SRI LANKA INSTITUTE OF INFORMATION TECHNOLOGY

Modern Topics in Information Technology

Assignment 04 Report

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The following report consists of two sections which provide answers for both question 1 & 2 in MTIT Assignment 4. In this report the answers are provided based on “Google Contacts” API version 3.0

Contents

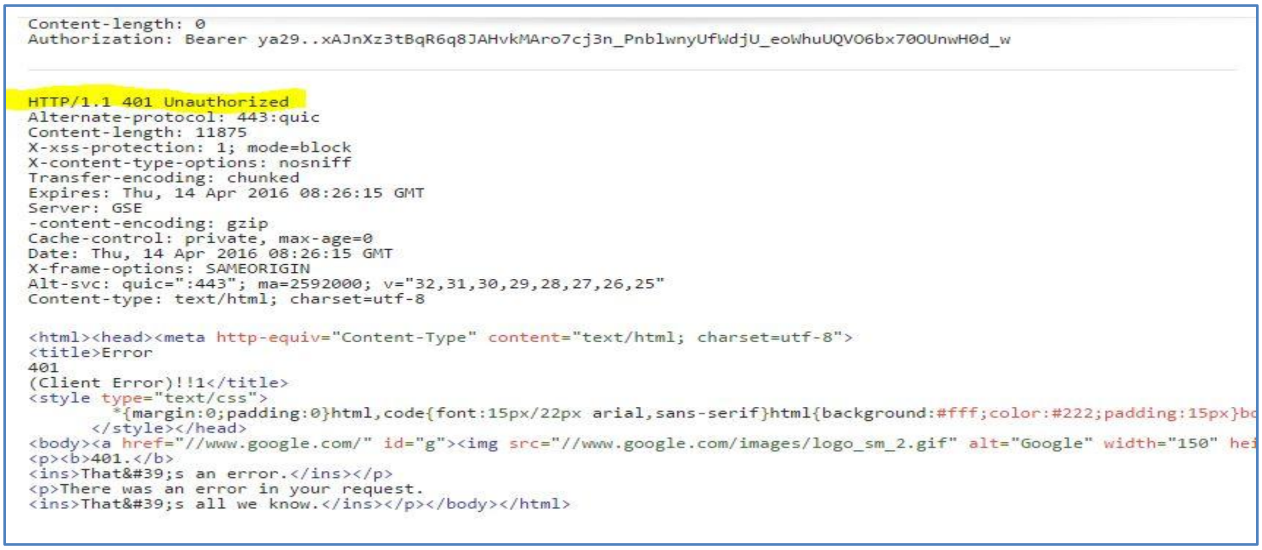
1. Google ContactsAPI

Google Contacts Application Program Interface (API) facilitates the users to access Google Contacts information of particular user. The user will be the owner of access token. In order to acquire an access token the user must follow the authentication process which has described below.

1.1.Authentication

Authentication is a technique which validatesclient applications before they access to different services or vulnerable data in a system. Since REST requestsare capable of mutating the data ina system, authentication mechanism becomes more important security aspect in order to validate those client side applications.

In Google Contacts it has used OAuth 2.0 authentication protocolto authenticate the RESTful requestsmade by respective client side applications (i.e. Postman plug-in). Otherwise it will prevent accessing GoogleContacts data or any other related service.

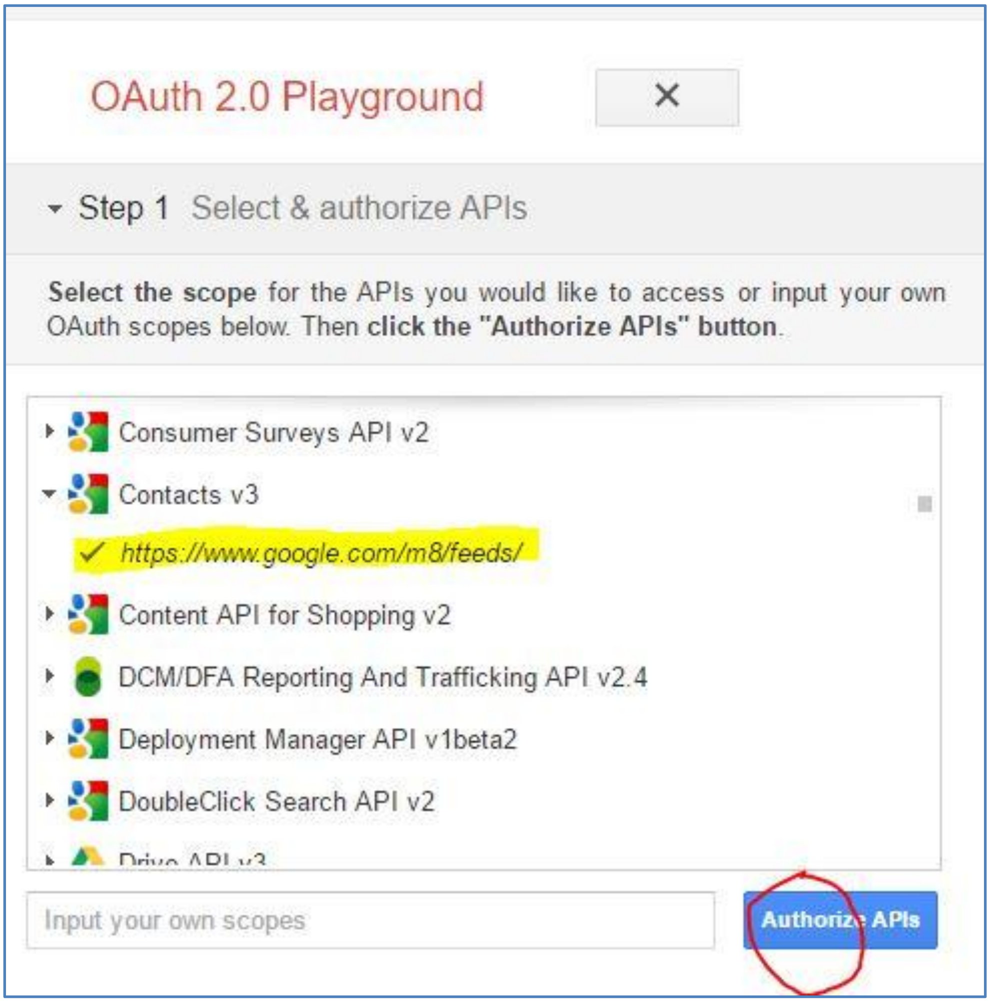


```
Content-length: 0
Authorization: Bearer ya29..xAJnXz3tBqR6q8JAHvkMAro7cj3n_PnblwnyUfWdjU_eoWhuUQVO6bx70OUnwH0d_w

HTTP/1.1 401 Unauthorized
Alternate-protocol: 443:quic
Content-length: 11875
X-xss-protection: 1; mode=block
X-content-type-options: nosniff
Transfer-encoding: chunked
Expires: Thu, 14 Apr 2016 08:26:15 GMT
Server: GSE
-content-encoding: gzip
Cache-control: private, max-age=0
Date: Thu, 14 Apr 2016 08:26:15 GMT
X-frame-options: SAMEORIGIN
Alt-svc: quic=":443"; ma=2592000; v="32,31,30,29,28,27,26,25"
Content-type: text/html; charset=utf-8

<html><head><meta http-equiv="Content-Type" content="text/html; charset=utf-8">
<title>Error
401
(Client Error)!!1</title>
<style type="text/css">
        *{margin:0;padding:0}html,code{font:15px/22px arial,sans-serif}html{background:#fff;color:#222;padding:15px}bo
      </style></head>
<body><a href="//www.google.com/" id="g"><img src="//www.google.com/images/logo_sm_2.gif" alt="Google" width="150" hei
<p><b>401.</b>
<ins>That&#39;s an error.</ins></p>
<p>There was an error in your request.
<ins>That&#39;s all we know.</ins></p></body></html>
```

1-1 Unauthorized request

In this authentication technique it takes the owner information (email address ofany person who has Google account privileges) to authenticate the client-side application which makes the request to server. The steps for the authentication are described below.

- **Select the Google Contacts API**
  Visit Google OAuth playground and select the API that you need to access. In our case we have selected Google Contacts API version 3. Once you select it click on Authorize API button where it redirect to next step.



OAuth 2.0 Playground

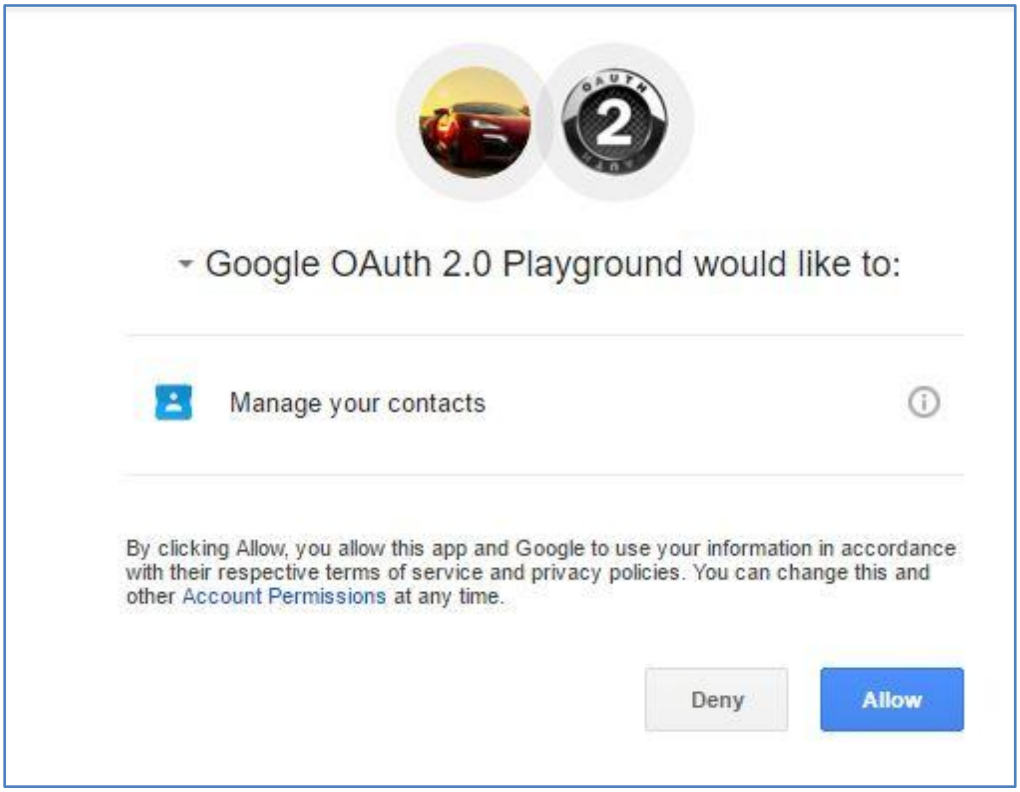
Step 1 Select & authorize APIs

Select the scope for the APIs you would like to access or input your own OAuth scopes below. Then **click the "Authorize APIs" button**.

- Consumer Surveys API v2
- Contacts v3
  - ✓ https://www.google.com/m8/feeds/
- Content API for Shopping v2
- DCM/DFA Reporting And Trafficking API v2.4
- Deployment Manager API v1beta2
- DoubleClick Search API v2
- Drive API v3

1-2 Select Contacts API

- **Access Permissions**
  As the next step you need to sign in to your Google account. Note that this account will be considered by the APIservice in order to generate authentication token. Therefore it requires the respective user permission inorder to access respectiveprivate data as well as identifying the ownership of client side application.



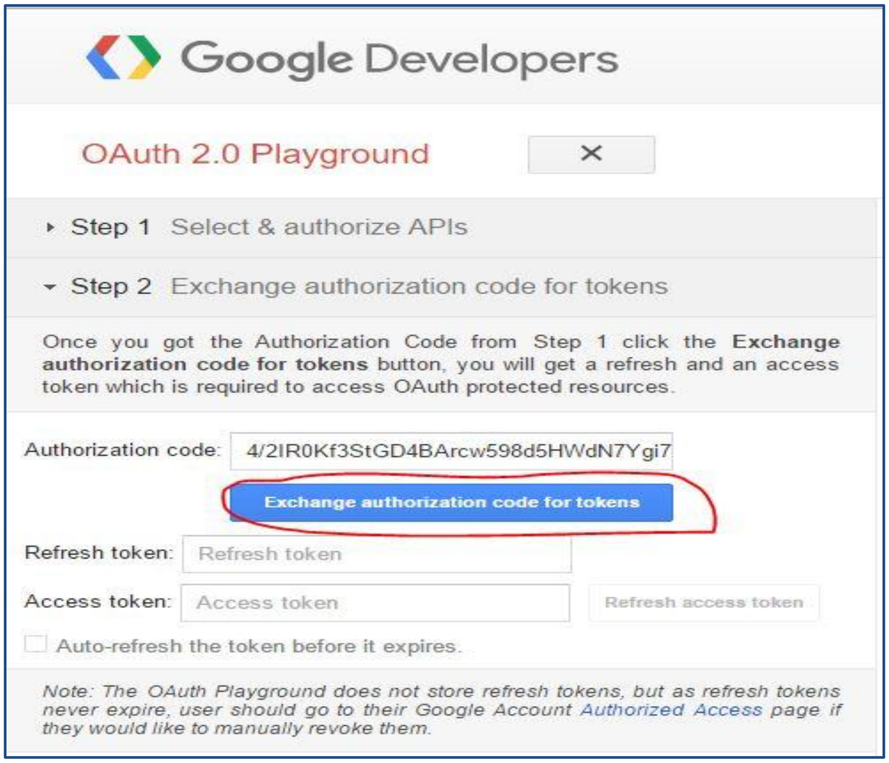
Google OAuth 2.0 Playground would like to:

Manage your contacts

By clicking Allow, you allow this app and Google to use your information in accordance with their respective terms of service and privacy policies. You can change this and other Account Permissions at any time.

1-3 Provide permission

- **Generate Access Token**
  Once you click on Allow button in above dialog it will redirect to the next step of creating the access token where it provides an access token for limited time duration to access the API service.


Google Developers
OAuth 2.0 Playground
✕
Step 1 Select & authorize APIs
Step 2 Exchange authorization code for tokens

Once you got the Authorization Code from Step 1 click the **Exchange authorization code for tokens** button, you will get a refresh and an access token which is required to access OAuth protected resources.

Authorization code: 4/2IR0Kf3StGD4BArcw598d5HWdN7Ygi7

Exchange authorization code for tokens

Refresh token: Refresh token

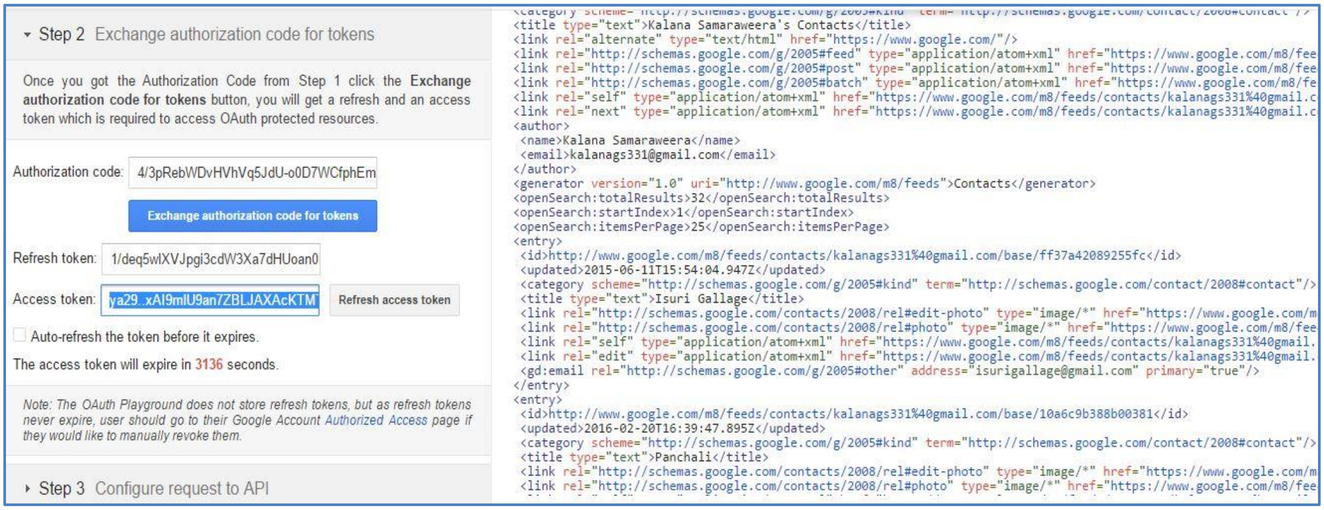
Access token: Access token

□ Auto-refresh the token before it expires.

Note: The OAuth Playground does not store refresh tokens, but as refresh tokens never expire, user should go to their Google Account Authorized Access page if they would like to manually revoke them.

1-4 Create access token

Once the access token is created copy the token and paste it in Postman plug-in under Auth tab



▾ Step 2 Exchange authorization code for tokens

Once you got the Authorization Code from Step 1 click the **Exchange authorization code for tokens** button, you will get a refresh and an access token which is required to access OAuth protected resources.

Authorization code: 4/3pRebWDvHVhVq5JdU-o0D7WCfphEm

Exchange authorization code for tokens

Refresh token: 1/deq5wlXVJpgi3cdW3Xa7dHUoan0

Access token: ya29..xAI9mIU9an7ZBLJAXAcKTM

Refresh access token

□ Auto-refresh the token before it expires.

