate resource contention across multiple processes.
- MaxRetryTimes

  Maximum number of retry attempts. If cron job cannot write within maximum number of attempts, then it will ignore the write request and return a failure response.
- File_Name

  File name to be updated regularly from master server.

25. APPENDIX

25.1. Deploying FHIR wordpress server on RedHat AWS EC2 Instance.

After access to the server via ssh, you need to run commands as followings:

This command will ensure that curl and gpg are installed

```
sudo yum install -y curl gpg gcc gcc-c++ make
```

```
Loaded plugins: fastestmirror, langpacks
base                                          | 3.6 kB    00:00
extras                                                 | 3.4 kB  00:00:00
updates                                                                                                        | 3.4 kB  00:00:00
(1/2): extras/7/x86_64/primary_db                                                                              | 191 kB  00:00:04
(2/2): updates/7/x86_64/primary_db                                                                             | 7.8 MB  00:00:08
Loading mirror speeds from cached hostfile
 * base: mirror.centos.org
 * extras: mirror.centos.org
 * updates: mirror.centos.org
Package curl-7.29.0-35.el7.centos.x86_64 already installed and latest version
Package gnupg2-2.0.22-4.el7.x86_64 already installed and latest version
Package gcc-4.8.5-11.el7.x86_64 already installed and latest version
Package 1:make-3.82-23.el7.x86_64 already installed and latest version
Resolving Dependencies
--> Running transaction check
---> Package gcc-c++.x86_64 0:4.8.5-11.el7 will be installed
--> Processing Dependency: libstdc++-devel = 4.8.5-11.el7 for package: gcc-c++-4.8.5-11.el7.x86_64
--> Running transaction check
---> Package libstdc++-devel.x86_64 0:4.8.5-11.el7 will be installed
--> Finished Dependency Resolution

Dependencies Resolved

================================================================================================================================
 Package                    Arch             Version                    Repository                Size
================================================================================================================================
Installing:
 gcc-c++                    x86_64           4.8.5-11.el7               base                      7.2 M
Installing for dependencies:
 libstdc++-devel            x86_64           4.8.5-11.el7               base                      1.5 M

Transaction Summary
================================================================================================================================
Install  1 Package (+1 Dependent package)

Total download size: 8.7 M
Installed size: 25 M
Downloading packages:
```

These commands will install rvm. You need to run these commands one by one

```
sudo gpg --keyserver hkp://keys.gnupg.net --recv-keys 409B6B1796C275462A1703113804BB82D39DC0E3
```

```
gpg: directory `/root/.gnupg' created
gpg: new configuration file `/root/.gnupg/gpg.conf' created
gpg: WARNING: options in `/root/.gnupg/gpg.conf' are not yet active during this run
gpg: keyring `/root/.gnupg/secring.gpg' created
gpg: keyring `/root/.gnupg/pubring.gpg' created
gpg: requesting key D39DC0E3 from hkp server keys.gnupg.net
gpg: /root/.gnupg/trustdb.gpg: trustdb created
gpg: key D39DC0E3: public key "Michal Papis (RVM signing) <mpapis@gmail.com>" imported
gpg: no ultimately trusted keys found
gpg: Total number processed: 1
gpg:               imported: 1  (RSA: 1)
```

```
curl -sSL https://get.rvm.io | sudo bash -s stable
```

```
Downloading https://github.com/rvm/rvm/archive/1.29.2.tar.gz
Downloading https://github.com/rvm/rvm/releases/download/1.29.2/1.29.2.tar.gz.asc
gpg: Signature made Thu 22 Jun 2017 05:18:38 PM BST using RSA key ID BF04FF17
gpg: Good signature from "Michal Papis (RVM signing) <mpapis@gmail.com>"
gpg:                  aka "Michal Papis <michal.papis@toptal.com>"
gpg:                  aka "[jpeg image of size 5015]"
gpg: WARNING: This key is not certified with a trusted signature!
gpg:          There is no indication that the signature belongs to the owner.
Primary key fingerprint: 409B 6B17 96C2 7546 2A17  0311 3804 BB82 D39D C0E3
     Subkey fingerprint: 62C9 E5F4 DA30 0D94 AC36  166B E206 C29F BF04 FF17
GPG verified '/usr/local/rvm/archives/rvm-1.29.2.tgz'
Creating group 'rvm'

Installing RVM to /usr/local/rvm/
Installation of RVM in /usr/local/rvm/ is almost complete:

  * First you need to add all users that will be using rvm to 'rvm' group,
    and logout - login again, anyone using rvm will be operating with `umask u=rwx,g=rwx,o=rx`.

  * To start using RVM you need to run `source /etc/profile.d/rvm.sh`
    in all your open shell windows, in rare cases you need to reopen all shell windows.

# osboxes,
#
#   Thank you for using RVM!
#   We sincerely hope that RVM helps to make your life easier and more enjoyable!!!
#
# ~Wayne, Michal & team.

In case of problems: https://rvm.io/help and https://twitter.com/rvm_io
```

```
sudo usermod -a -G rvm `whoami`
```

