



Lab 4 - HL7 FHIR Fundamentals

CS6440 Intro Health Informatics, 2020 Spring

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Exercise 1: Create a Patient Resource

Create a patient resource with the following information:

- **Identifier:** Your GT Username if you use HAPI FHIR; Your firstname.lastname if you use GT FHIR.
- **Name:** You can create a First Name and Last Name
- **Birthday:** Make Up One
- **Gender:** Choose One
- **Telecom:** Make Up One
- **Address:** Make up one with Line, City, State, Postal Code, and Country

Feel free to add other elements as you wish! Add your resource code to your PDF submission. You can submit your solution in XML or JSON format.

As shown in **Figure 1**.



Figure 1. Patient resource code created using HAPI FHIR, in JSON format.

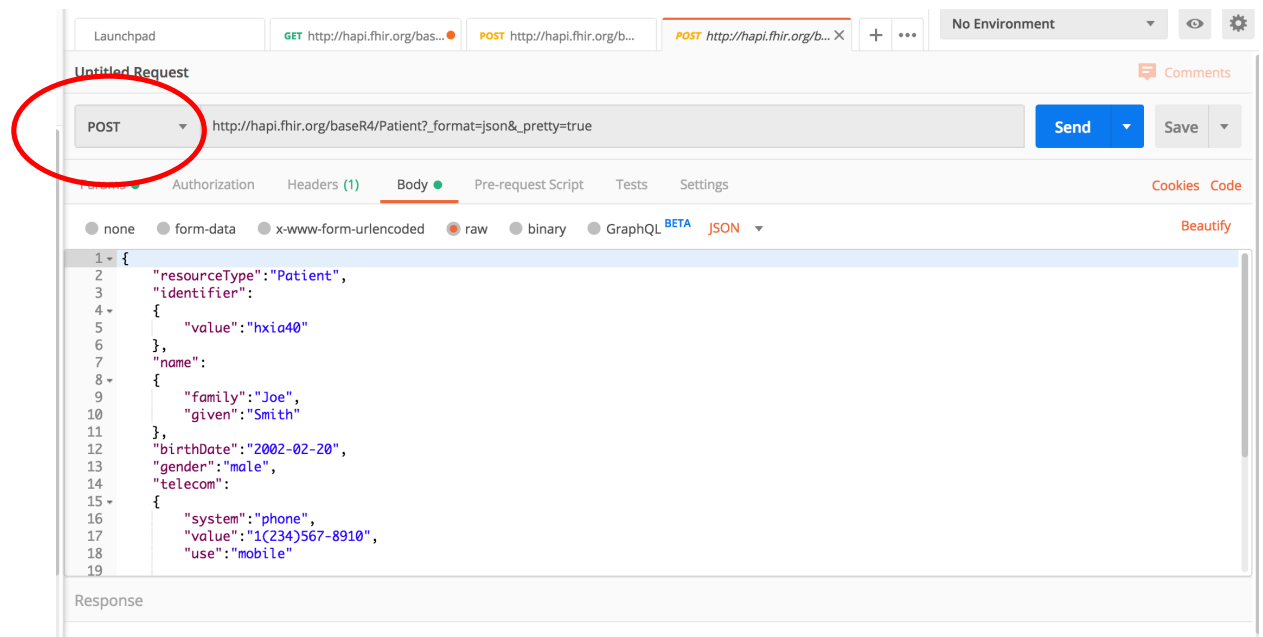
Exercise 2: CRUD Operations

Complete the following tasks:

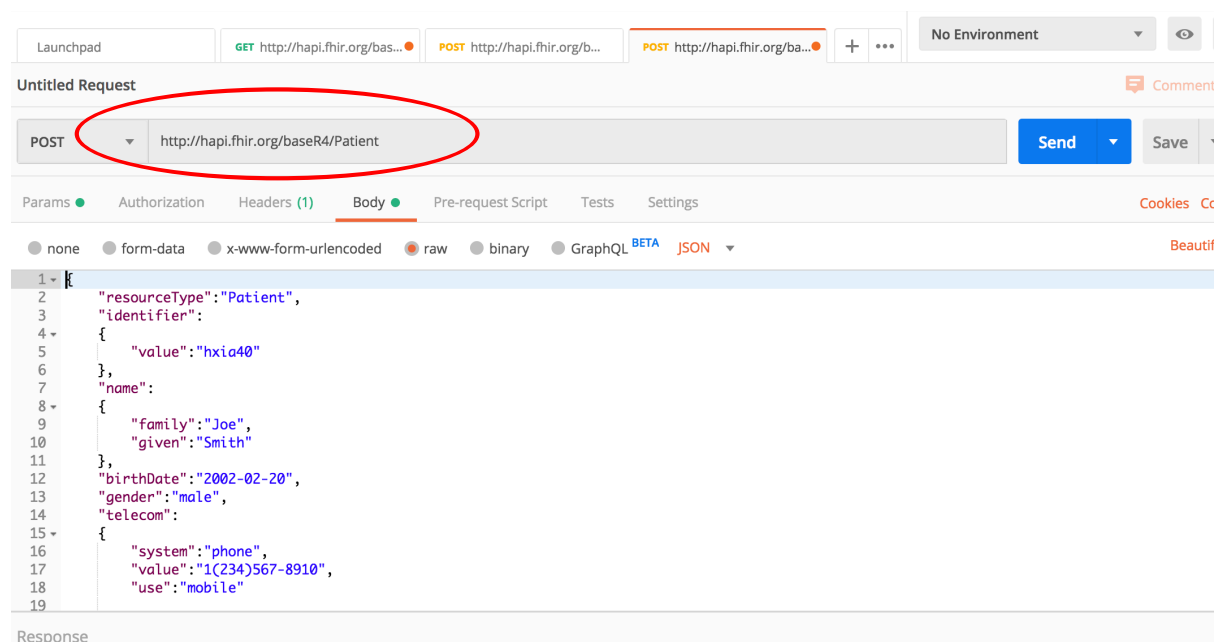
1. Using the Patient Resource you created, save the resources by making a POST to the FHIR Server. Make sure the New Resource is successfully saved.

The Steps I took:

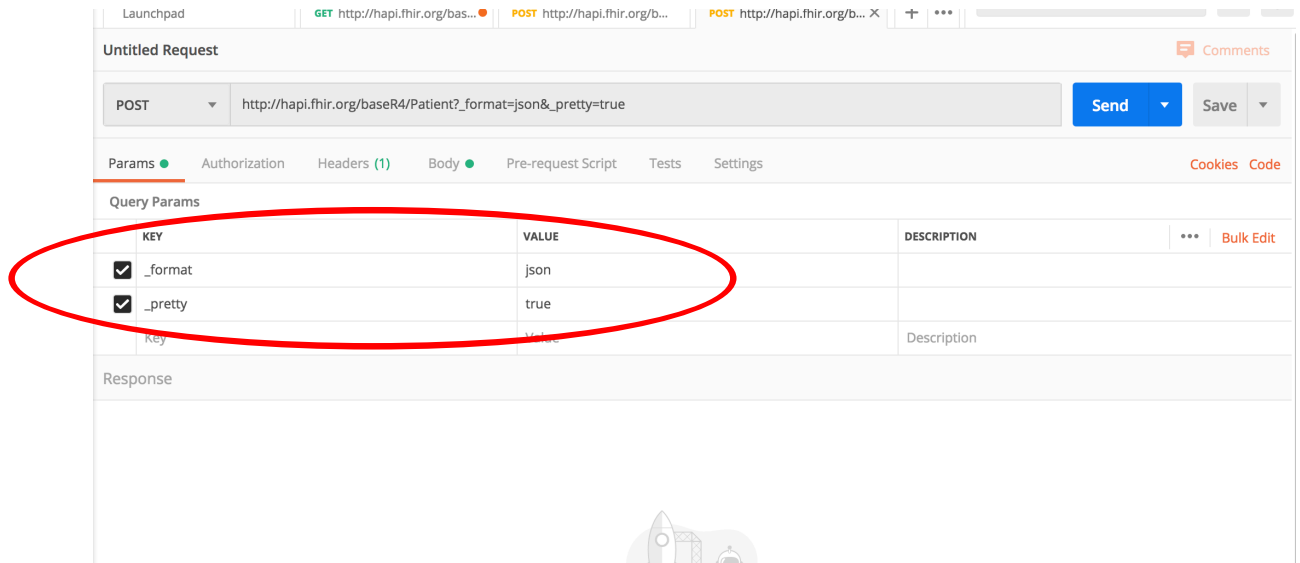
1.1. Selected the POST method



1.2. Input HAPI FHIR address.



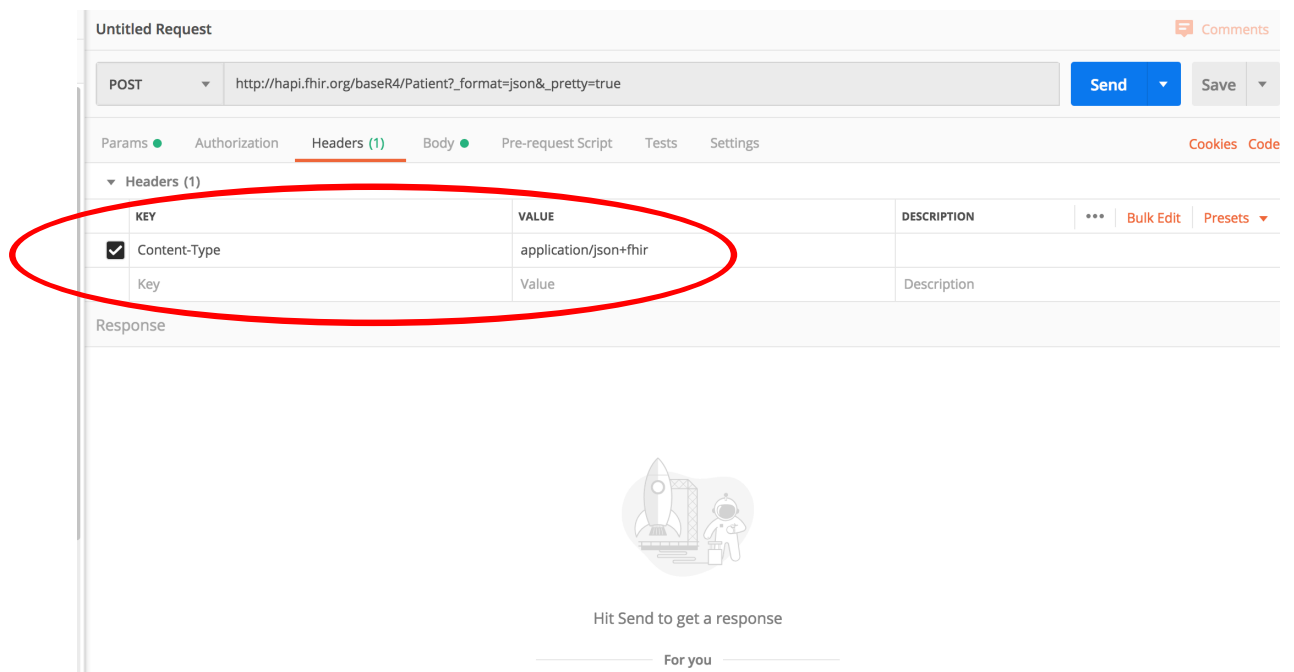
- 1.3. Set parameters “_format” to “json”, and “_pretty” to “true” under “Params” tab.



The screenshot shows the 'Params' tab of an HTTP client. The URL bar contains 'http://hapi.fhir.org/baseR4/Patient?_format=json&_pretty=true'. The 'Query Params' table has two rows: '_format' with value 'json' and '_pretty' with value 'true'. These rows are circled in red.

KEY	VALUE	DESCRIPTION
<input checked="" type="checkbox"/> _format	json	
<input checked="" type="checkbox"/> _pretty	true	
Key	Value	Description

- 1.4. Set parameters “Content_type” to “application/json+fhir” under “Headers” tab.