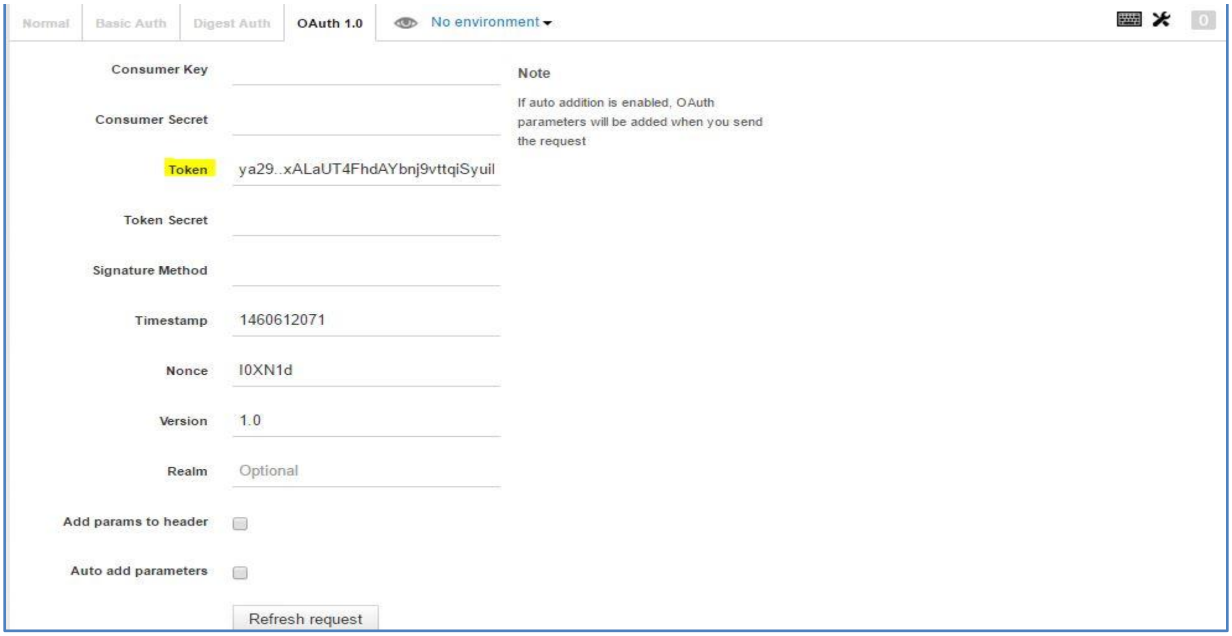
The access token will expire in 3136 seconds.

Note: The OAuth Playground does not store refresh tokens, but as refresh tokens never expire, user should go to their Google Account Authorized Access page if they would like to manually revoke them.

▸ Step 3 Configure request to API

```
<category scheme="http://schemas.google.com/g/2005#kind" term="http://schemas.google.com/contact/2008#contact"/>
<title type="text">Kalana Samaraweera's Contacts</title>
<link rel="alternate" type="text/html" href="https://www.google.com/"/>
<link rel="http://schemas.google.com/g/2005#feed" type="application/atom+xml" href="https://www.google.com/m8/fee
<link rel="http://schemas.google.com/g/2005#post" type="application/atom+xml" href="https://www.google.com/m8/fee
<link rel="http://schemas.google.com/g/2005#batch" type="application/atom+xml" href="https://www.google.com/m8/fe
<link rel="self" type="application/atom+xml" href="https://www.google.com/m8/feeds/contacts/kalanags331%40gmail.c
<link rel="next" type="application/atom+xml" href="https://www.google.com/m8/feeds/contacts/kalanags331%40gmail.c
<author>
 <name>Kalana Samaraweera</name>
 <email>kalanags331@gmail.com</email>
</author>
<generator version="1.0" uri="http://www.google.com/m8/feeds">Contacts</generator>
<openSearch:totalResults>32</openSearch:totalResults>
<openSearch:startIndex>1</openSearch:startIndex>
<openSearch:itemsPerPage>25</openSearch:itemsPerPage>
<entry>
 <id>http://www.google.com/m8/feeds/contacts/kalanags331%40gmail.com/base/ff37a42089255fc</id>
 <updated>2015-06-11T15:54:04.947Z</updated>
 <category scheme="http://schemas.google.com/g/2005#kind" term="http://schemas.google.com/contact/2008#contact"/>
 <title type="text">Isuri Gallage</title>
 <link rel="http://schemas.google.com/contacts/2008/rel#edit-photo" type="image/*" href="https://www.google.com/m
 <link rel="http://schemas.google.com/contacts/2008/rel#photo" type="image/*" href="https://www.google.com/m8/fee
 <link rel="self" type="application/atom+xml" href="https://www.google.com/m8/feeds/contacts/kalanags331%40gmail.
 <link rel="edit" type="application/atom+xml" href="https://www.google.com/m8/feeds/contacts/kalanags331%40gmail.
 <gd:email rel="http://schemas.google.com/g/2005#other" address="isurigallage@gmail.com" primary="true"/>
</entry>
<entry>
 <id>http://www.google.com/m8/feeds/contacts/kalanags331%40gmail.com/base/10a6c9b388b00381</id>
 <updated>2016-02-20T16:39:47.895Z</updated>
 <category scheme="http://schemas.google.com/g/2005#kind" term="http://schemas.google.com/contact/2008#contact"/>
 <title type="text">Panchali</title>
 <link rel="http://schemas.google.com/contacts/2008/rel#edit-photo" type="image/*" href="https://www.google.com/m
 <link rel="http://schemas.google.com/contacts/2008/rel#photo" type="image/*" href="https://www.google.com/m8/fee
```

1-6 Copy generated access token



Consumer Key:

Consumer Secret:

Token: ya29..xALaUT4FhdAYbnj9vttqiSyuil

Token Secret:

Signature Method:

Timestamp: 1460612071

Nonce: I0XN1d

Version: 1.0

Realm: Optional

Add params to header □

Auto add parameters □

Refresh request

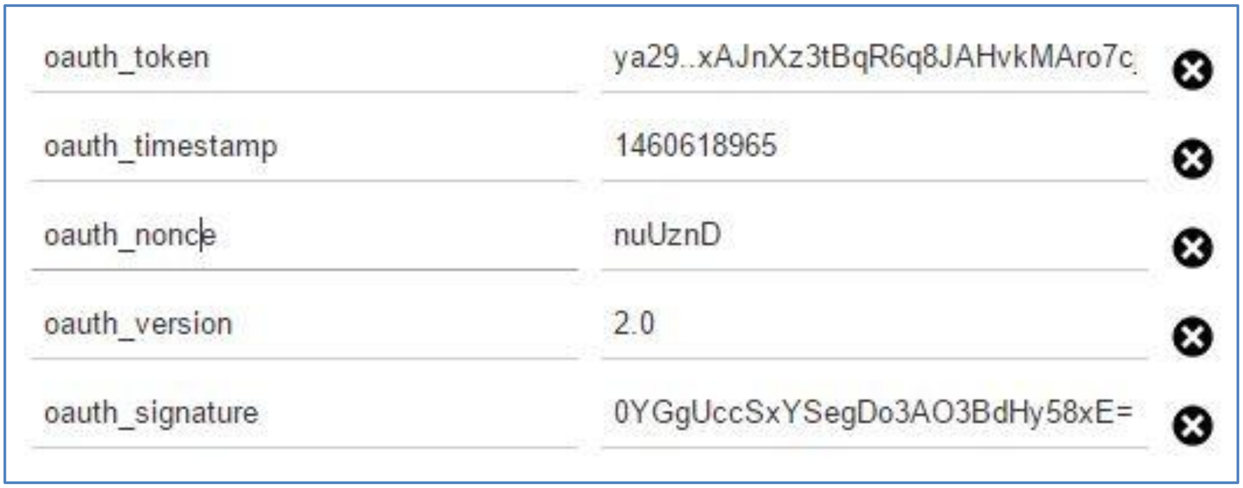
Note

If auto addition is enabled, OAuth parameters will be added when you send the request

1-5 Paste access token in Postman application

Once you have pasted the token correctly it will automatically fill other fields (TimeStamp, “nounce” and version), but since we use OAuthe version 2.0 it has to change the version number to 2 in Version field.

Now authentication is completed but make sure to send your request before countdown expires which isdisplayed OAuth play ground.(*NOTE:* The countdown of availability is shown in Step 2 in OAuth playground.)
The request with proper authentication should appear in this way.



oauth_token	ya29..xAJnXz3tBqR6q8JAHvkMAro7c
oauth_timestamp	1460618965
oauth_nonce	nuUznD
oauth_version	2.0
oauth_signature	0YGgUccSxYSegDo3AO3BdHy58xE=

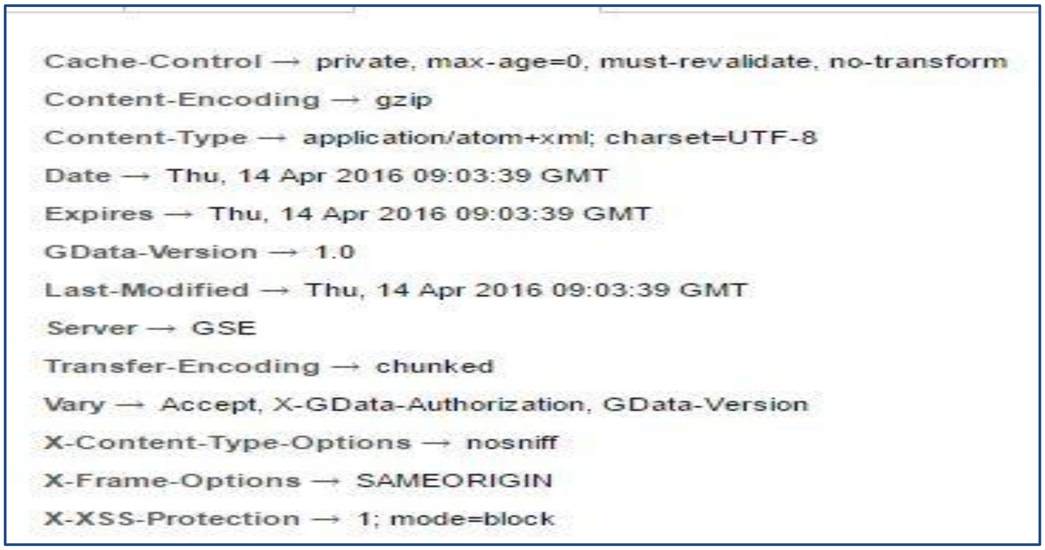
1-7Authentication parameters

Token	The access token provided OAuth playground
Timestamp	Total lifetime of access availability
Nonce(number of once)	Unique string per each request to identify each request individually
Version	OAuth version
Signature	Encrypts the request identification details in order to prevent security attacks during the request transmission

Furthermore instead using postman plug-in you can also check authentication using Step 3 in Google OAuth playground.

1.2.Get Requests

1.2.1. Response Header

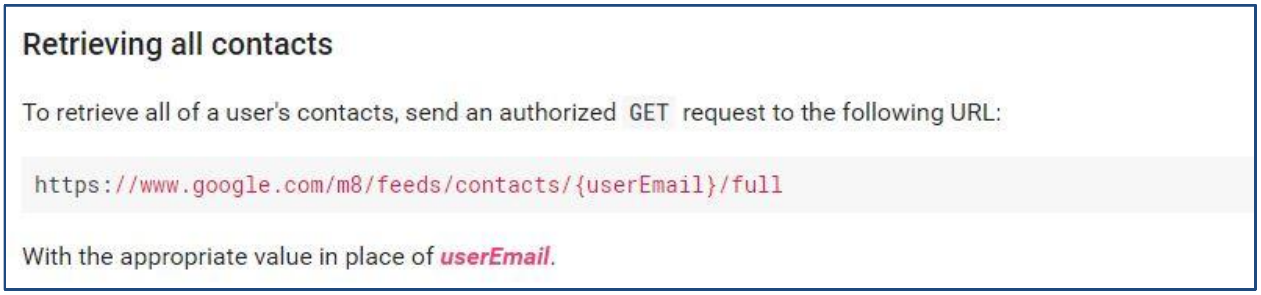


```
Cache-Control → private, max-age=0, must-revalidate, no-transform
Content-Encoding → gzip
Content-Type → application/atom+xml; charset=UTF-8
Date → Thu, 14 Apr 2016 09:03:39 GMT
Expires → Thu, 14 Apr 2016 09:03:39 GMT
GData-Version → 1.0
Last-Modified → Thu, 14 Apr 2016 09:03:39 GMT
Server → GSE
Transfer-Encoding → chunked
Vary → Accept, X-GData-Authorization, GData-Version
X-Content-Type-Options → nosniff
X-Frame-Options → SAMEORIGIN
X-XSS-Protection → 1; mode=block
```

1-8 Response headers

Cache-Control	Describes data caching mechanism between server & client during data transaction
Content Encoding	The encoding mechanism of response data
Date	Date and time of the request arrived to server (measured at server end)
Expires	The date & time which the responseprovided(measured at server end)
GData version	Response http version header
Last modified	Date & time which the response was last modified by server (measured at server end)
Server	Name of server
Transfer encoding	Encoding protocol applied for entire response data packet
Vary	Informs the proxies in between server and client how future requests should be managed using cached data
X-Content-type options	Only available value is ”nosniff” method which prevents intentionally reducing the data content of response
X-frame-options	Enable click jacking protection in the response ;SAMEORIGIN check the origin of response is from same source else prevent rendering the output at client end
X-XSS-Protection	Prevent entering malicious script code embedded inside response(Cross site scripting)

1.2.2. GET Contacts list



Retrieving all contacts

To retrieve all of a user's contacts, send an authorized `GET` request to the following URL:

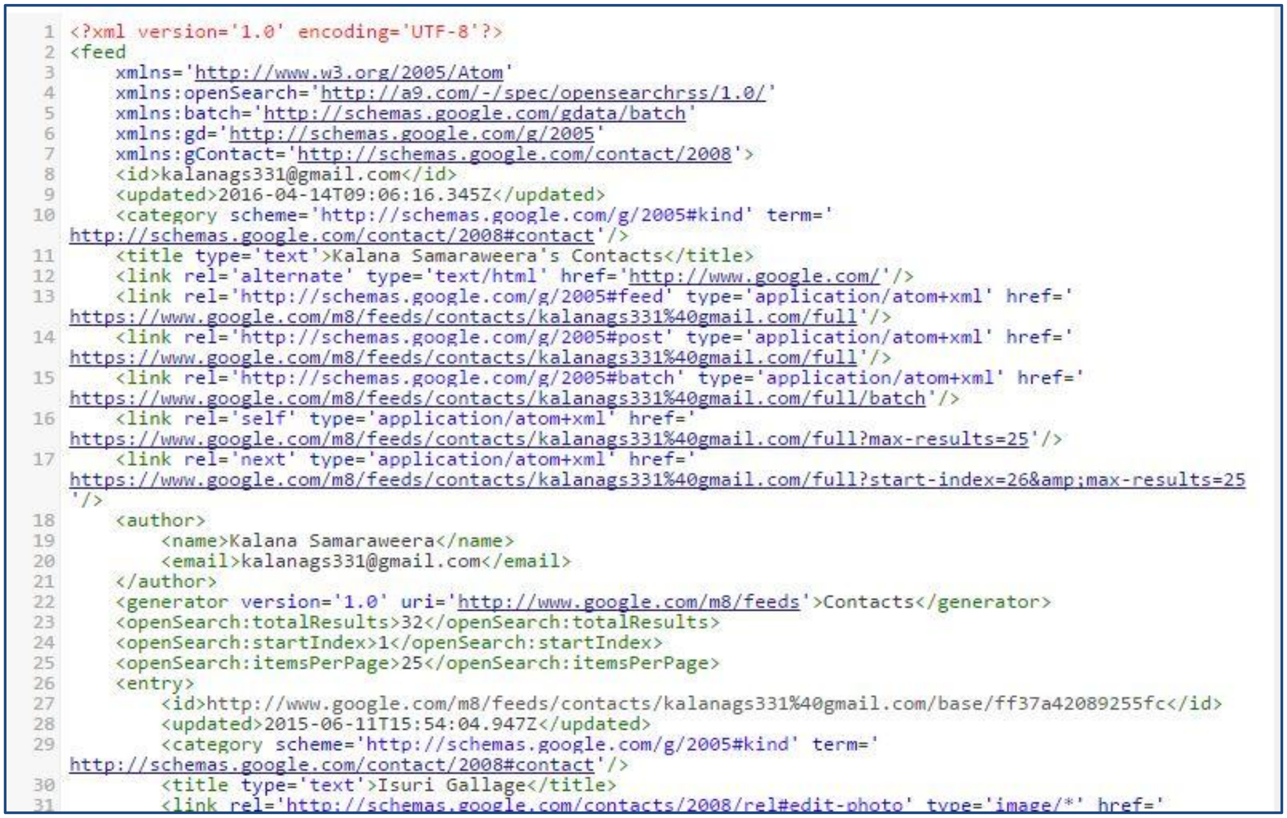
```
https://www.google.com/m8/feeds/contacts/{userEmail}/full
```

With the appropriate value in place of ***userEmail***.

1-9 URL to get all contacts

This GET request returns all the contacts of the authenticated user. As for the {User-Email} it should provide the email address of the owner who is registeredin API otherwise it will return an unauthorized access error (401).

Once you have completed the authentication process mentioned above next the above URL should be pasted in URL box and set request type to GET .Also make sure to change {user-Email} to your email address.