Run this command to ensure environment set up correctly

```
if sudo grep -q secure_path /etc/sudoers; then sudo sh -c "echo export rvmsudo_secure_path=1 >
> /etc/profile.d/rvm_secure_path.sh" && echo Environment variable installed; fi
```

If you can see "Environment variable installed" after run this command, then the installation is progressing correctly.

After this step, you need to log out, and then log in to your server. Without logging out and back in, RVM won't work correctly.

After relogin, run this command to install Ruby and use that as a default.

```
rm -f /etc/yum.repos.d/epel.repo

sudo yum install -y https://dl.fedoraproject.org/pub/epel/epel-release-latest-7.noarch.rpm
```

Here we are installing ruby-2.2:

```
rvm install ruby-X.X.X

rvm --default use ruby-X.X.X
```

Run this command to install Ruby bundler:

```
gem install bundler --no-rdoc --no-ri
```

After this, you need to go to the directory where the Sequoia Provider Directory server Ruby source code exists.

In this example, we placed the WordPress version of the server in the directory /home/ec2-user/FHIRServer.

Next, run this command to install necessary gems at once using bundler:

```
bundle install
```

Confirm there are no errors during the bundler execution.

Next, open a port for this server. In this example, we will use port 3050.

To open this port, you need to set security rule of that instance to allow traffic to port 3050.

After then, you need to change IPA in config file(server.ini).

You can see IPAddress in Default section.

Change the server.ini as follows:

IPAddress = '0.0.0.0'

After setting the server.ini file value, run this command to run the Sequoia Healthcare Directory server:

```
ruby FHIRserver.rb
```

At this point, the Sequoia Healthcare Directory server should be running. Please test it thoroughly to confirm proper operation, to validate capacity is sufficient (CPU, network bandwidth, RAM, hard disk, etc.). In addition, we strong recommend that operational monitoring, watchdog processes also be employed in addition to following other IT best practices such as ensuring the server is secured.

25.2. Deploying cron job to keep the server

To deploy cron job, first login to server via ssh.

In this example, the FHIR wordpress server exists in /home/ec2-user/FHIRServer.

- Build shell scripts to check if server is running and restart if it is down.

  Run command as below (or create the file using other mechanisms):

  ```
  vi /home/ec2-user/watchdog.sh
  ```

  You need to add text below into the watchdog.sh file:

  ```
  #!/bin/sh

  SERVICE='ruby'

  if ps ax | grep -v grep | grep $SERVICE > /dev/null
  then
      echo "$SERVICE service running, everything is fine"
  else
      echo "$SERVICE is not running"
      cd /home/ec2-user/FHIRServer
      /usr/local/rvm/bin/rvm-exec ruby-2.2.6 ruby /home/ec2-user/FHIRServer/FHIRserver.rb &
  fi
  ```

Make the script file is executable by performing following command:

```
sudo chmod +x /home/ec2-user/watchdog.sh
```

- Make cron

The next Step is make cron job so that it will check the status every 1 min and restart if neeed.