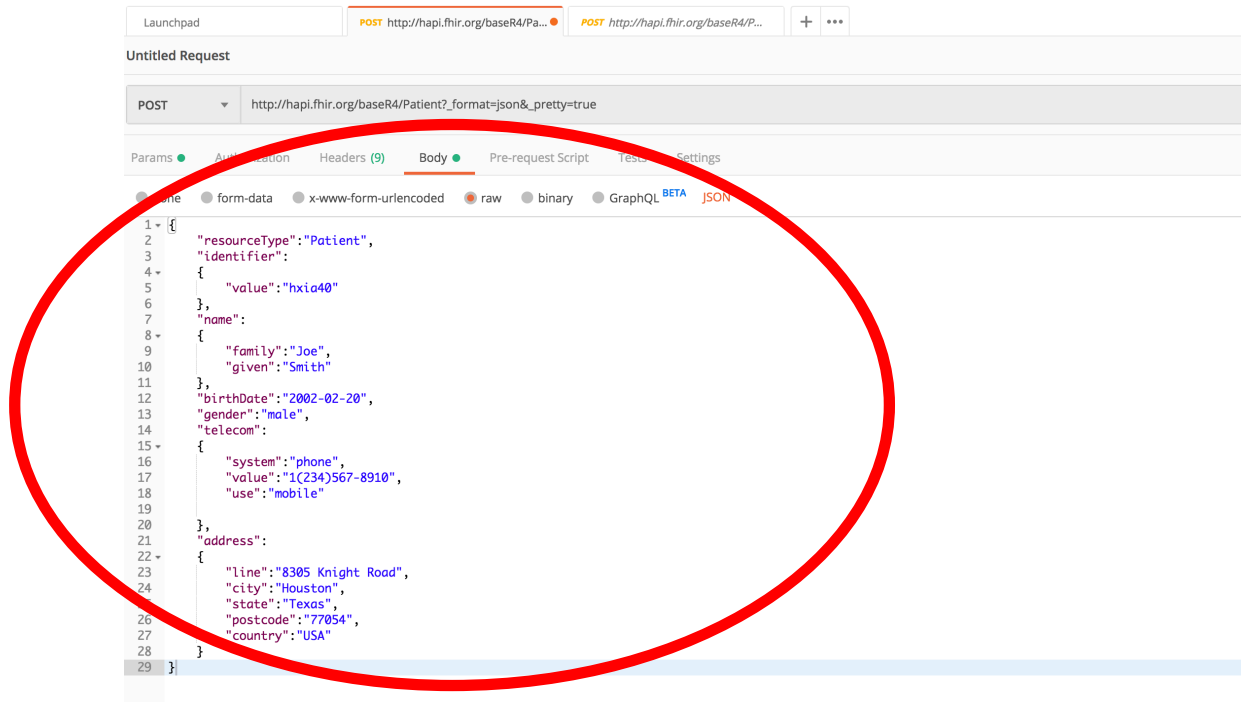
The screenshot shows the 'Headers' tab of the same HTTP client. The URL bar remains the same. The 'Headers' table has one row: 'Content-Type' with value 'application/json+fhir'. This row is circled in red.

KEY	VALUE	DESCRIPTION
<input checked="" type="checkbox"/> Content-Type	application/json+fhir	
Key	Value	Description