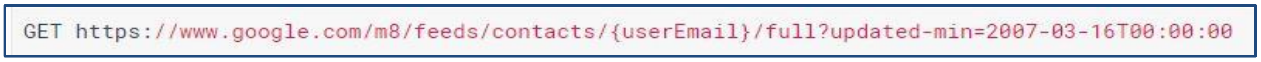
```
<?xml version='1.0' encoding='UTF-8'?>
<feed
    xmlns='http://www.w3.org/2005/Atom'
    xmlns:openSearch='http://a9.com/-/spec/opensearchrss/1.0/'
    xmlns:batch='http://schemas.google.com/gdata/batch'
    xmlns:gd='http://schemas.google.com/g/2005'
    xmlns:gContact='http://schemas.google.com/contact/2008'>
    <id>kalanags331@gmail.com</id>
    <updated>2016-04-14T09:06:16.345Z</updated>
    <category scheme='http://schemas.google.com/g/2005#kind' term='
http://schemas.google.com/contact/2008#contact'/>
    <title type='text'>Kalana Samaraweera's Contacts</title>
    <link rel='alternate' type='text/html' href='http://www.google.com/'/>
    <link rel='http://schemas.google.com/g/2005#feed' type='application/atom+xml' href='
https://www.google.com/m8/feeds/contacts/kalanags331%40gmail.com/full'/>
    <link rel='http://schemas.google.com/g/2005#post' type='application/atom+xml' href='
https://www.google.com/m8/feeds/contacts/kalanags331%40gmail.com/full'/>
    <link rel='http://schemas.google.com/g/2005#batch' type='application/atom+xml' href='
https://www.google.com/m8/feeds/contacts/kalanags331%40gmail.com/full/batch'/>
    <link rel='self' type='application/atom+xml' href='
https://www.google.com/m8/feeds/contacts/kalanags331%40gmail.com/full?max-results=25'/>
    <link rel='next' type='application/atom+xml' href='
https://www.google.com/m8/feeds/contacts/kalanags331%40gmail.com/full?start-index=26&amp;max-results=25
'/>
    <author>
        <name>Kalana Samaraweera</name>
        <email>kalanags331@gmail.com</email>
    </author>
    <generator version='1.0' uri='http://www.google.com/m8/feeds'>Contacts</generator>
    <openSearch:totalResults>32</openSearch:totalResults>
    <openSearch:startIndex>1</openSearch:startIndex>
    <openSearch:itemsPerPage>25</openSearch:itemsPerPage>
    <entry>
        <id>http://www.google.com/m8/feeds/contacts/kalanags331%40gmail.com/base/ff37a42089255fc</id>
        <updated>2015-06-11T15:54:04.947Z</updated>
        <category scheme='http://schemas.google.com/g/2005#kind' term='
http://schemas.google.com/contact/2008#contact'/>
        <title type='text'>Isuri Gallage</title>
        <link rel='http://schemas.google.com/contacts/2008/rel#edit-photo' type='image/*' href='
```

1-10 Result of all contacts

The response will be in XML format where it will return all the contacts of the authenticated user

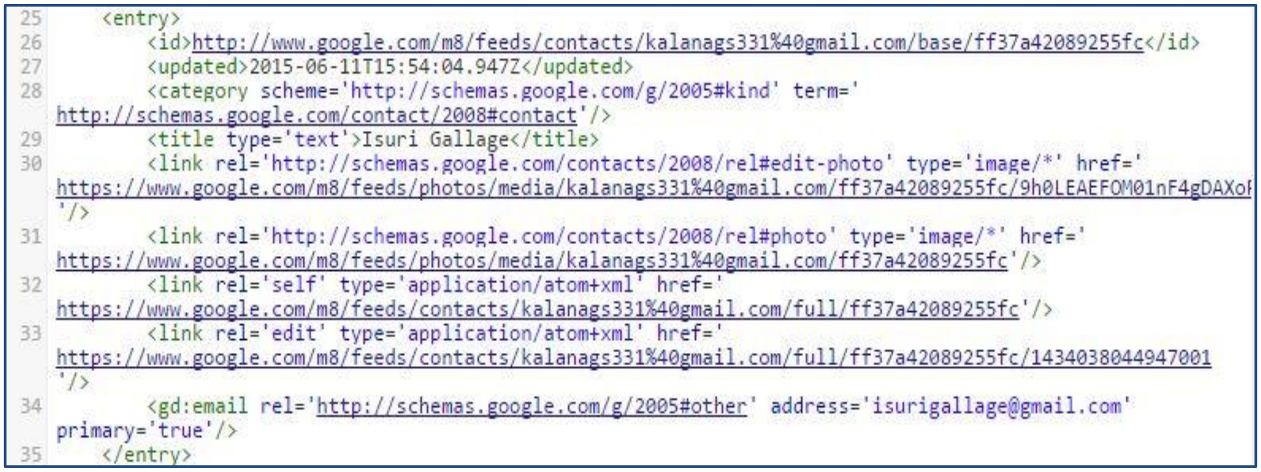
1.2.3. Get Contact List for criteria

In following GET request method it will return the details of contacts added by user after given date (after “ updated-min=”) .Similarly in this request also it has to consider the E-mail address of user



```
GET https://www.google.com/m8/feeds/contacts/{userEmail}/full?updated-min=2007-03-16T00:00:00
```

1-11The contacts added after a given date

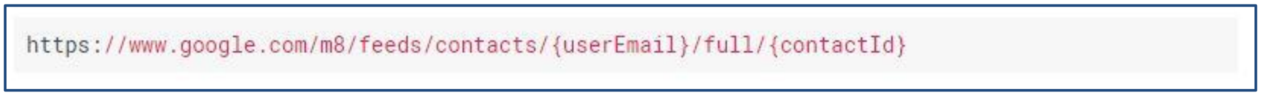


```
    <entry>
        <id>http://www.google.com/m8/feeds/contacts/kalanags331%40gmail.com/base/ff37a42089255fc</id>
        <updated>2015-06-11T15:54:04.947Z</updated>
        <category scheme='http://schemas.google.com/g/2005#kind' term='
http://schemas.google.com/contact/2008#contact'/>
        <title type='text'>Isuri Gallage</title>
        <link rel='http://schemas.google.com/contacts/2008/rel#edit-photo' type='image/*' href='
https://www.google.com/m8/feeds/photos/media/kalanags331%40gmail.com/ff37a42089255fc/9h0LEAEFOM01nF4gDAXoI
'/>
        <link rel='http://schemas.google.com/contacts/2008/rel#photo' type='image/*' href='
https://www.google.com/m8/feeds/photos/media/kalanags331%40gmail.com/ff37a42089255fc'/>
        <link rel='self' type='application/atom+xml' href='
https://www.google.com/m8/feeds/contacts/kalanags331%40gmail.com/full/ff37a42089255fc'/>
        <link rel='edit' type='application/atom+xml' href='
https://www.google.com/m8/feeds/contacts/kalanags331%40gmail.com/full/ff37a42089255fc/1434038044947001
'/>
        <gd:email rel='http://schemas.google.com/g/2005#other' address='isurigallage@gmail.com'
primary='true'/>
    </entry>
```

1-12The result set of contacts which are added after given date

1.2.4. Get Single Contact for given Id

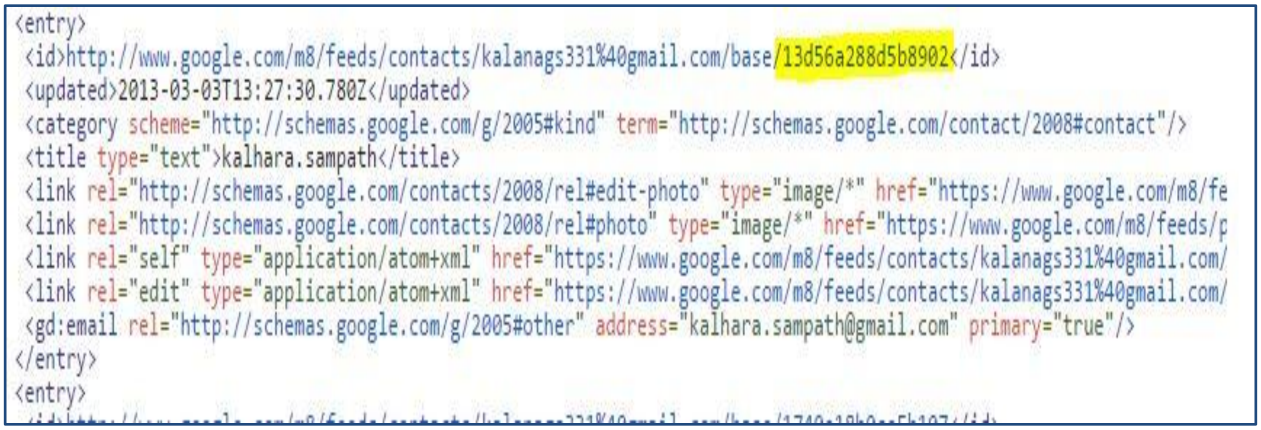
This request requires two input parameters   namely; E-mail address of authenticated user{user-Email} and the contact Id of particular user who is a connected with respective user.



```
https://www.google.com/m8/feeds/contacts/{userEmail}/full/{contactId}
```

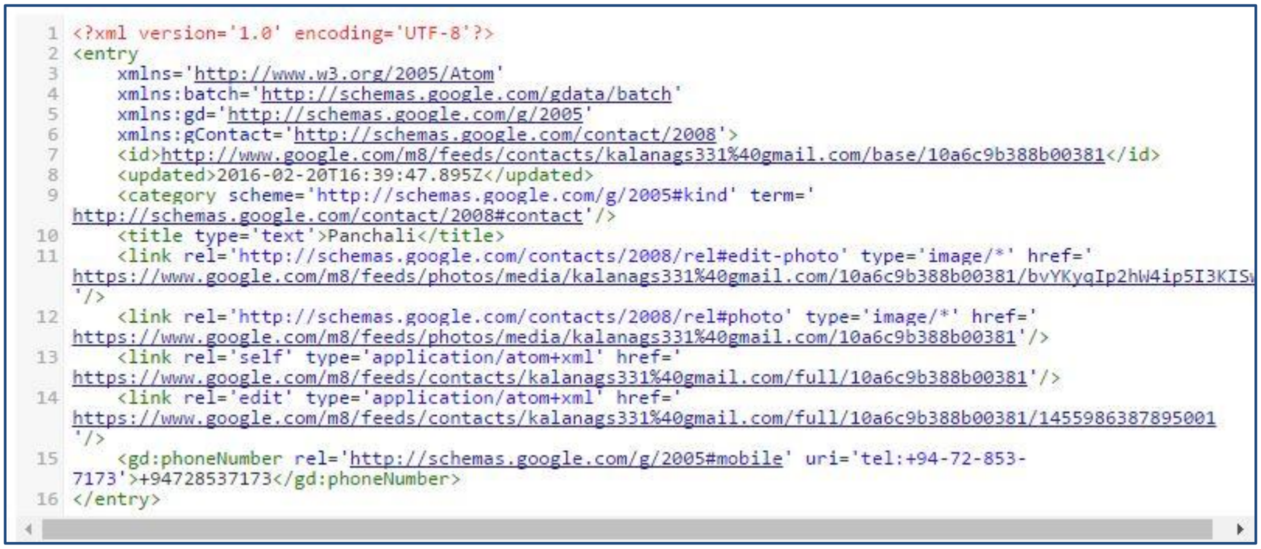
1-13 Request to get specific single contact record

The contact id can be archived using previous request which hold the value of <id> tag of each <entry> tag. The id will be the last string set after base/ element in URL



```
<entry>
 <id>http://www.google.com/m8/feeds/contacts/kalanags331%40gmail.com/base/13d56a288d5b8902</id>
 <updated>2013-03-03T13:27:30.780Z</updated>
 <category scheme="http://schemas.google.com/g/2005#kind" term="http://schemas.google.com/contact/2008#contact"/>
 <title type="text">kalhara.sampath</title>
 <link rel="http://schemas.google.com/contacts/2008/rel#edit-photo" type="image/*" href="https://www.google.com/m8/fe
 <link rel="http://schemas.google.com/contacts/2008/rel#photo" type="image/*" href="https://www.google.com/m8/feeds/p
 <link rel="self" type="application/atom+xml" href="https://www.google.com/m8/feeds/contacts/kalanags331%40gmail.com/
 <link rel="edit" type="application/atom+xml" href="https://www.google.com/m8/feeds/contacts/kalanags331%40gmail.com/
 <gd:email rel="http://schemas.google.com/g/2005#other" address="kalhara.sampath@gmail.com" primary="true"/>
</entry>
<entry>
```

1-14 Selecting the required contact Id



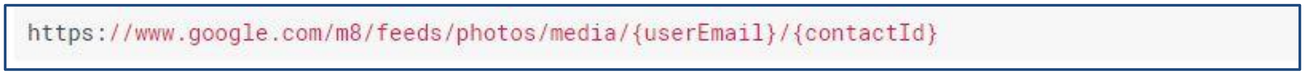
```
<?xml version='1.0' encoding='UTF-8'?>
<entry
    xmlns='http://www.w3.org/2005/Atom'
    xmlns:batch='http://schemas.google.com/gdata/batch'
    xmlns:gd='http://schemas.google.com/g/2005'
    xmlns:gContact='http://schemas.google.com/contact/2008'>
    <id>http://www.google.com/m8/feeds/contacts/kalanags331%40gmail.com/base/10a6c9b388b00381</id>
    <updated>2016-02-20T16:39:47.895Z</updated>
    <category scheme='http://schemas.google.com/g/2005#kind' term='
http://schemas.google.com/contact/2008#contact'/>
    <title type='text'>Panchali</title>
    <link rel='http://schemas.google.com/contacts/2008/rel#edit-photo' type='image/*' href='
https://www.google.com/m8/feeds/photos/media/kalanags331%40gmail.com/10a6c9b388b00381/bvYKyqIp2hW4ip5I3KIS
'/>
    <link rel='http://schemas.google.com/contacts/2008/rel#photo' type='image/*' href='
https://www.google.com/m8/feeds/photos/media/kalanags331%40gmail.com/10a6c9b388b00381'/>
    <link rel='self' type='application/atom+xml' href='
https://www.google.com/m8/feeds/contacts/kalanags331%40gmail.com/full/10a6c9b388b00381'/>
    <link rel='edit' type='application/atom+xml' href='
https://www.google.com/m8/feeds/contacts/kalanags331%40gmail.com/full/10a6c9b388b00381/1455986387895001
'/>
    <gd:phoneNumber rel='http://schemas.google.com/g/2005#mobile' uri='tel:+94-72-853-
7173'>+94728537173</gd:phoneNumber>
</entry>
```

1-15 Result of single contact

The response consist of single entry record if you have provided valid contact id and user email as input parameters to the request

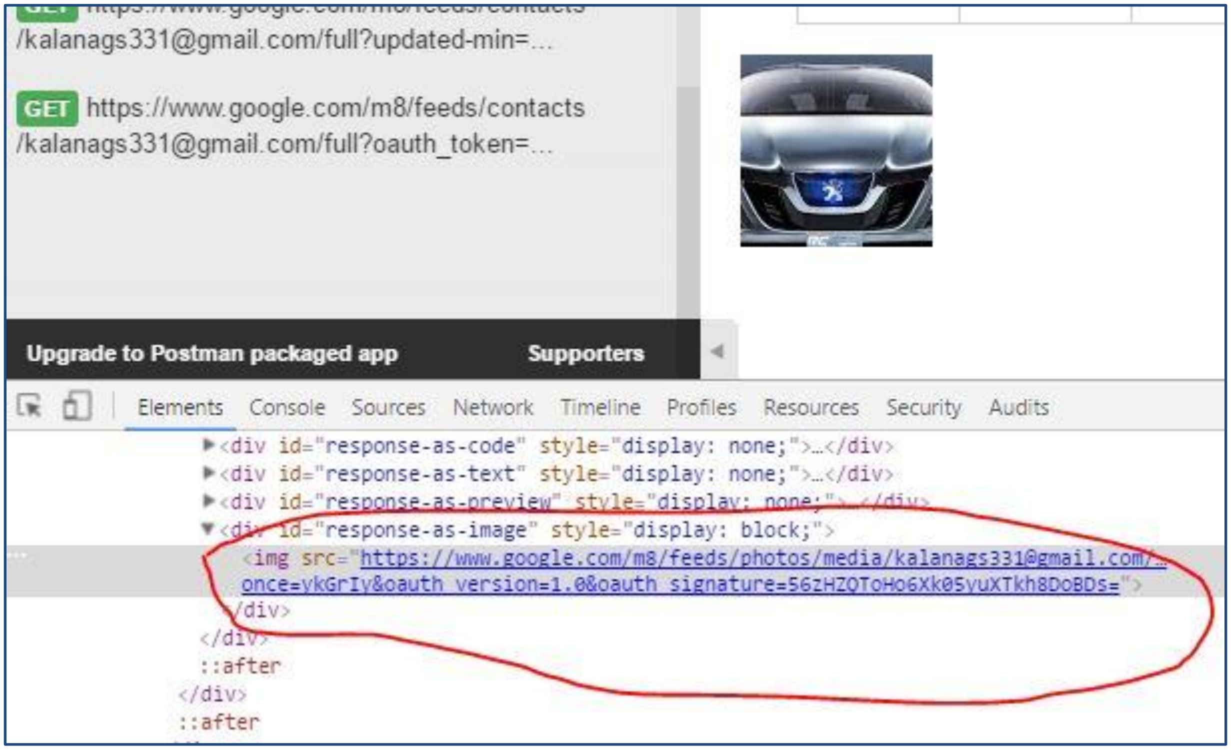
1.2.5. Retrieving profile picture of a contact

In this request server return the profile picture of the contact. In the body of the contact it has to provide the above mentioned id of respective contact as well as the email address of authenticated user to API.



```
https://www.google.com/m8/feeds/photos/media/{userEmail}/{contactId}
```

1-16 Request to return profile image



GET https://www.google.com/m8/feeds/contacts
/kalanags331@gmail.com/full?updated-min=...

GET https://www.google.com/m8/feeds/contacts
/kalanags331@gmail.com/full?oauth_token=...