To make cron job, run the command below:

```
crontab -e
```

And add this line to add cron job which will run every 1 min

```
* * * * * /home/ec2-user/watchdog.sh >/dev/null 2>&1
```

25.3. Deploying run script to start the server when reboot

First, make the file /etc/rc.d/rc.local file executable.

```
sudo chmod +x /etc/rc.d/rc.local
```

Second, need to run the command below:

```
sudo vi /etc/rc.d/rc.local
```

Then, you need to add this:

cd /home/ec2-user/FHIRServer

/usr/local/rvm/bin/rvm-exec ruby-2.2.6 ruby /home/ec2-user/FHIRServer/FHIRserver.rb &

After that, when start reboots, Sequoia Healthcare Directory server will run automcatically. So for now, it is using the method of 25.2.

25.4. Creating AMI Image and cloning it.

- **Creating AMI Image**

1. Right-click the instance you want to use as the basis for your AMI, and choose **Create Image** from the context menu.
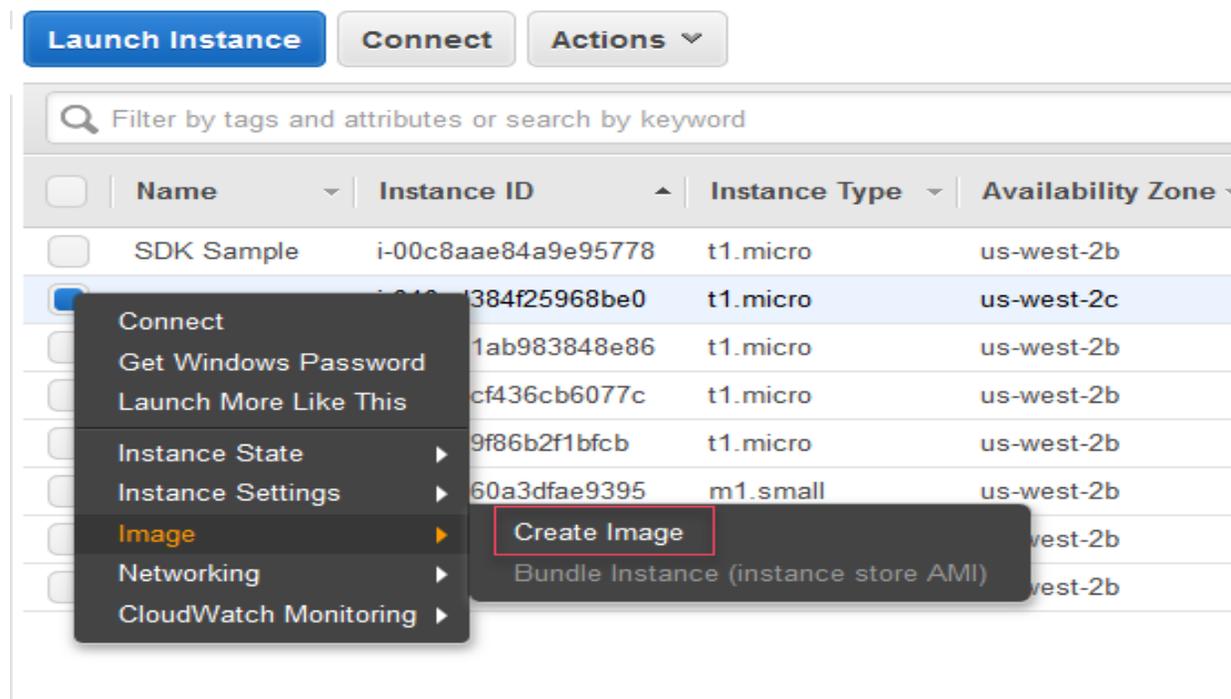
2. In the **Create Image** dialog box, type a unique name and description, and then choose **Create Image**.
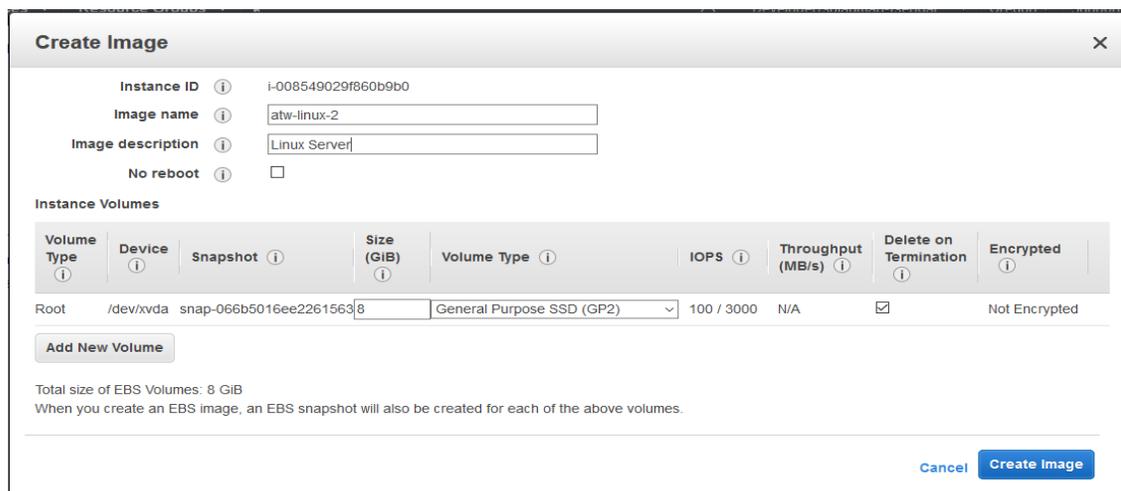
3. It may take a few minutes for the AMI to be created. After it is created, it will appear in the **AMIs** view in AWS Explorer. To display this view, double-click the **Amazon EC2 | AMIs** node in AWS Explorer. To see your AMIs, from the **Viewing** drop-down list, choose **Owned By Me**. You may need to choose **Refresh** to see your AMI. When the AMI first appears, it may be in a pending state, but after a few moments, it transitions to an available state.