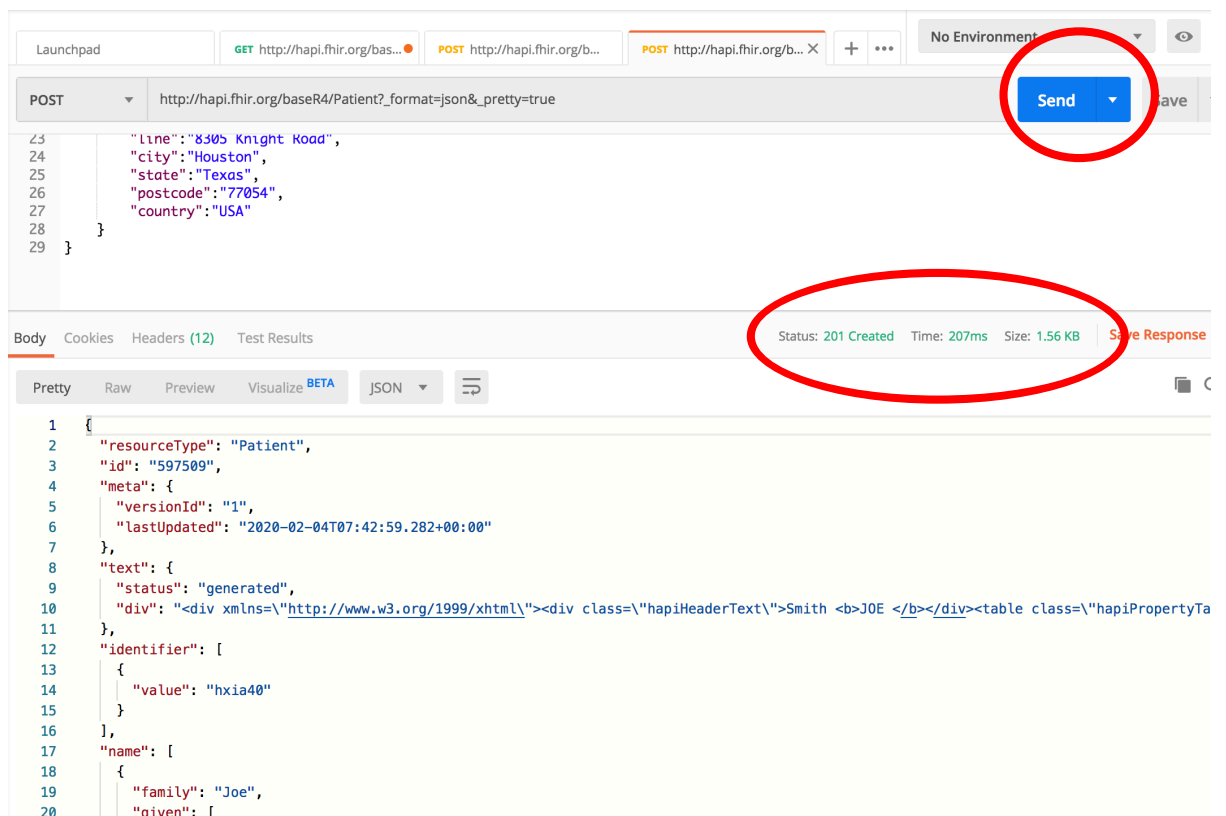
Hit Send to get a response

For you

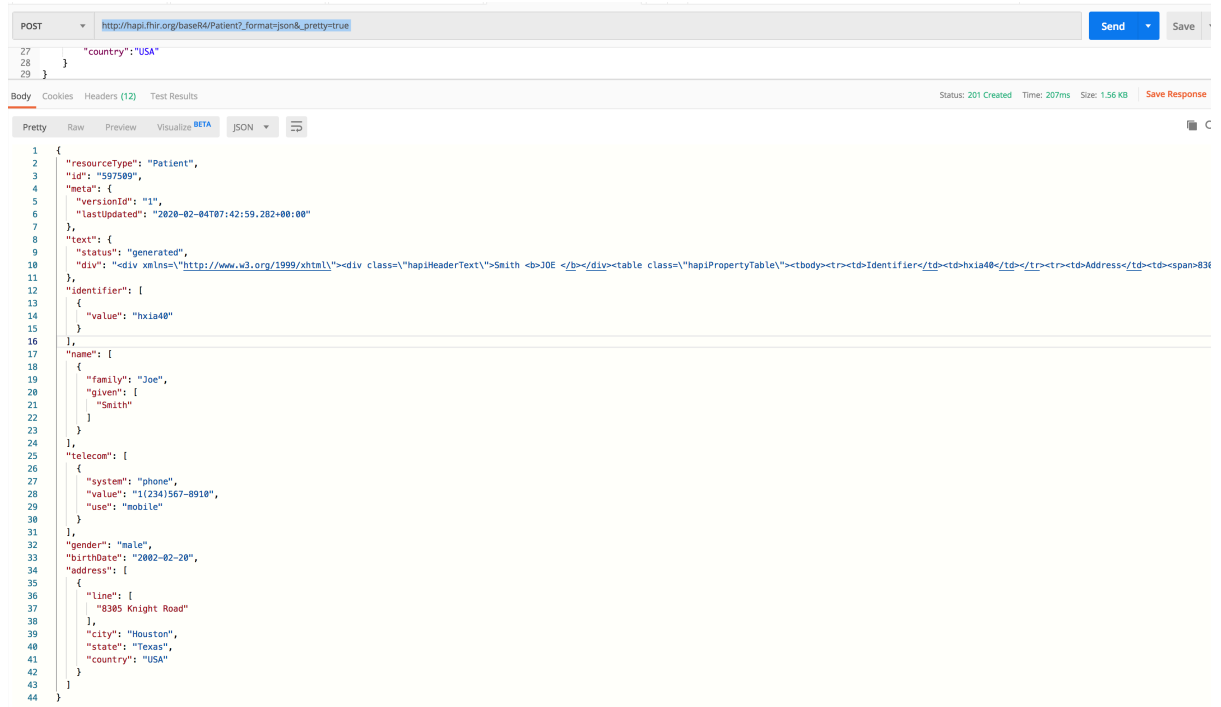
- 1.5. Input the resource code that I have created in Exercise A, which is shown above, into the blank after choosing “raw” under the “Body” tab.



- 1.6. Press “Send” button. If the returned information indicates the Status is “201 created”, the POST action was successful.