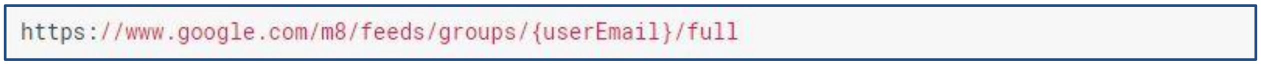
```
▶<div id="response-as-code" style="display: none;">…</div>
▶<div id="response-as-text" style="display: none;">…</div>
▶<div id="response-as-preview" style="display: none;">…</div>
▼<div id="response-as-image" style="display: block;">
   <img src="https://www.google.com/m8/feeds/photos/media/kalanags331@gmail.com/…
   once=ykGrIy&oauth_version=1.0&oauth_signature=56zHZQToHo6Xk05yuXTkh8DoBDs=">
  </div>
 </div>
 ::after
</div>
::after
```

1-17 The result of profile image

The response renders the outputted profile image of that particular contact and display in html <img> tag assigning the'src 'attribute as URL of Google server

1.2.6. Retrieve all Contact Group

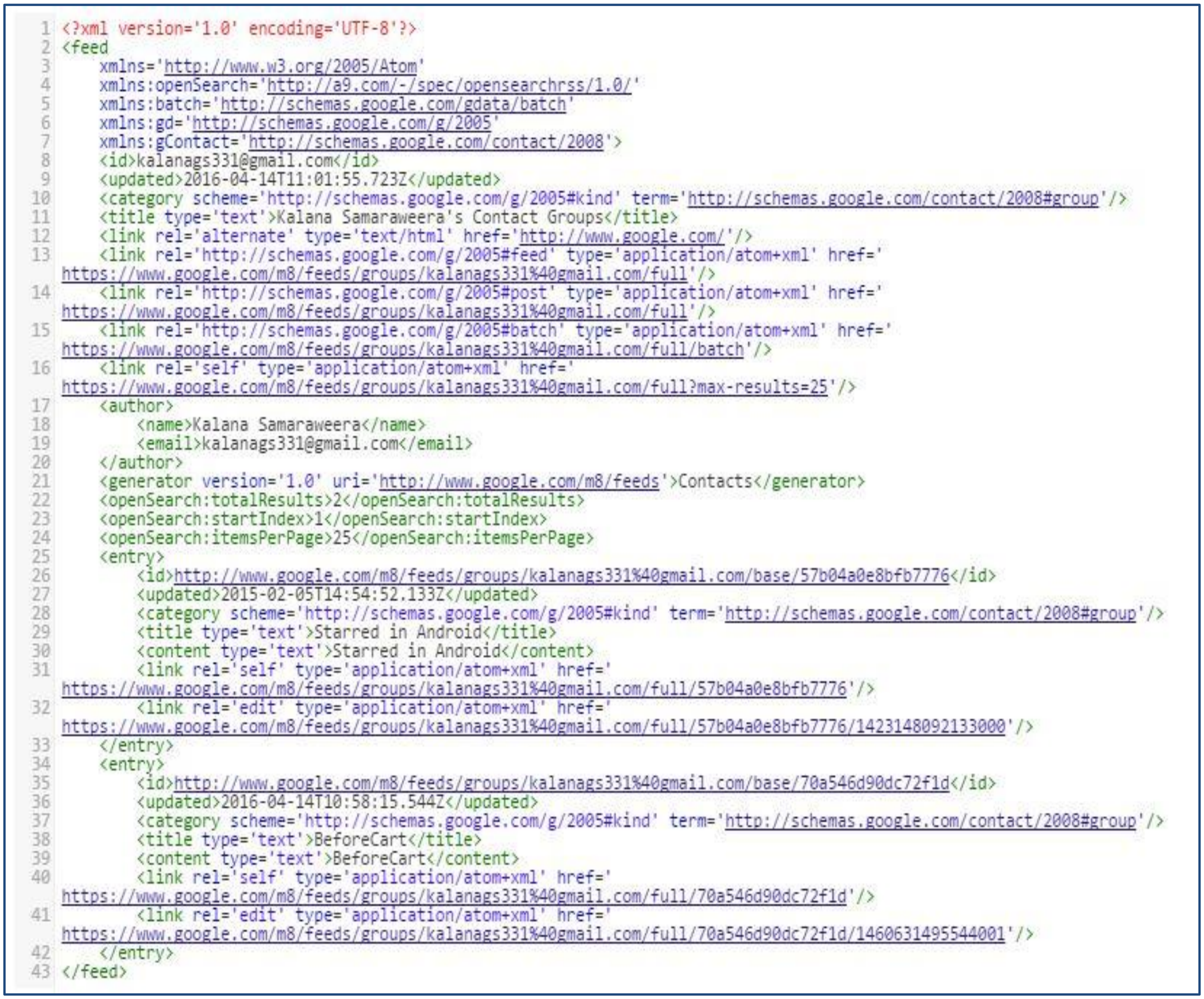
This request returns all the user groups of the authenticated user currently joined with. In order to make the requestit requires the e-mail address of the authenticated user.



```
https://www.google.com/m8/feeds/groups/{userEmail}/full
```

1-18 Request to acquire user groups

The response will be in xml format where it includes all joined groups by respective user. In the response each <feed> tag includes the joined groups by user



```
<?xml version='1.0' encoding='UTF-8'?>
<feed
    xmlns='http://www.w3.org/2005/Atom'
    xmlns:openSearch='http://a9.com/-/spec/opensearchrss/1.0/'
    xmlns:batch='http://schemas.google.com/gdata/batch'
    xmlns:gd='http://schemas.google.com/g/2005'
    xmlns:gContact='http://schemas.google.com/contact/2008'>
    <id>kalanags331@gmail.com</id>
    <updated>2016-04-14T11:01:55.723Z</updated>
    <category scheme='http://schemas.google.com/g/2005#kind' term='http://schemas.google.com/contact/2008#group'/>
    <title type='text'>Kalana Samaraweera's Contact Groups</title>
    <link rel='alternate' type='text/html' href='http://www.google.com/'/>
    <link rel='http://schemas.google.com/g/2005#feed' type='application/atom+xml' href='
https://www.google.com/m8/feeds/groups/kalanags331%40gmail.com/full'/>
    <link rel='http://schemas.google.com/g/2005#post' type='application/atom+xml' href='
https://www.google.com/m8/feeds/groups/kalanags331%40gmail.com/full'/>
    <link rel='http://schemas.google.com/g/2005#batch' type='application/atom+xml' href='
https://www.google.com/m8/feeds/groups/kalanags331%40gmail.com/full/batch'/>
    <link rel='self' type='application/atom+xml' href='
https://www.google.com/m8/feeds/groups/kalanags331%40gmail.com/full?max-results=25'/>
    <author>
        <name>Kalana Samaraweera</name>
        <email>kalanags331@gmail.com</email>
    </author>
    <generator version='1.0' uri='http://www.google.com/m8/feeds'>Contacts</generator>
    <openSearch:totalResults>2</openSearch:totalResults>
    <openSearch:startIndex>1</openSearch:startIndex>
    <openSearch:itemsPerPage>25</openSearch:itemsPerPage>
    <entry>
        <id>http://www.google.com/m8/feeds/groups/kalanags331%40gmail.com/base/57b04a0e8bfb7776</id>
        <updated>2015-02-05T14:54:52.133Z</updated>
        <category scheme='http://schemas.google.com/g/2005#kind' term='http://schemas.google.com/contact/2008#group'/>
        <title type='text'>Starred in Android</title>
        <content type='text'>Starred in Android</content>
        <link rel='self' type='application/atom+xml' href='
https://www.google.com/m8/feeds/groups/kalanags331%40gmail.com/full/57b04a0e8bfb7776'/>
        <link rel='edit' type='application/atom+xml' href='
https://www.google.com/m8/feeds/groups/kalanags331%40gmail.com/full/57b04a0e8bfb7776/1423148092133000'/>
    </entry>
    <entry>
        <id>http://www.google.com/m8/feeds/groups/kalanags331%40gmail.com/base/70a546d90dc72f1d</id>
        <updated>2016-04-14T10:58:15.544Z</updated>
        <category scheme='http://schemas.google.com/g/2005#kind' term='http://schemas.google.com/contact/2008#group'/>
        <title type='text'>BeforeCart</title>
        <content type='text'>BeforeCart</content>
        <link rel='self' type='application/atom+xml' href='
https://www.google.com/m8/feeds/groups/kalanags331%40gmail.com/full/70a546d90dc72f1d'/>
        <link rel='edit' type='application/atom+xml' href='
https://www.google.com/m8/feeds/groups/kalanags331%40gmail.com/full/70a546d90dc72f1d/1460631495544001'/>
    </entry>
</feed>
```

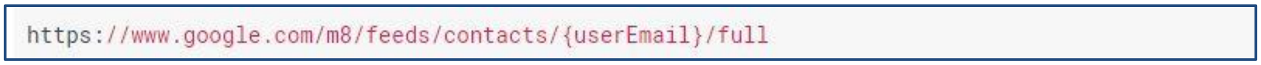
1-19The response of user groups

1.3.POST Requests

1.3.1. Create Contact

This POST request creates a new contact record for respective authenticated user. In order to send the post request it is required; email address of authenticated user, request headers and the content to be posted.

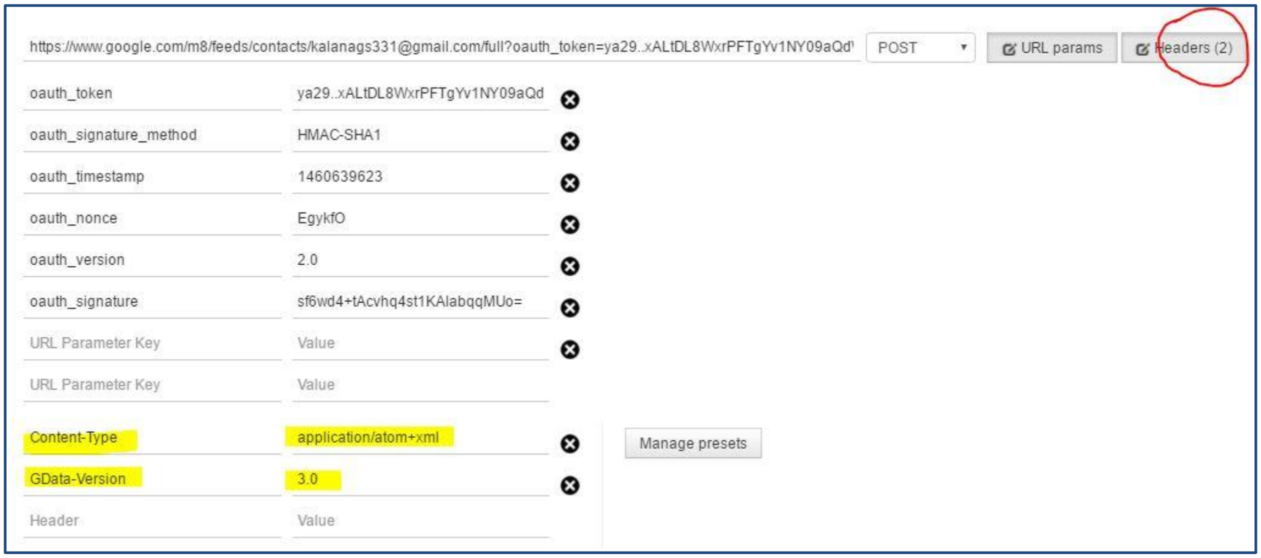
The request header consists of two entries namely;GData-version which describes the version of particular request and content type which describes the data type of the body in the request. As for the body thecontent will be in XML format which has been validated according to by w3c schema definition language (http://www.w3.org/2005/Atom). Therefore in header it has to mention the encoding mechanism as application/atom+xmlformat.



```
https://www.google.com/m8/feeds/contacts/{userEmail}/full
```

1-20 Post request of creating contact

In order to add above mentioned two headers click on “Headers” button under OAuth tab in postman plug-in. Then add the headers as shown in below image

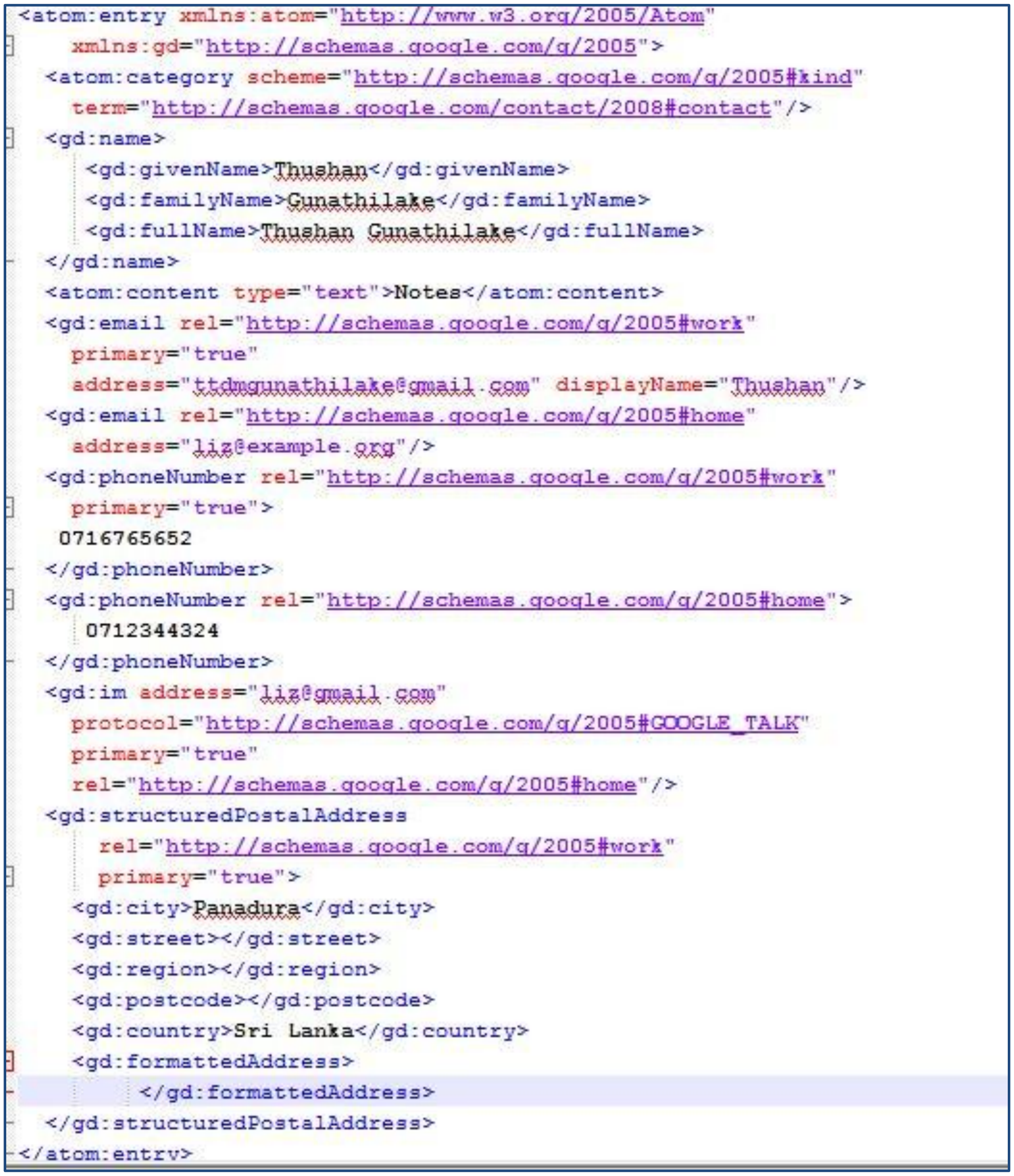


https://www.google.com/m8/feeds/contacts/kalanags331@gmail.com/full?oauth_token=ya29..xALtDL8WxrPFTgYv1NY09aQd'

oauth_token	ya29..xALtDL8WxrPFTgYv1NY09aQd
oauth_signature_method	HMAC-SHA1
oauth_timestamp	1460639623
oauth_nonce	EgykfO
oauth_version	2.0
oauth_signature	sf6wd4+tAcvhq4st1KAlabqqMUo=
URL Parameter Key	Value
URL Parameter Key	Value
Content-Type	application/atom+xml
GData-Version	3.0
Header	Value

1-21 Adding request headers

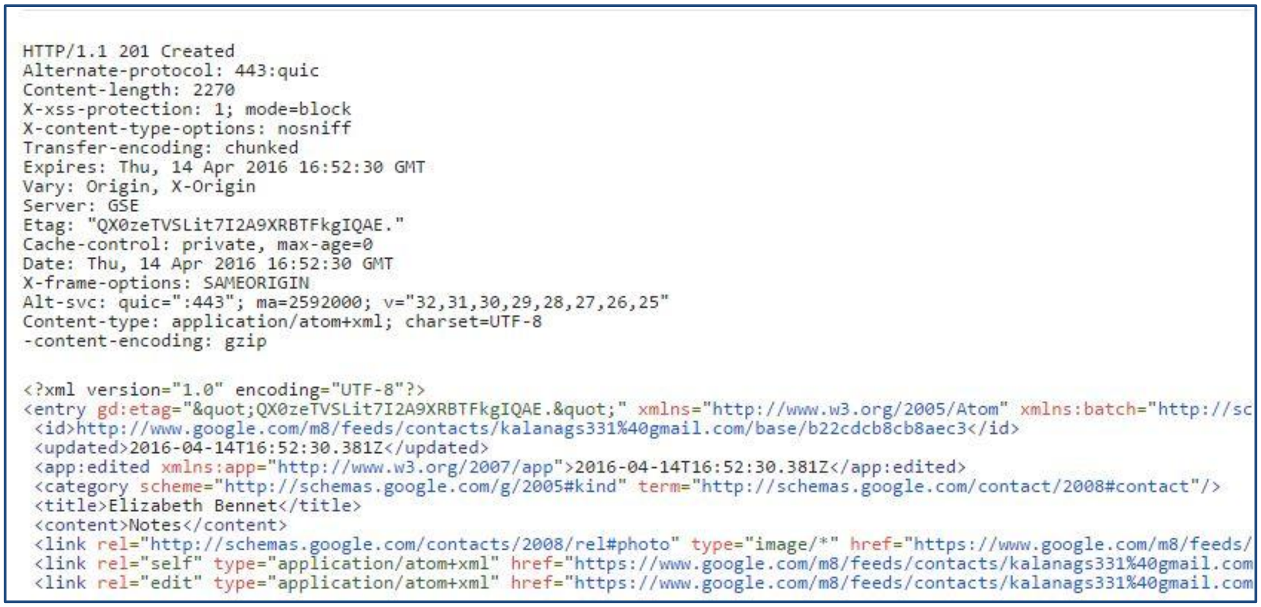
Once the headers are added we have to add the body content. In this API xml is used to define the body content for requests. This content includes the information that is required to create new contact recordin server. Therefore once server received the request it will analyze the headers& URL,and then read the body content. Next it will validate the body and finally createsa new contact record in server database.



```
<atom:entry xmlns:atom="http://www.w3.org/2005/Atom"
    xmlns:gd="http://schemas.google.com/g/2005">
  <atom:category scheme="http://schemas.google.com/g/2005#kind"
    term="http://schemas.google.com/contact/2008#contact"/>
  <gd:name>
     <gd:givenName>Thushan</gd:givenName>
     <gd:familyName>Gunathilake</gd:familyName>
     <gd:fullName>Thushan Gunathilake</gd:fullName>
  </gd:name>
  <atom:content type="text">Notes</atom:content>
  <gd:email rel="http://schemas.google.com/g/2005#work"
    primary="true"
    address="ttdmgunathilake@gmail.com" displayName="Thushan"/>
  <gd:email rel="http://schemas.google.com/g/2005#home"
    address="liz@example.org"/>
  <gd:phoneNumber rel="http://schemas.google.com/g/2005#work"
    primary="true">
   0716765652
  </gd:phoneNumber>
  <gd:phoneNumber rel="http://schemas.google.com/g/2005#home">
     0712344324
  </gd:phoneNumber>
  <gd:im address="liz@gmail.com"
    protocol="http://schemas.google.com/g/2005#GOOGLE_TALK"
    primary="true"
    rel="http://schemas.google.com/g/2005#home"/>
  <gd:structuredPostalAddress
      rel="http://schemas.google.com/g/2005#work"
      primary="true">
    <gd:city>Panadura</gd:city>
    <gd:street></gd:street>
    <gd:region></gd:region>
    <gd:postcode></gd:postcode>
    <gd:country>Sri Lanka</gd:country>
    <gd:formattedAddress>
        </gd:formattedAddress>
  </gd:structuredPostalAddress>
</atom:entry>
```