- **Cloning AWS EC2 instance from AMI**
1. Go to EC2 on AWS Explorer
2. Click the dropdown icon on the right of Launch Instance button
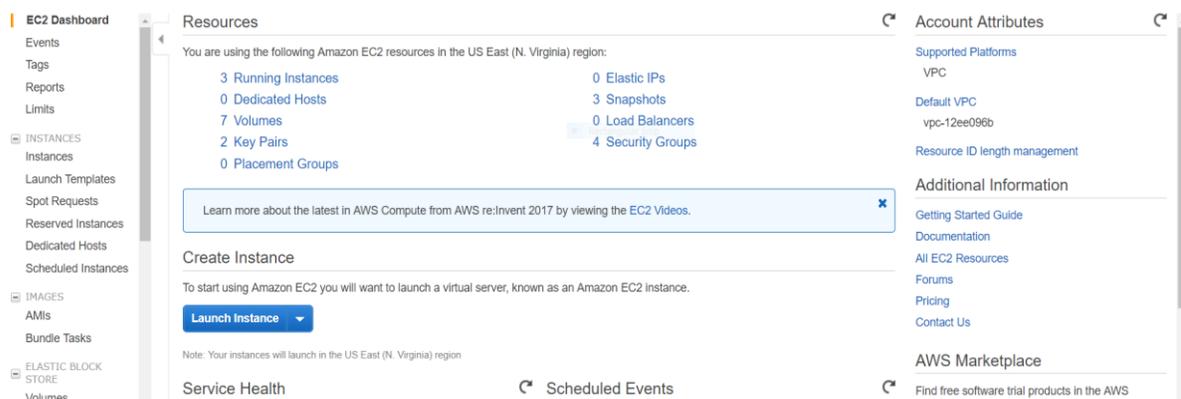
3. Click on "Launch Instance" context menu.
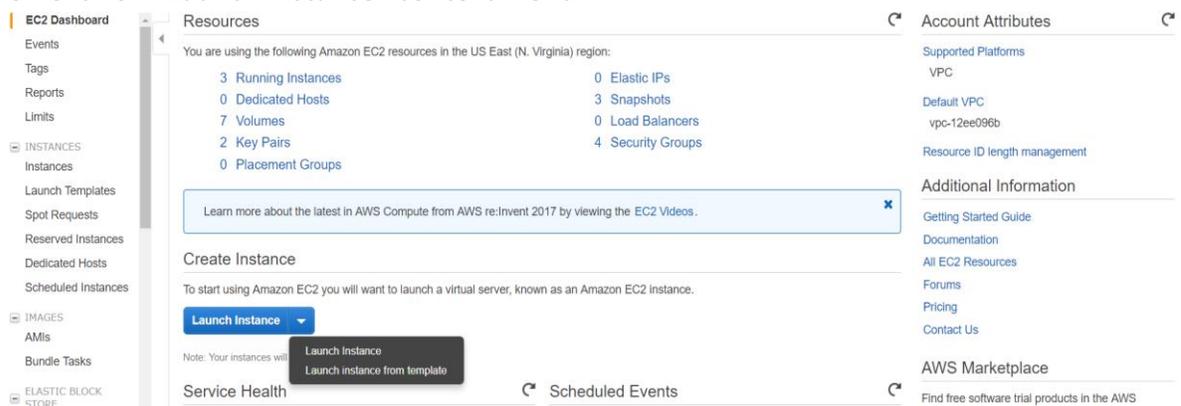
4. Then you can see the Step 1 screen. Click "My AMIs" menu on the left sidemenu bar. Then you can see the list of AMIs you created. Click on "Select" button on AMI which you are going to clone AWS EC2 instance from. Then you can see the Step 2(Choose an Instance Type).