- 1.7. The created resource is shown below. Note that line 10 of the resource is too long to be fully demonstrated here.



```

POST http://hapi.fhir.org/baseR4/Patient?format=json&pretty=true
{
  "country": "USA"
}

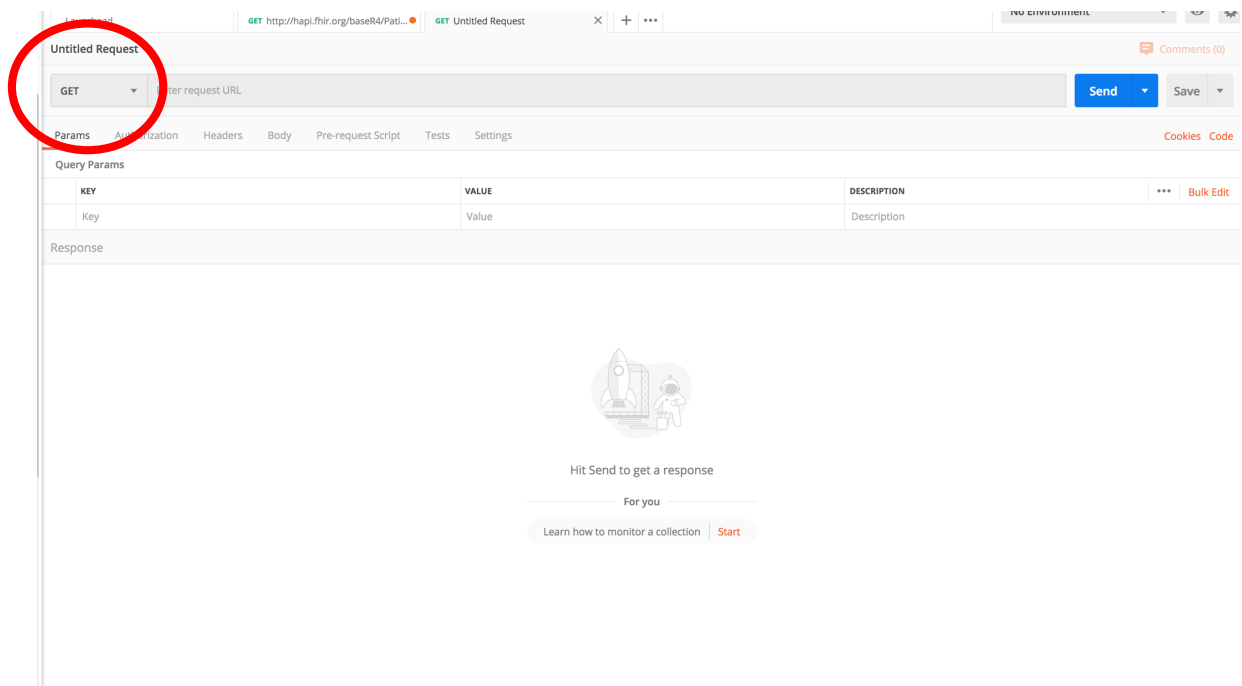
Status: 201 Created Time: 207ms Size: 1.56 KB Save Response

Pretty Raw Preview Visualize BETA JSON
1 {
2   "resourceType": "Patient",
3   "id": "597589",
4   "meta": {
5     "versionId": "1",
6     "lastUpdated": "2020-02-04T07:42:59.282+00:00"
7   },
8   "text": {
9     "status": "generated",
10    "div": "<div xmlns='http://www.w3.org/1999/xhtml'><div class='hapiHeaderText'>Smith <b>JOE </b></div><table class='hapiPropertyTable'><tbody><tr><td>Identifier</td><td>hxia40</td></tr><tr><td>Address</td><td><span>834