1-20 The request body for Create Contact POST request

The response given by the server will be also in xml format. If the response being successfully validated andinserted the server will provide following respond to client application also in XML format



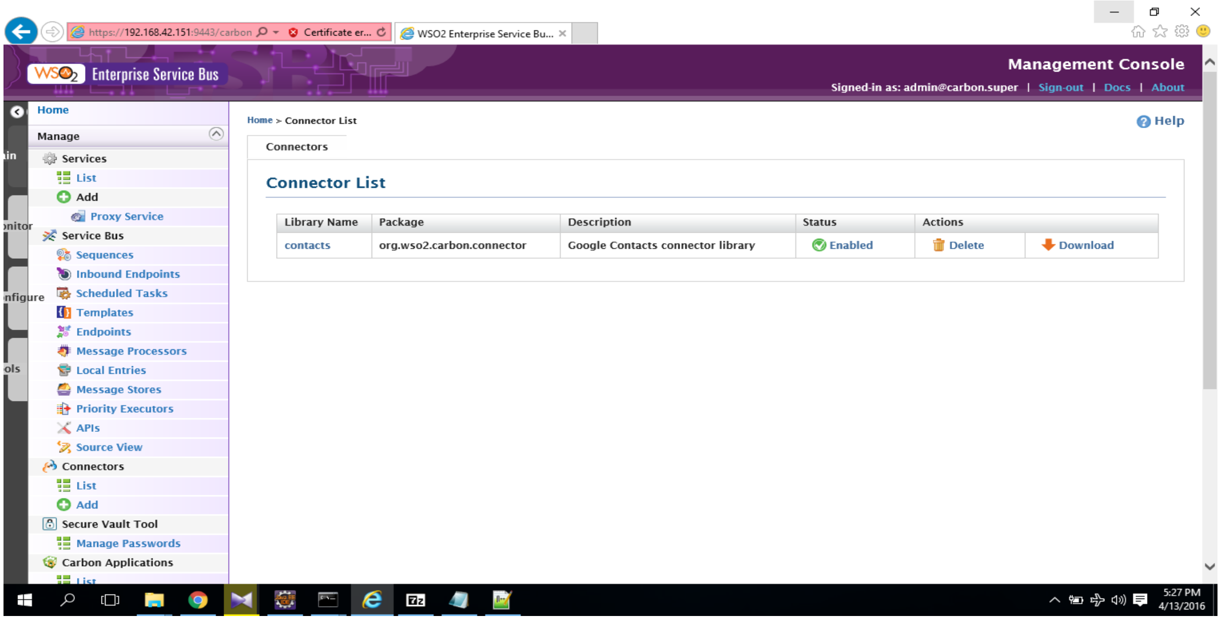
```
HTTP/1.1 201 Created
Alternate-protocol: 443:quic
Content-length: 2270
X-xss-protection: 1; mode=block
X-content-type-options: nosniff
Transfer-encoding: chunked
Expires: Thu, 14 Apr 2016 16:52:30 GMT
Vary: Origin, X-Origin
Server: GSE
Etag: "QX0zeTVSLit7I2A9XRBTFkgIQAE."
Cache-control: private, max-age=0
Date: Thu, 14 Apr 2016 16:52:30 GMT
X-frame-options: SAMEORIGIN
Alt-svc: quic=":443"; ma=2592000; v="32,31,30,29,28,27,26,25"
Content-type: application/atom+xml; charset=UTF-8
-content-encoding: gzip

<?xml version="1.0" encoding="UTF-8"?>
<entry gd:etag="&quot;QX0zeTVSLit7I2A9XRBTFkgIQAE.&quot;" xmlns="http://www.w3.org/2005/Atom" xmlns:batch="http://sc
 <id>http://www.google.com/m8/feeds/contacts/kalanags331%40gmail.com/base/b22cdcb8cb8aec3</id>
 <updated>2016-04-14T16:52:30.381Z</updated>
 <app:edited xmlns:app="http://www.w3.org/2007/app">2016-04-14T16:52:30.381Z</app:edited>
 <category scheme="http://schemas.google.com/g/2005#kind" term="http://schemas.google.com/contact/2008#contact"/>
 <title>Elizabeth Bennet</title>
 <content>Notes</content>
 <link rel="http://schemas.google.com/contacts/2008/rel#photo" type="image/*" href="https://www.google.com/m8/feeds/
 <link rel="self" type="application/atom+xml" href="https://www.google.com/m8/feeds/contacts/kalanags331%40gmail.com
 <link rel="edit" type="application/atom+xml" href="https://www.google.com/m8/feeds/contacts/kalanags331%40gmail.com
```

1-21 The server response for POST request

2. WSO2 Connector

2.1.Enabled Connector

In this assignment we will be creating a connector for Google Contacts API using WSO2 Enterprise Service Bus and transfer the acquired data via proxy service which is implemented inside ESB itself to our client application, Postman. Therefore we have selected 'GetAllContacts' GET request to demonstrate the procedure. The sample output after creating the connector should appear like below image. In this report it describes the step by step procedure to complete above mentioned task from configuring the ESB.



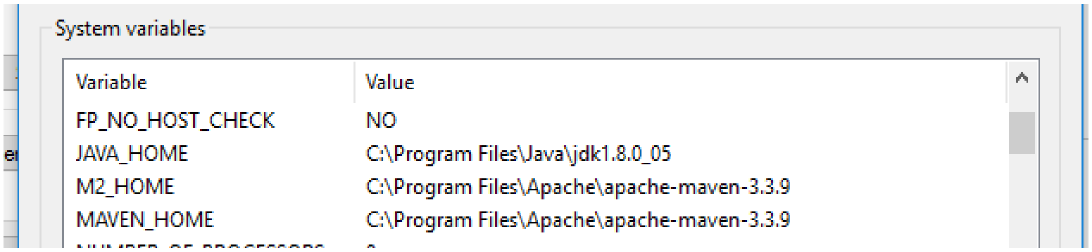
Connector List

Library Name	Package	Description	Status	Actions	
contacts	org.wso2.carbon.connector	Google Contacts connector library	Enabled	Delete	Download

Figure 2.1.1 Enabled connector in WSO2 ESB

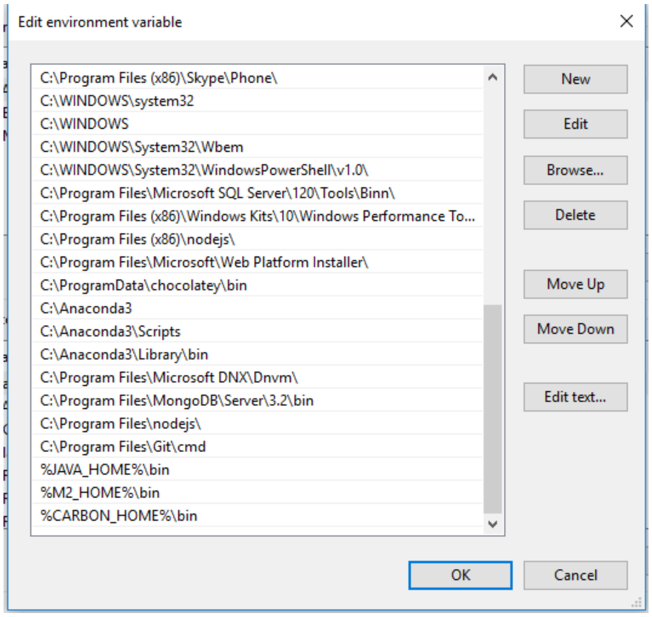
2.2.Creating Connector Screen Shots

1. Set java and maven home



Variable	Value
FP_NO_HOST_CHECK	NO
JAVA_HOME	C:\Program Files\Java\jdk1.8.0_05
M2_HOME	C:\Program Files\Apache\apache-maven-3.3.9
MAVEN_HOME	C:\Program Files\Apache\apache-maven-3.3.9

Figure 2.2.1 Set Maven and JDK paths



```
C:\Program Files (x86)\Skype\Phone\
C:\WINDOWS\system32
C:\WINDOWS
C:\WINDOWS\System32\Wbem
C:\WINDOWS\System32\WindowsPowerShell\v1.0\
C:\Program Files\Microsoft SQL Server\120\Tools\Binn\
C:\Program Files (x86)\Windows Kits\10\Windows Performance To...
C:\Program Files (x86)\nodejs\
C:\Program Files\Microsoft\Web Platform Installer\
C:\ProgramData\chocolatey\bin
C:\Anaconda3
C:\Anaconda3\Scripts
C:\Anaconda3\Library\bin
C:\Program Files\Microsoft DNX\Dnvm\
C:\Program Files\MongoDB\Server\3.2\bin
C:\Program Files\nodejs\
C:\Program Files\Git\cmd
%JAVA_HOME%\bin
%M2_HOME%\bin
%CARBON_HOME%\bin
```

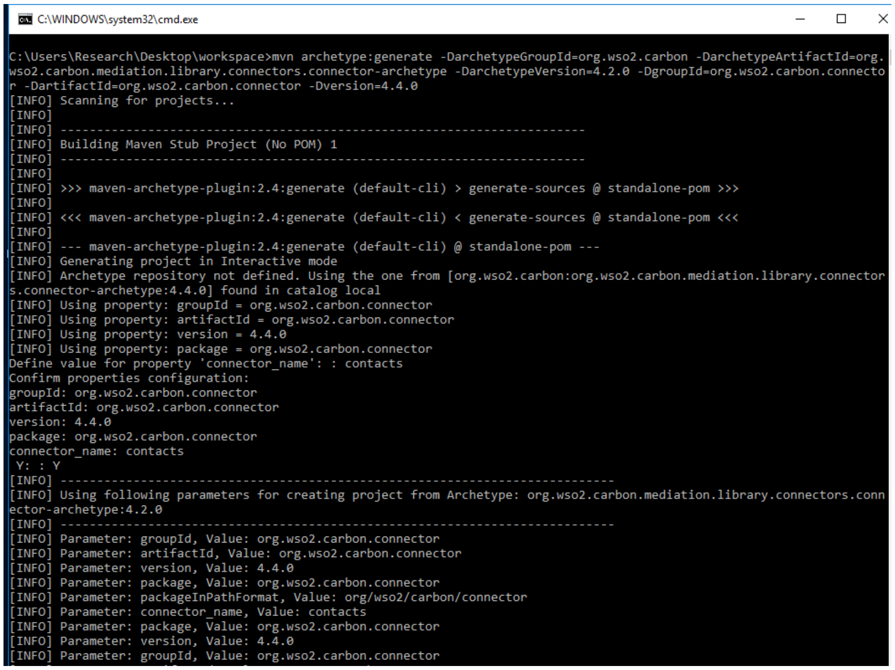
Figure 2.2.2 setting variable paths

2. Command to create a mavenarchitecture type project for wso2 ESB connector

mvnarchetype:generate -DarchetypeGroupId=org.wso2.carbon -DarchetypeArtifactId=org.wso2.carbon.mediation.library.connectors.connector-archetype -DarchetypeVersion=4.2.0 -DgroupId=org.wso2.carbon.connector -DartifactId=org.wso2.carbon.connector -Dversion=1.0.0

- **Use connector name as “contacts”**

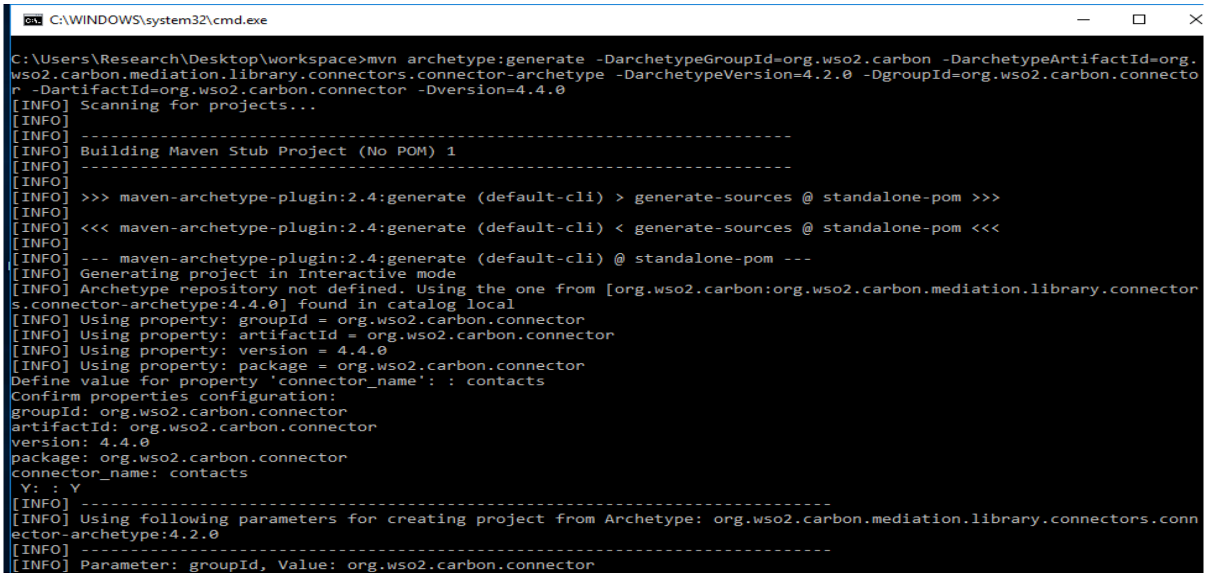
- **Enter Y to proceed**



```
C:\Users\Research\Desktop\workspace>mvn archetype:generate -DarchetypeGroupId=org.wso2.carbon -DarchetypeArtifactId=org.
wso2.carbon.mediation.library.connectors.connector-archetype -DarchetypeVersion=4.2.0 -DgroupId=org.wso2.carbon.connecto
r -DartifactId=org.wso2.carbon.connector -Dversion=4.4.0
[INFO] Scanning for projects...
[INFO]
[INFO] ------------------------------------------------------------------------
[INFO] Building Maven Stub Project (No POM) 1
[INFO] ------------------------------------------------------------------------
[INFO]
[INFO] >>> maven-archetype-plugin:2.4:generate (default-cli) > generate-sources @ standalone-pom >>>
[INFO]
[INFO] <<< maven-archetype-plugin:2.4:generate (default-cli) < generate-sources @ standalone-pom <<<
[INFO]
[INFO] --- maven-archetype-plugin:2.4:generate (default-cli) @ standalone-pom ---
[INFO] Generating project in Interactive mode
[INFO] Archetype repository not defined. Using the one from [org.wso2.carbon:org.wso2.carbon.mediation.library.connector
s.connector-archetype:4.4.0] found in catalog local
[INFO] Using property: groupId = org.wso2.carbon.connector
[INFO] Using property: artifactId = org.wso2.carbon.connector
[INFO] Using property: version = 4.4.0
[INFO] Using property: package = org.wso2.carbon.connector
Define value for property 'connector_name': : contacts
Confirm properties configuration:
groupId: org.wso2.carbon.connector
artifactId: org.wso2.carbon.connector
version: 4.4.0
package: org.wso2.carbon.connector
connector_name: contacts
 Y: : Y
[INFO] ----------------------------------------------------------------------------
[INFO] Using following parameters for creating project from Archetype: org.wso2.carbon.mediation.library.connectors.conn
ector-archetype:4.2.0
[INFO] ----------------------------------------------------------------------------
[INFO] Parameter: groupId, Value: org.wso2.carbon.connector
[INFO] Parameter: artifactId, Value: org.wso2.carbon.connector
[INFO] Parameter: version, Value: 4.4.0
[INFO] Parameter: package, Value: org.wso2.carbon.connector
[INFO] Parameter: packageInPathFormat, Value: org/wso2/carbon/connector
[INFO] Parameter: connector_name, Value: contacts
[INFO] Parameter: package, Value: org.wso2.carbon.connector
[INFO] Parameter: version, Value: 4.4.0
[INFO] Parameter: groupId, Value: org.wso2.carbon.connector
```