5. On Step2, choose the instance type and click on "Next: Configure Instance Details" button. Then you can see the Step3 screen.

6. Here you need to choose subnet, check "Enable termination protection" and "Monitoring". Then click on "Advanced Details".

You can see "User Data" field and here you should to add scripts to set up environment of the instance you are going to create from AMI. (This is important.)
"User Data" field should be shell scripts.
After that click on "Add Storage" button.

7. On Step 4, you don't need to touch anything as we don't use any storage.
   Click on "Next: Add Tags" button.

8. On Step 5, you don't need to touch anything as we don't use any tag.
   Click on "Next: Configure Security Group"

9. On Step 6, you can create new security group or just select one of existing security grups
to allow traffic. After that click "Review and Launch" button.

10. On Step7, you can review all configurations before launching it. Click "Launch" button
. Then new AWS EC2 instance will be created and it will take for about 5mins for it to be st
arted fully.

26.   CHANGE LOG

2018-05-24   Eric Heflin   Changed the Org-Status aka the Organization.active data type from an unconstrained string to a Boolean constrained value. This change was deployed in production Carequality directories on this date. See detailed change #1 below.

1.   Change Organization Active Element To Align with FHIR STU3

Referencing: http://hl7.org/fhir/stu3/organization.html

This formerly unenforced value, which exists directly under Organizational resources, will use the FHIR STU3 definition of this element. This results in a data type change from an unconstrained string value, to a FHIR Boolean data type (as per http://hl7.org/fhir/stu3/datatypes.html#boolean).

Examples before this change:

```
<Organization>
…
  <active value="Active"/>
…
</Organization>

<Organization>
…
  <active value="Inactive"/>
…
</Organization>
```


Examples after this change:

```
<Organization>
…
  <active value="true"/>
…
</Organization>

<Organization>
…
  <active value="false"/>
…
```

```
</Organization>
```

Informative note: In XML, this is returned as quoted string with exactly and only one of "true" or "false". In JSON, this is returned as a value of true or false, as an unquoted Boolean variable. This is enforced identically for both the eHealth Exchange and Carequality for XML and Excel file imports and RESTful post and update. This value is returned from the Sequoia Healthcare Directory in queries as a JSON and XML Boolean data type.

(end of document)