11  </td></tr></tbody></table></div>"
12  },
13  "identifier": [
14    {
15      "value": "hxia40"
16    }
17  ],
18  "name": [
19    {
20      "family": "Joe",
21      "given": [
22        "Smith"
23      ]
24    }
25  ],
26  "telecom": [
27    {
28      "system": "phone",
29      "value": "1(234)567-8910",
30      "use": "mobile"
31    }
32  ],
33  "gender": "male",
34  "birthDate": "2002-02-20",
35  "address": [
36    {
37      "line": [
38        "8305 Knight Road"
39      ],
40      "city": "Houston",
41      "state": "Texas",
42      "country": "USA"
43    }
44  ]
45 }

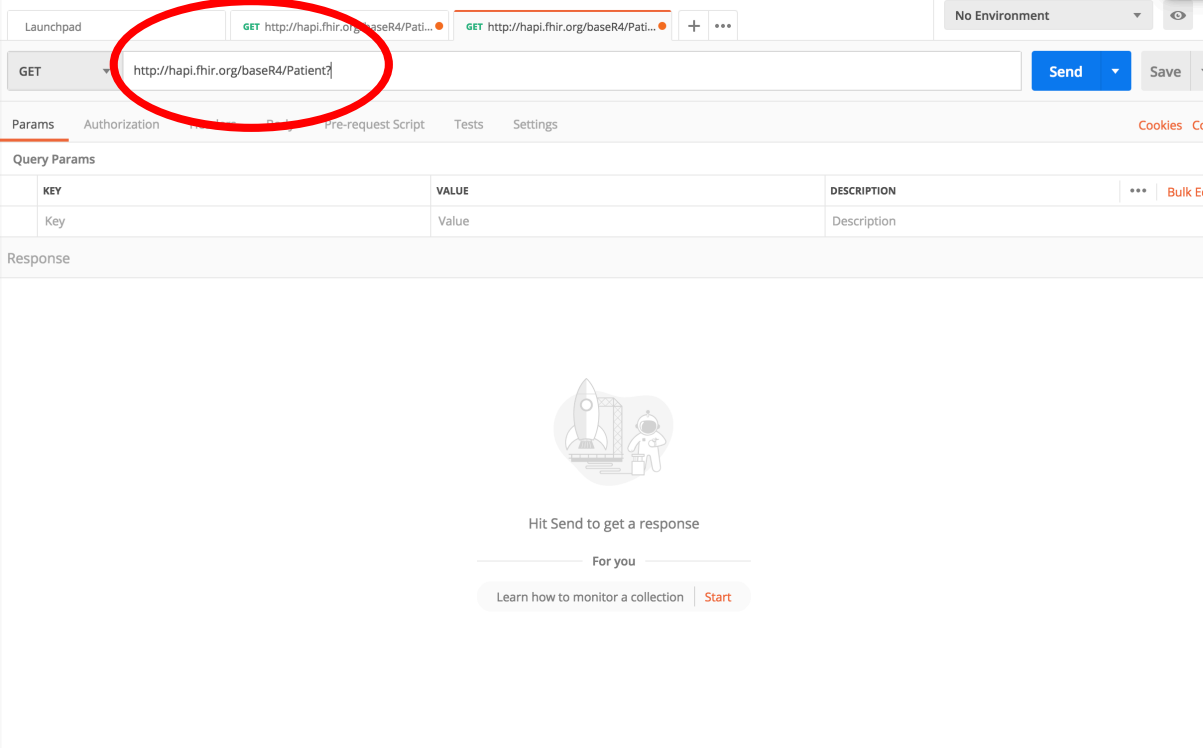
```