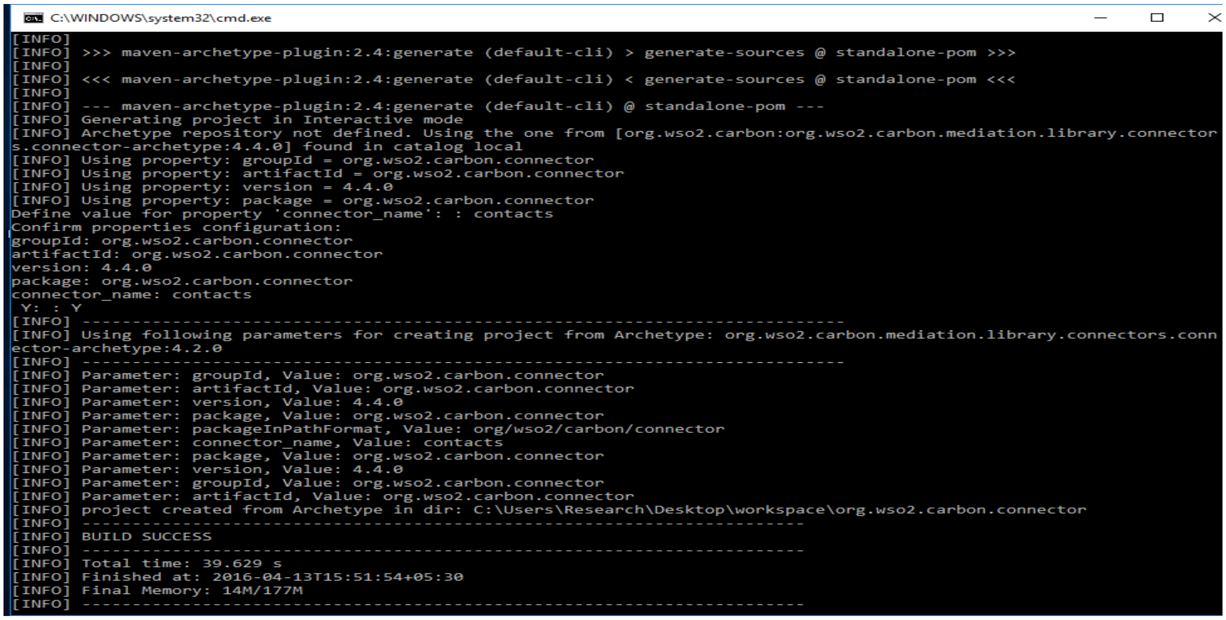
Figure 2.2.3 Create Maven Project

3. Create google-contacts-1.0.0 in workspace
4. Move **org.wso2.carbon.connector** folder inside and rename and append ‘contacts’
5. Create proxy and requests folders in the same folder level.
6. Inside **org.wso2.carbon.connector.contacts** folder there is a pom.xml file. At this level right click with shift key pressed to get a command prompt. Then run the command mvn clean install.
7. Delete ‘HelloWorld’ sample in org.wso2.carbon.connector.contacts\src\main\resources folder.
8. Copy methods.csv and vcat_2.0a.jar files to resource folder
9. Run “java -jar vcat_2.0a.jar” in a command from the resource folder.
    - give connector name as ‘contacts’
    - Enter ‘R’ for REST
    - Enter ‘J’ for JSON



```
C:\Users\Research\Desktop\workspace>mvn archetype:generate -DarchetypeGroupId=org.wso2.carbon -DarchetypeArtifactId=org.
wso2.carbon.mediation.library.connectors.connector-archetype -DarchetypeVersion=4.2.0 -DgroupId=org.wso2.carbon.connecto
r -DartifactId=org.wso2.carbon.connector -Dversion=4.4.0
[INFO] Scanning for projects...
[INFO]
[INFO] ------------------------------------------------------------------------
[INFO] Building Maven Stub Project (No POM) 1
[INFO] ------------------------------------------------------------------------
[INFO]
[INFO] >>> maven-archetype-plugin:2.4:generate (default-cli) > generate-sources @ standalone-pom >>>
[INFO]
[INFO] <<< maven-archetype-plugin:2.4:generate (default-cli) < generate-sources @ standalone-pom <<<
[INFO]
[INFO] --- maven-archetype-plugin:2.4:generate (default-cli) @ standalone-pom ---
[INFO] Generating project in Interactive mode
[INFO] Archetype repository not defined. Using the one from [org.wso2.carbon:org.wso2.carbon.mediation.library.connector
s.connector-archetype:4.4.0] found in catalog local
[INFO] Using property: groupId = org.wso2.carbon.connector
[INFO] Using property: artifactId = org.wso2.carbon.connector
[INFO] Using property: version = 4.4.0
[INFO] Using property: package = org.wso2.carbon.connector
Define value for property 'connector_name': : contacts
Confirm properties configuration:
groupId: org.wso2.carbon.connector
artifactId: org.wso2.carbon.connector
version: 4.4.0
package: org.wso2.carbon.connector
connector_name: contacts
 Y: : Y
[INFO] ----------------------------------------------------------------------------
[INFO] Using following parameters for creating project from Archetype: org.wso2.carbon.mediation.library.connectors.conn
ector-archetype:4.2.0
[INFO] ----------------------------------------------------------------------------
[INFO] Parameter: groupId, Value: org.wso2.carbon.connector
```

Figure 2.2.4 Create connector

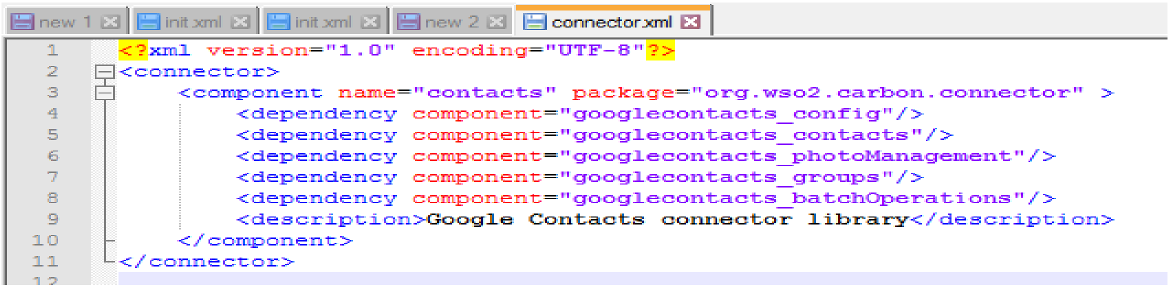


```
[INFO]
[INFO] >>> maven-archetype-plugin:2.4:generate (default-cli) > generate-sources @ standalone-pom >>>
[INFO]
[INFO] <<< maven-archetype-plugin:2.4:generate (default-cli) < generate-sources @ standalone-pom <<<
[INFO]
[INFO] --- maven-archetype-plugin:2.4:generate (default-cli) @ standalone-pom ---
[INFO] Generating project in Interactive mode
[INFO] Archetype repository not defined. Using the one from [org.wso2.carbon:org.wso2.carbon.mediation.library.connector
s.connector-archetype:4.4.0] found in catalog local
[INFO] Using property: groupId = org.wso2.carbon.connector
[INFO] Using property: artifactId = org.wso2.carbon.connector
[INFO] Using property: version = 4.4.0
[INFO] Using property: package = org.wso2.carbon.connector
Define value for property 'connector_name': : contacts
Confirm properties configuration:
groupId: org.wso2.carbon.connector
artifactId: org.wso2.carbon.connector
version: 4.4.0
package: org.wso2.carbon.connector
connector_name: contacts
 Y: : Y
[INFO] ----------------------------------------------------------------------------
[INFO] Using following parameters for creating project from Archetype: org.wso2.carbon.mediation.library.connectors.conn
ector-archetype:4.2.0
[INFO] ----------------------------------------------------------------------------
[INFO] Parameter: groupId, Value: org.wso2.carbon.connector
[INFO] Parameter: artifactId, Value: org.wso2.carbon.connector
[INFO] Parameter: version, Value: 4.4.0
[INFO] Parameter: package, Value: org.wso2.carbon.connector
[INFO] Parameter: packageInPathFormat, Value: org/wso2/carbon/connector
[INFO] Parameter: connector_name, Value: contacts
[INFO] Parameter: package, Value: org.wso2.carbon.connector
[INFO] Parameter: version, Value: 4.4.0
[INFO] Parameter: groupId, Value: org.wso2.carbon.connector
[INFO] Parameter: artifactId, Value: org.wso2.carbon.connector
[INFO] project created from Archetype in dir: C:\Users\Research\Desktop\workspace\org.wso2.carbon.connector
[INFO] ------------------------------------------------------------------------
[INFO] BUILD SUCCESS
[INFO] ------------------------------------------------------------------------
[INFO] Total time: 39.629 s
[INFO] Finished at: 2016-04-13T15:51:54+05:30
[INFO] Final Memory: 14M/177M
[INFO] ------------------------------------------------------------------------
```

Figure 2.2.5 successfully created carbon connector

11. Remove methods.csv and vcat_2.0a.jar files from resource folder

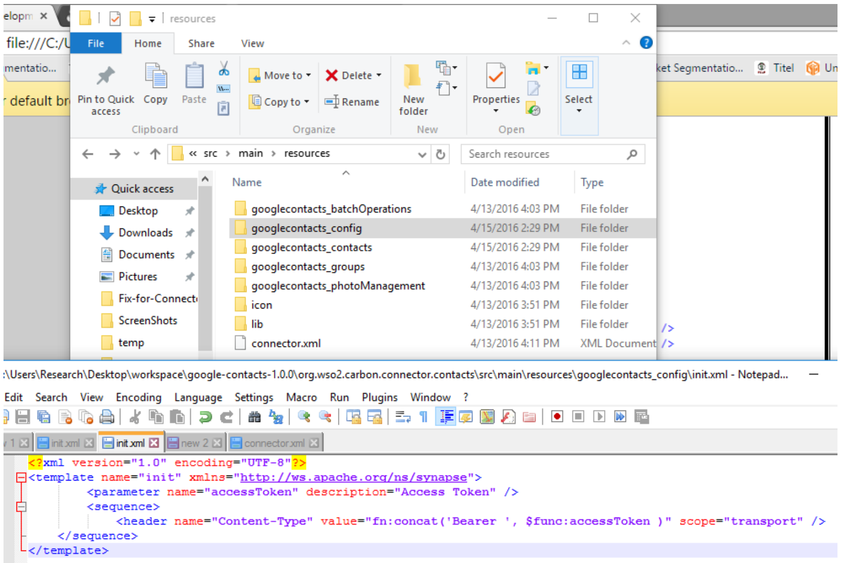
12. Change connector.xml in resources as below



```xml
<?xml version="1.0" encoding="UTF-8"?>
<connector>
    <component name="contacts" package="org.wso2.carbon.connector" >
        <dependency component="googlecontacts_config"/>
        <dependency component="googlecontacts_contacts"/>
        <dependency component="googlecontacts_photoManagement"/>
        <dependency component="googlecontacts_groups"/>
        <dependency component="googlecontacts_batchOperations"/>
        <description>Google Contacts connector library</description>
    </component>
</connector>
```

Figure 2.2.6 Change connector dependencies

13. Change \\resources\googlecontacts_config\init.xml as below



Name	Date modified	Type
googlecontacts_batchOperations	4/13/2016 4:03 PM	File folder
googlecontacts_config	4/15/2016 2:29 PM	File folder
googlecontacts_contacts	4/15/2016 2:29 PM	File folder
googlecontacts_groups	4/13/2016 4:03 PM	File folder
googlecontacts_photoManagement	4/13/2016 4:03 PM	File folder
icon	4/13/2016 3:51 PM	File folder
lib	4/13/2016 3:51 PM	File folder
connector.xml	4/13/2016 4:11 PM	XML Document

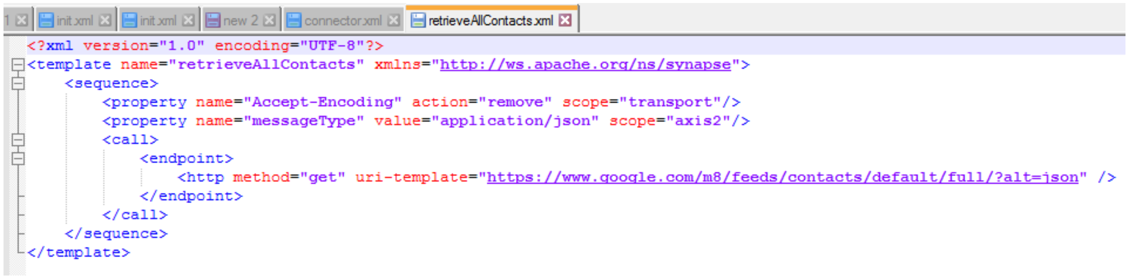
:\Users\Research\Desktop\workspace\google-contacts-1.0.0\org.wso2.carbon.connector.contacts\src\main\resources\googlecontacts_config\init.xml - Notepad...

Edit Search View Encoding Language Settings Macro Run Plugins Window ?
init.xml
init.xml
new 2
connector.xml

```xml
<?xml version="1.0" encoding="UTF-8"?>
<template name="init" xmlns="http://ws.apache.org/ns/synapse">
        <parameter name="accessToken" description="Access Token" />
        <sequence>
            <header name="Content-Type" value="fn:concat('Bearer ', $func:accessToken )" scope="transport" />
    </sequence>
</template>
```

Figure 2.2.7 Change request structure in init.xml

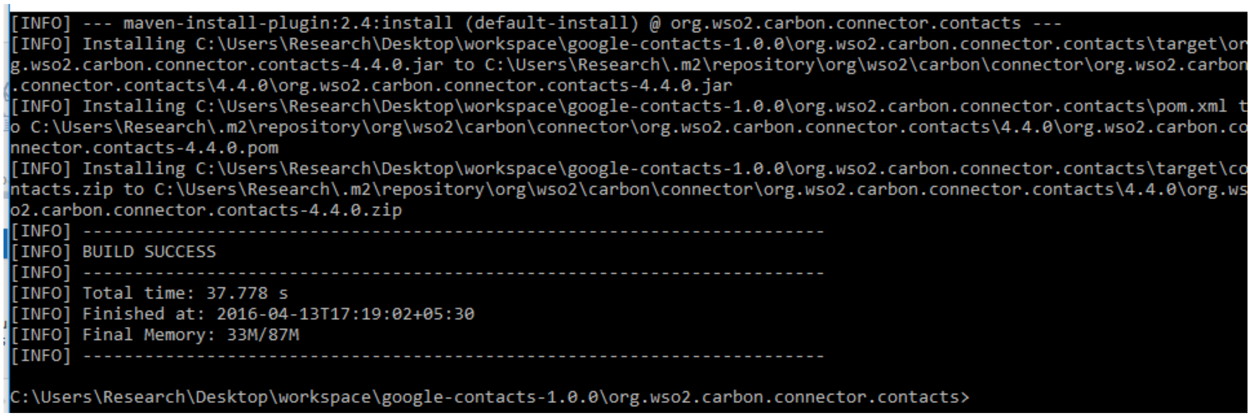
14. Change \\resources\googlecontacts_contacts\retrieveAllContacts.xml as below



```xml
<?xml version="1.0" encoding="UTF-8"?>
<template name="retrieveAllContacts" xmlns="http://ws.apache.org/ns/synapse">
    <sequence>
        <property name="Accept-Encoding" action="remove" scope="transport"/>
        <property name="messageType" value="application/json" scope="axis2"/>
        <call>
            <endpoint>
                <http method="get" uri-template="https://www.google.com/m8/feeds/contacts/default/full/?alt=json" />
            </endpoint>
        </call>
    </sequence>
</template>
```

Figure 2.2.8 Initiate request method

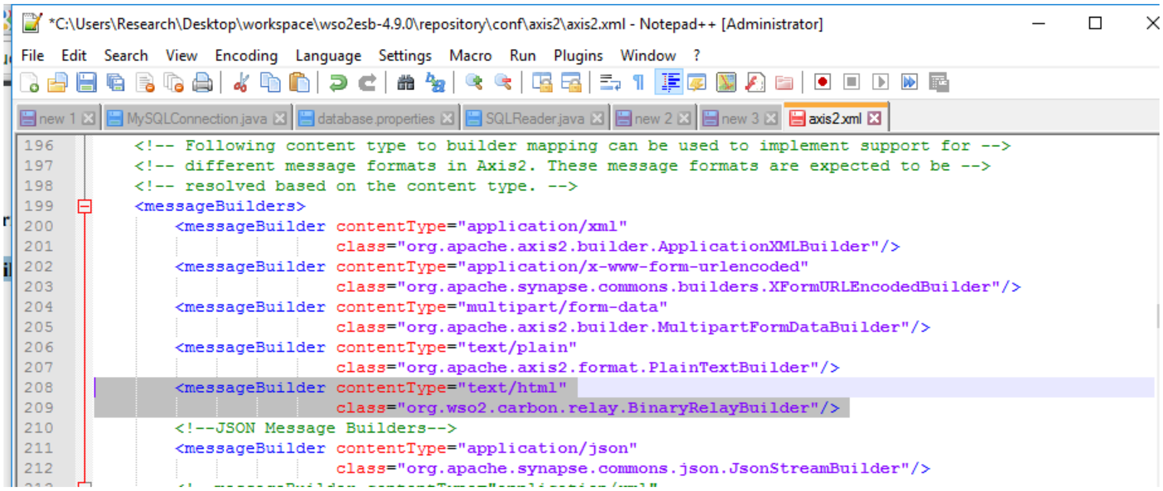
15. Go back to pom.xml folder level and run ‘mvn clean install’ in a command prompt



```
[INFO] --- maven-install-plugin:2.4:install (default-install) @ org.wso2.carbon.connector.contacts ---
[INFO] Installing C:\Users\Research\Desktop\workspace\google-contacts-1.0.0\org.wso2.carbon.connector.contacts\target\or
g.wso2.carbon.connector.contacts-4.4.0.jar to C:\Users\Research\.m2\repository\org\wso2\carbon\connector\org.wso2.carbon
.connector.contacts\4.4.0\org.wso2.carbon.connector.contacts-4.4.0.jar
[INFO] Installing C:\Users\Research\Desktop\workspace\google-contacts-1.0.0\org.wso2.carbon.connector.contacts\pom.xml t
o C:\Users\Research\.m2\repository\org\wso2\carbon\connector\org.wso2.carbon.connector.contacts\4.4.0\org.wso2.carbon.co
nnector.contacts-4.4.0.pom
[INFO] Installing C:\Users\Research\Desktop\workspace\google-contacts-1.0.0\org.wso2.carbon.connector.contacts\target\co
ntacts.zip to C:\Users\Research\.m2\repository\org\wso2\carbon\connector\org.wso2.carbon.connector.contacts\4.4.0\org.ws
o2.carbon.connector.contacts-4.4.0.zip
[INFO] ------------------------------------------------------------------------
[INFO] BUILD SUCCESS
[INFO] ------------------------------------------------------------------------
[INFO] Total time: 37.778 s
[INFO] Finished at: 2016-04-13T17:19:02+05:30
[INFO] Final Memory: 33M/87M
[INFO] ------------------------------------------------------------------------

C:\Users\Research\Desktop\workspace\google-contacts-1.0.0\org.wso2.carbon.connector.contacts>
```

Figure 2.2.9 Build connector

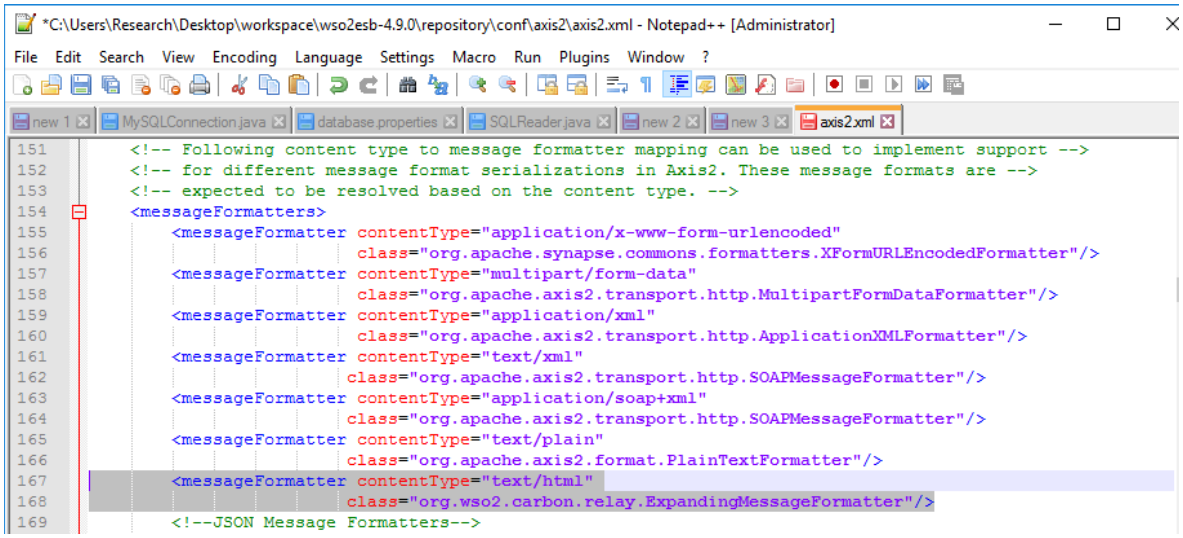
16. Add Formatter and Builders in axis2.xml



*C:\Users\Research\Desktop\workspace\wso2esb-4.9.0\repository\conf\axis2\axis2.xml - Notepad++ [Administrator]

```
    <!-- Following content type to builder mapping can be used to implement support for -->
    <!-- different message formats in Axis2. These message formats are expected to be -->
    <!-- resolved based on the content type. -->
    <messageBuilders>
        <messageBuilder contentType="application/xml"
                        class="org.apache.axis2.builder.ApplicationXMLBuilder"/>
        <messageBuilder contentType="application/x-www-form-urlencoded"
                        class="org.apache.synapse.commons.builders.XFormURLEncodedBuilder"/>
        <messageBuilder contentType="multipart/form-data"
                        class="org.apache.axis2.builder.MultipartFormDataBuilder"/>
        <messageBuilder contentType="text/plain"
                        class="org.apache.axis2.format.PlainTextBuilder"/>
        <messageBuilder contentType="text/html"
                        class="org.wso2.carbon.relay.BinaryRelayBuilder"/>
        <!--JSON Message Builders-->
        <messageBuilder contentType="application/json"
                        class="org.apache.synapse.commons.json.JsonStreamBuilder"/>
```

Figure 2.2.10 Initiate builders -1

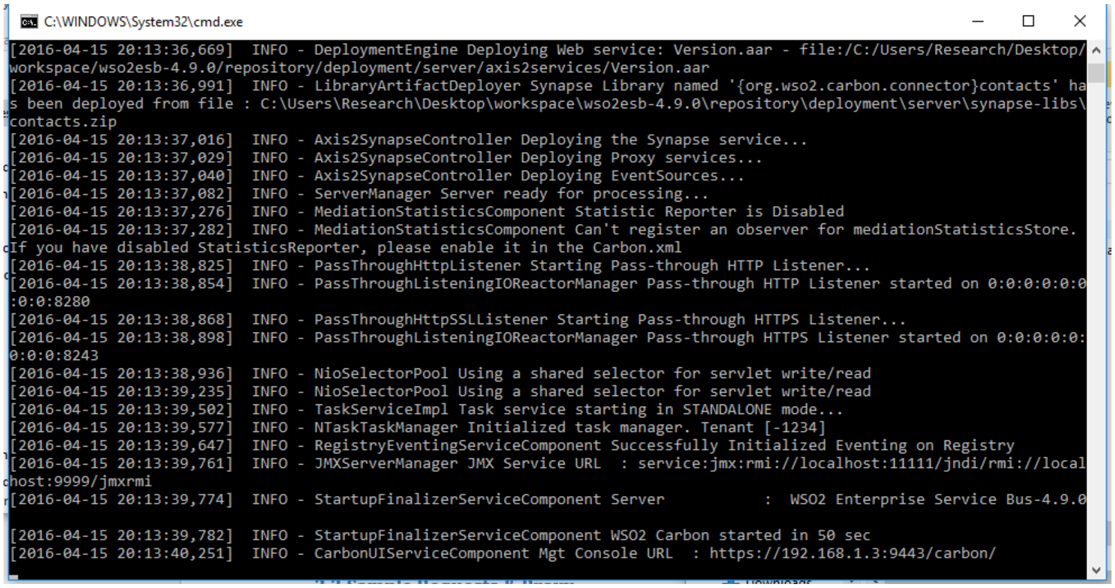

*C:\Users\Research\Desktop\workspace\wso2esb-4.9.0\repository\conf\axis2\axis2.xml - Notepad++ [Administrator]
File Edit Search View Encoding Language Settings Macro Run Plugins Window ?
new 1
MySQLConnection.java
database.properties
SQLReader.java
new 2
new 3
axis2.xml

```
    <!-- Following content type to message formatter mapping can be used to implement support -->
    <!-- for different message format serializations in Axis2. These message formats are -->
    <!-- expected to be resolved based on the content type. -->
    <messageFormatters>
        <messageFormatter contentType="application/x-www-form-urlencoded"
                          class="org.apache.synapse.commons.formatters.XFormURLEncodedFormatter"/>
        <messageFormatter contentType="multipart/form-data"
                          class="org.apache.axis2.transport.http.MultipartFormDataFormatter"/>
        <messageFormatter contentType="application/xml"
                          class="org.apache.axis2.transport.http.ApplicationXMLFormatter"/>
        <messageFormatter contentType="text/xml"
                         class="org.apache.axis2.transport.http.SOAPMessageFormatter"/>
        <messageFormatter contentType="application/soap+xml"
                         class="org.apache.axis2.transport.http.SOAPMessageFormatter"/>
        <messageFormatter contentType="text/plain"
                         class="org.apache.axis2.format.PlainTextFormatter"/>
        <messageFormatter contentType="text/html"
                         class="org.wso2.carbon.relay.ExpandingMessageFormatter"/>
        <!--JSON Message Formatters-->
```

Figure 2.2.11 Initiate Builders –II

- Once you have modified all above files you can save them and run the ESB

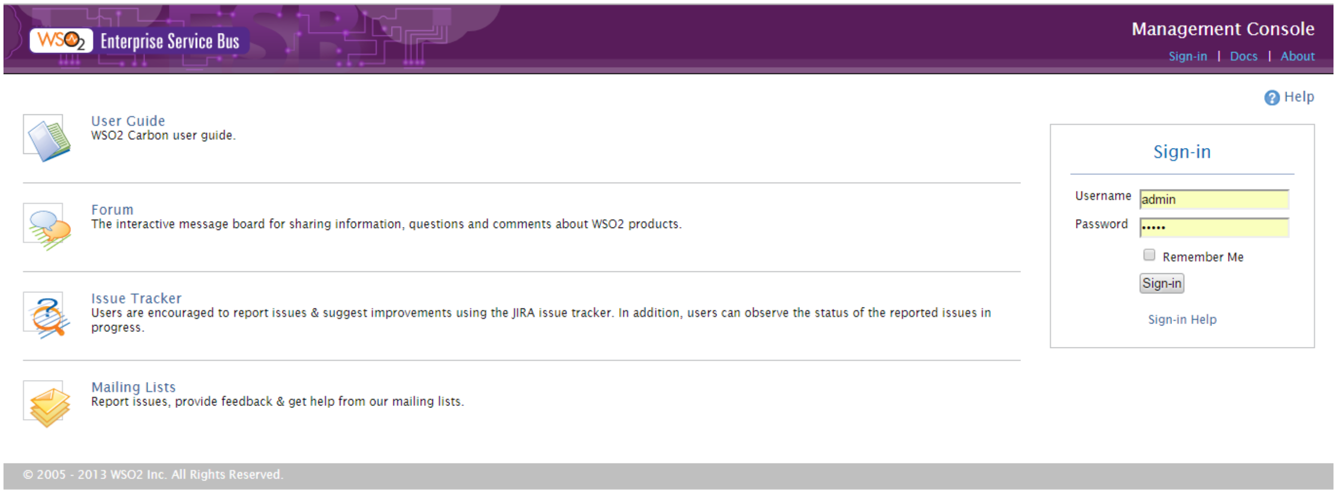
17. Start ESB server



```
[2016-04-15 20:13:36,669]  INFO - DeploymentEngine Deploying Web service: Version.aar - file:/C:/Users/Research/Desktop/
workspace/wso2esb-4.9.0/repository/deployment/server/axis2services/Version.aar
[2016-04-15 20:13:36,991]  INFO - LibraryArtifactDeployer Synapse Library named '{org.wso2.carbon.connector}contacts' ha
s been deployed from file : C:\Users\Research\Desktop\workspace\wso2esb-4.9.0\repository\deployment\server\synapse-libs\
contacts.zip
[2016-04-15 20:13:37,016]  INFO - Axis2SynapseController Deploying the Synapse service...
[2016-04-15 20:13:37,029]  INFO - Axis2SynapseController Deploying Proxy services...
[2016-04-15 20:13:37,040]  INFO - Axis2SynapseController Deploying EventSources...
[2016-04-15 20:13:37,082]  INFO - ServerManager Server ready for processing...
[2016-04-15 20:13:37,276]  INFO - MediationStatisticsComponent Statistic Reporter is Disabled
[2016-04-15 20:13:37,282]  INFO - MediationStatisticsComponent Can't register an observer for mediationStatisticsStore.
If you have disabled StatisticsReporter, please enable it in the Carbon.xml
[2016-04-15 20:13:38,825]  INFO - PassThroughHttpListener Starting Pass-through HTTP Listener...
[2016-04-15 20:13:38,854]  INFO - PassThroughListeningIOReactorManager Pass-through HTTP Listener started on 0:0:0:0:0:0
:0:0:8280
[2016-04-15 20:13:38,868]  INFO - PassThroughHttpSSLListener Starting Pass-through HTTPS Listener...
[2016-04-15 20:13:38,898]  INFO - PassThroughListeningIOReactorManager Pass-through HTTPS Listener started on 0:0:0:0:0:
0:0:0:8243
[2016-04-15 20:13:38,936]  INFO - NioSelectorPool Using a shared selector for servlet write/read
[2016-04-15 20:13:39,235]  INFO - NioSelectorPool Using a shared selector for servlet write/read
[2016-04-15 20:13:39,502]  INFO - TaskServiceImpl Task service starting in STANDALONE mode...
[2016-04-15 20:13:39,577]  INFO - NTaskTaskManager Initialized task manager. Tenant [-1234]
[2016-04-15 20:13:39,647]  INFO - RegistryEventingServiceComponent Successfully Initialized Eventing on Registry
[2016-04-15 20:13:39,761]  INFO - JMXServerManager JMX Service URL  : service:jmx:rmi://localhost:11111/jndi/rmi://local
host:9999/jmxrmi
[2016-04-15 20:13:39,774]  INFO - StartupFinalizerServiceComponent Server           :  WSO2 Enterprise Service Bus-4.9.0

[2016-04-15 20:13:39,782]  INFO - StartupFinalizerServiceComponent WSO2 Carbon started in 50 sec
[2016-04-15 20:13:40,251]  INFO - CarbonUIServiceComponent Mgt Console URL  : https://192.168.1.3:9443/carbon/
```

Figure 2.2.12 Start ESB Server to upload connector

18. .Enter username and password as ‘admin’



User Guide
WSO2 Carbon user guide.

Forum
The interactive message board for sharing information, questions and comments about WSO2 products.

Issue Tracker
Users are encouraged to report issues & suggest improvements using the JIRA issue tracker. In addition, users can observe the status of the reported issues in progress.

Mailing Lists
Report issues, provide feedback & get help from our mailing lists.

Sign-in

Username: admin
Password: •••••
□ Remember Me

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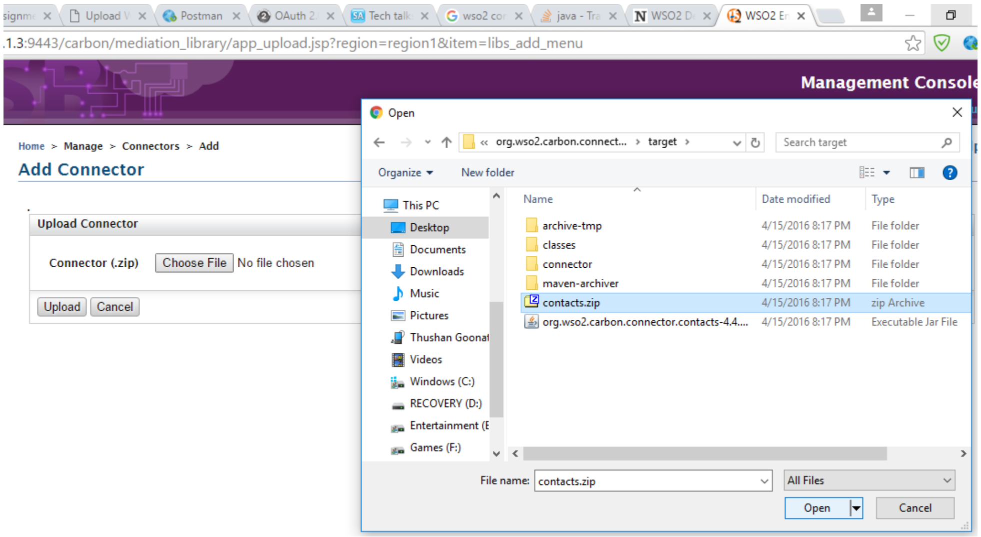
Figure 2.2.13 Sign in to ESB

Once the ESB is up and running visit the domain name displayed in above console (Figure 2.2.13). Then Sign In to ESB using above credentials. (password: admin)

Note: If the web page does not appear probably the Anti-virus software installed in your PC may be interrupting the process.Threrefore disable it and restart the service.

19. Once you have logged in to add the connector upload the contacts.zip file generated in target folder from maven build (\\workspace\google-contacts-1.0.0\org.wso2.carbon.connector.contacts\target)



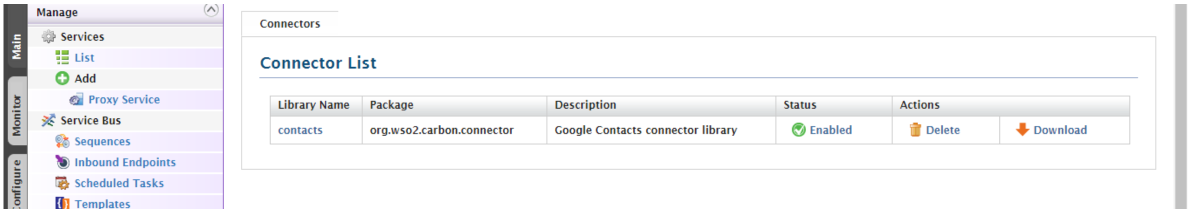
.1.3:9443/carbon/mediation_library/app_upload.jsp?region=region1&item=libs_add_menu

Name	Date modified	Type
archive-tmp	4/15/2016 8:17 PM	File folder
classes	4/15/2016 8:17 PM	File folder
connector	4/15/2016 8:17 PM	File folder
maven-archiver	4/15/2016 8:17 PM	File folder
contacts.zip	4/15/2016 8:17 PM	zip Archive
org.wso2.carbon.connector.contacts-4.4....	4/15/2016 8:17 PM	Executable Jar File

File name: contacts.zip

Figure 2.2.14 Upload connector

20. Enable the Connector

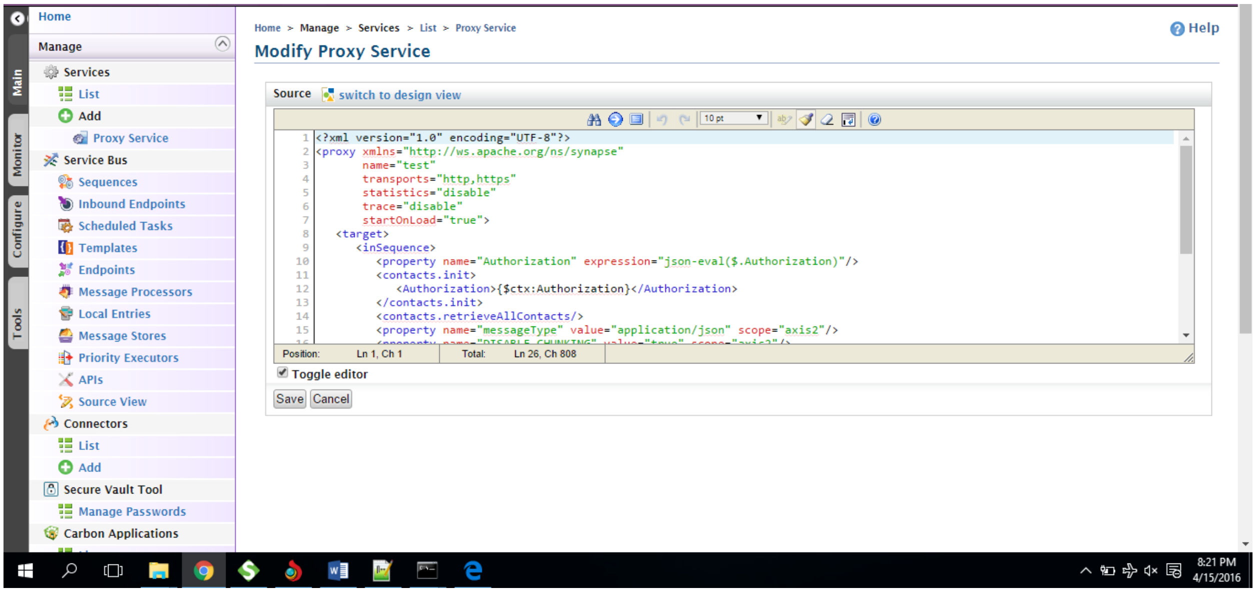


Library Name	Package	Description	Status	Actions	
contacts	org.wso2.carbon.connector	Google Contacts connector library	✓ Enabled	Delete	Download

Figure 2.2.15 Enable Connector

21. Add a custom proxy template to get all contacts

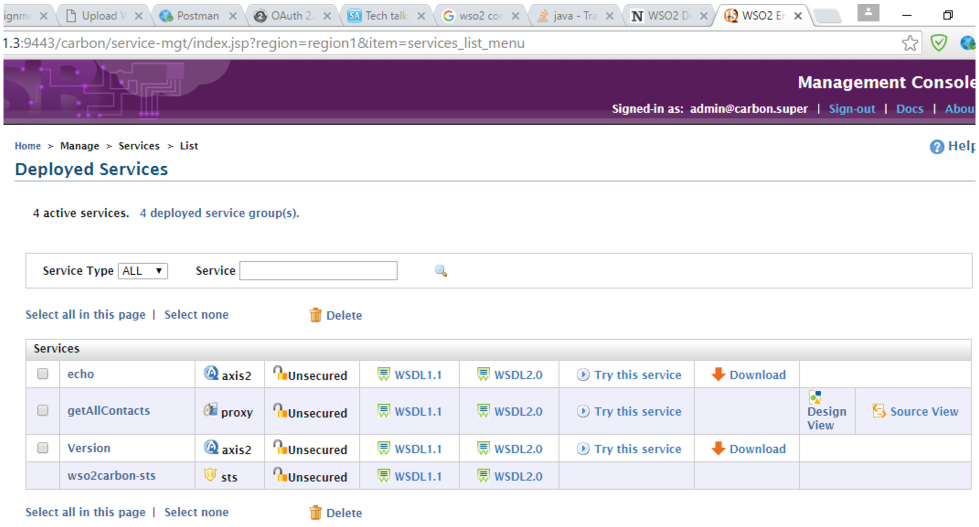
Now the connector has been created, therefore we can extract information from Google Contact API. However we must have a proxy service to be implemented inorder to transfer the acquired data from Google Contacts API to client application. This proxy will store the server response achieved by connector and forward it to the client application (Postman).



```
<?xml version="1.0" encoding="UTF-8"?>
<proxy xmlns="http://ws.apache.org/ns/synapse"
       name="test"
       transports="http,https"
       statistics="disable"
       trace="disable"
       startOnLoad="true">
   <target>
      <inSequence>
         <property name="Authorization" expression="json-eval($.Authorization)"/>
         <contacts.init>
            <Authorization>{$ctx:Authorization}</Authorization>
         </contacts.init>
         <contacts.retrieveAllContacts/>
         <property name="messageType" value="application/json" scope="axis2"/>
         <property name="DISABLE_CHUNKING" value="true" scope="axis2"/>
```

Figure 2.2.16 Implement proxy

22. GetAllContacts Proxy Service Created


ignm
Upload
Postman
OAuth 2
Tech talk
wso2 co
java - Tra
WSO2 D
WSO2 E
1.3:9443/carbon/service-mgt/index.jsp?region=region1&item=services_list_menu
Management Console
Signed-in as: admin@carbon.super | Sign-out | Docs | Abou
Home > Manage > Services > List
Help
Service Type ALL
Service
Select all in this page | Select none
Delete

Deployed Services

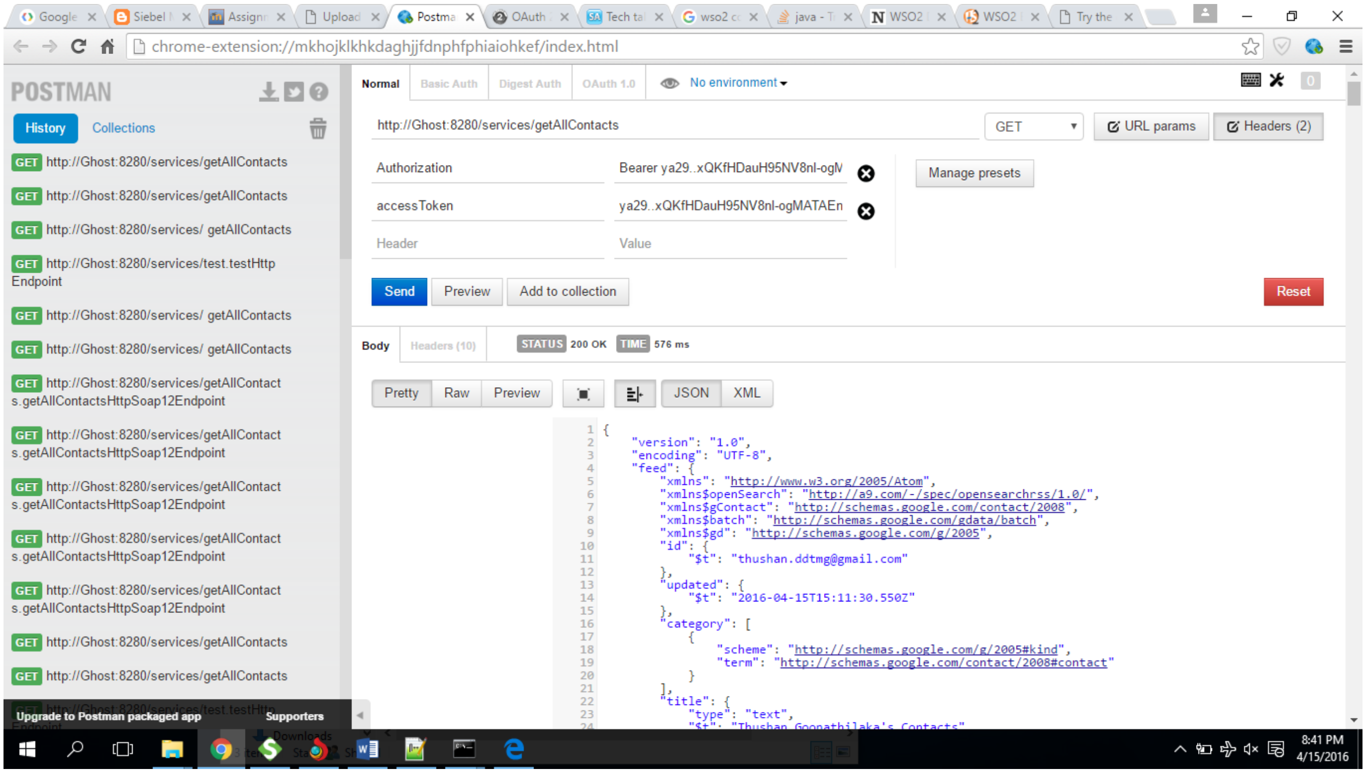
4 active services. 4 deployed service group(s).

Services								
□	echo	axis2	Unsecured	WSDL1.1	WSDL2.0	Try this service	Download	
□	getAllContacts	proxy	Unsecured	WSDL1.1	WSDL2.0	Try this service	Design View	Source View
□	Version	axis2	Unsecured	WSDL1.1	WSDL2.0	Try this service	Download	
	wso2carbon-sts	sts	Unsecured	WSDL1.1	WSDL2.0			

Figure 2.2.17 Proxy Created

23. Test Proxy and Connector

- Now we have to send GET request to the proxy service created at WSO2 ESB and it will contact connector. Then connector will send GET request to Google Contacts API and response back to connector. The connector will forward the response to proxy and finally proxy returns the response. In our case we have selected” GetAllContacts” GET request mentioned in API documentation and the results are shown below


chrome-extension://mkhojklkhkdaghjjfdnphfphiaiohkef/index.html
POSTMAN
History
Collections
GET http://Ghost:8280/services/getAllContacts
GET http://Ghost:8280/services/getAllContacts
GET http://Ghost:8280/services/ getAllContacts
GET http://Ghost:8280/services/test.testHttp Endpoint
GET http://Ghost:8280/services/ getAllContacts
GET http://Ghost:8280/services/ getAllContacts
GET http://Ghost:8280/services/getAllContacts.getAllContactsHttpSoap12Endpoint
GET http://Ghost:8280/services/getAllContacts.getAllContactsHttpSoap12Endpoint
GET http://Ghost:8280/services/getAllContacts.getAllContactsHttpSoap12Endpoint
GET http://Ghost:8280/services/getAllContacts.getAllContactsHttpSoap12Endpoint
GET http://Ghost:8280/services/getAllContacts.getAllContactsHttpSoap12Endpoint
GET http://Ghost:8280/services/getAllContacts
GET http://Ghost:8280/services/getAllContacts
Upgrade to Postman packaged app
Supporters
Normal
Basic Auth
Digest Auth
OAuth 1.0
No environment
GET
URL params
Headers (2)
Manage presets
Send
Preview
Add to collection
Reset
Body
Headers (10)
Pretty
Raw
Preview
JSON
XML
8:41 PM
4/15/2016

http://Ghost:8280/services/getAllContacts

Header	Value
Authorization	Bearer ya29..xQKfHDauH95NV8nl-ogM
accessToken	ya29..xQKfHDauH95NV8nl-ogMATAEn

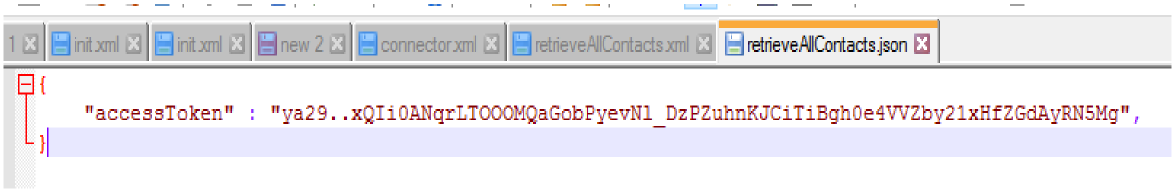
STATUS 200 OK TIME 576 ms

```
{
    "version": "1.0",
    "encoding": "UTF-8",
    "feed": {
        "xmlns": "http://www.w3.org/2005/Atom",
        "xmlns$openSearch": "http://a9.com/-/spec/opensearchrss/1.0/",
        "xmlns$gContact": "http://schemas.google.com/contact/2008",
        "xmlns$batch": "http://schemas.google.com/gdata/batch",
        "xmlns$gd": "http://schemas.google.com/g/2005",
        "id": {
            "$t": "thushan.ddtmg@gmail.com"
        },
        "updated": {
            "$t": "2016-04-15T15:11:30.550Z"
        },
        "category": [
            {
                "scheme": "http://schemas.google.com/g/2005#kind",
                "term": "http://schemas.google.com/contact/2008#contact"
            }
        ],
        "title": {
            "type": "text",
            "$t": "Thushan Goonathilaka's Contacts"
```

Figure 2.2.18 Response to Postman by WSO2 ESB

2.3 Additional References

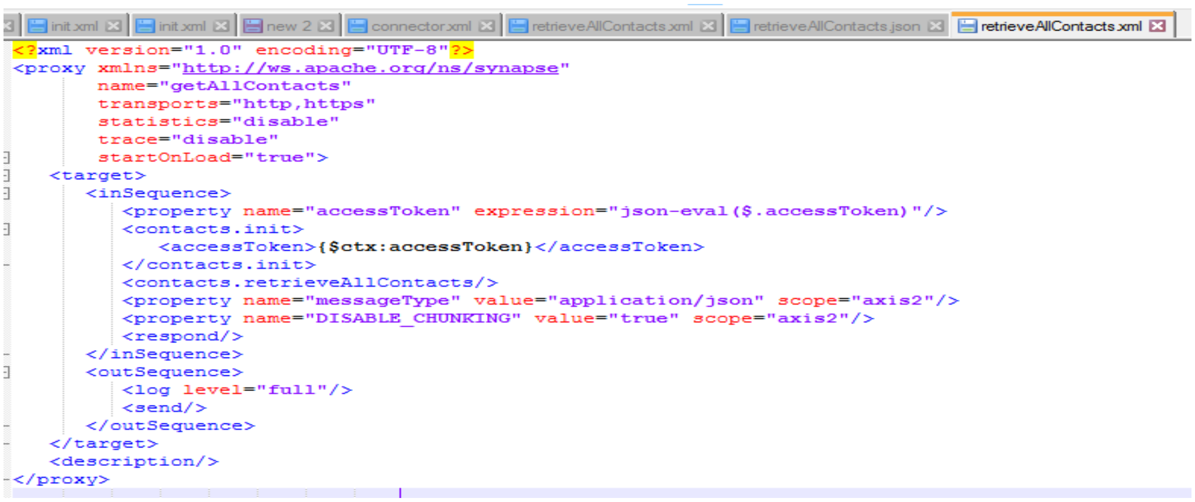
- Access Token



```
{
    "accessToken" : "ya29..xQIi0ANqrLTOOOMQaGobPyevNl_DzPZuhnKJCiTiBgh0e4VVZby21xHfZGdAyRN5Mg",
}
```

Figure 2.3.1 Access token given by API

- Sample Proxy Template

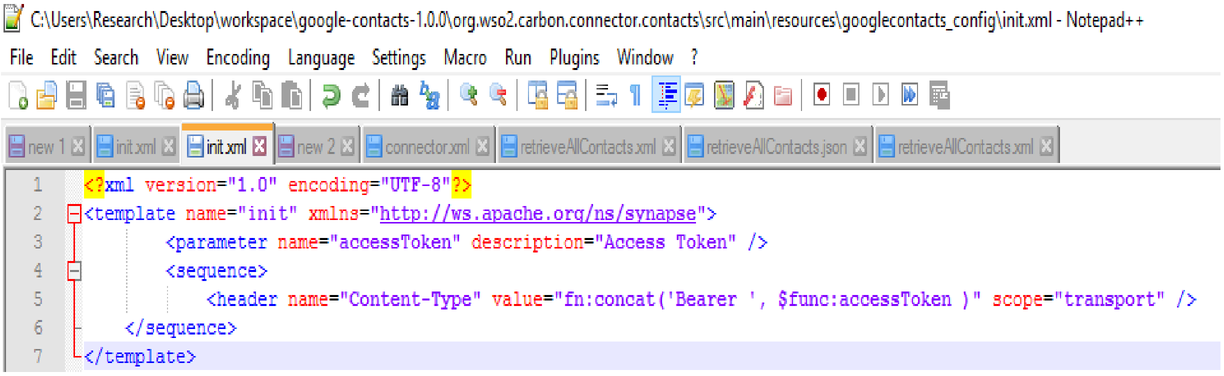


```
<?xml version="1.0" encoding="UTF-8"?>
<proxy xmlns="http://ws.apache.org/ns/synapse"
       name="getAllContacts"
       transports="http,https"
       statistics="disable"
       trace="disable"
       startOnLoad="true">
   <target>
      <inSequence>
         <property name="accessToken" expression="json-eval($.accessToken)"/>
         <contacts.init>
            <accessToken>{$ctx:accessToken}</accessToken>
         </contacts.init>
         <contacts.retrieveAllContacts/>
         <property name="messageType" value="application/json" scope="axis2"/>
         <property name="DISABLE_CHUNKING" value="true" scope="axis2"/>
         <respond/>
      </inSequence>
      <outSequence>
         <log level="full"/>
         <send/>
      </outSequence>
   </target>
   <description/>
</proxy>
```

Figure 2.3.2 Sample proxy structure

2.3.1 Template Methods

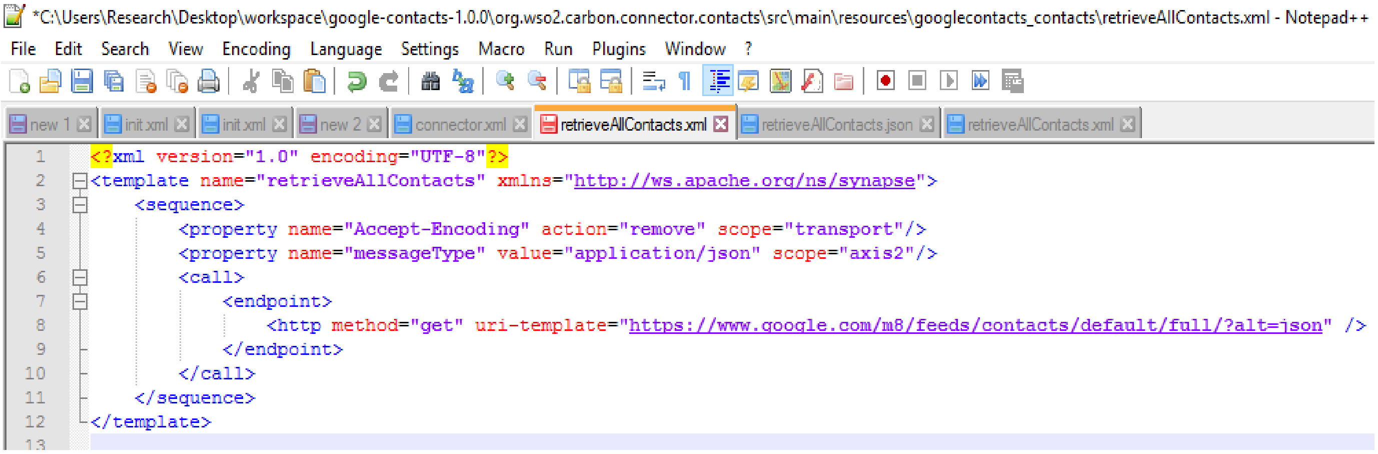
- Init.xml


C:\Users\Research\Desktop\workspace\google-contacts-1.0.0\org.wso2.carbon.connector.contacts\src\main\resources\googlecontacts_config\init.xml - Notepad++
File Edit Search View Encoding Language Settings Macro Run Plugins Window ?
new 1
init.xml
init.xml
new 2
connector.xml
retrieveAllContacts.xml
retrieveAllContacts.json
retrieveAllContacts.xml

```
<?xml version="1.0" encoding="UTF-8"?>
<template name="init" xmlns="http://ws.apache.org/ns/synapse">
        <parameter name="accessToken" description="Access Token" />
        <sequence>
            <header name="Content-Type" value="fn:concat('Bearer ', $func:accessToken )" scope="transport" />
    </sequence>
</template>
```

Figure 2.3.3 init.xml of the request

- retrieveAllContacts.xml


*C:\Users\Research\Desktop\workspace\google-contacts-1.0.0\org.wso2.carbon.connector.contacts\src\main\resources\googlecontacts_contacts\retrieveAllContacts.xml - Notepad++
File Edit Search View Encoding Language Settings Macro Run Plugins Window ?
new 1
init.xml
init.xml
new 2
connector.xml
retrieveAllContacts.xml
retrieveAllContacts.json
retrieveAllContacts.xml

```
<?xml version="1.0" encoding="UTF-8"?>
<template name="retrieveAllContacts" xmlns="http://ws.apache.org/ns/synapse">
    <sequence>
        <property name="Accept-Encoding" action="remove" scope="transport"/>
        <property name="messageType" value="application/json" scope="axis2"/>
        <call>
            <endpoint>
                <http method="get" uri-template="https://www.google.com/m8/feeds/contacts/default/full/?alt=json" />
            </endpoint>
        </call>
    </sequence>
</template>
```

Figure 2.3.4.Http request body of GET method