2. GET the FHIR Resource using the ID that has been assigned by the server to your resource.

2.1. Select the GET method



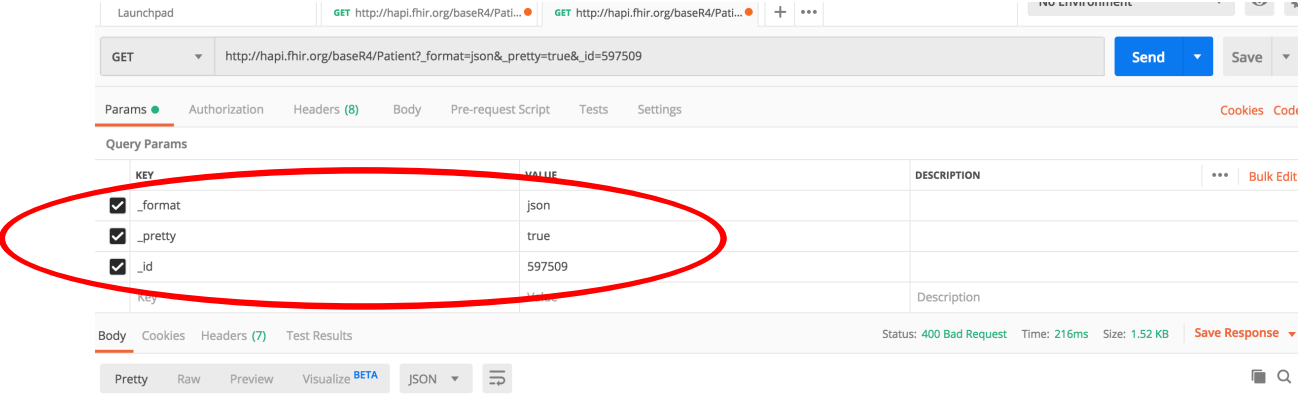
2.2. Input HAPI FHIR address



The screenshot shows the Launchpad interface for a REST client. The URL input field is highlighted with a red circle and contains the text `http://hapi.fhir.org/baseR4/Patient?`. The interface includes tabs for Params, Authorization, Headers, Body, Pre-request Script, Tests, and Settings. The Params tab is active, showing a table for Query Params with columns KEY, VALUE, and DESCRIPTION. The table has one row with KEY 'Key' and VALUE 'Value'. Below the table is a 'Response' section with a rocket icon and the text 'Hit Send to get a response'.

KEY	VALUE	DESCRIPTION
Key	Value	Description

2.3. Set parameters “_format” to “json”, “_pretty” to “true”, and “_id” to “597509” (refer to section 1.7.) under “Params” tab.



The screenshot shows the Launchpad interface with the Params tab selected. The URL input field now contains `http://hapi.fhir.org/baseR4/Patient?_format=json&_pretty=true&_id=597509`. The Params tab shows a table for Query Params with columns KEY, VALUE, and DESCRIPTION. The table has three rows: `_format` with value `json`, `_pretty` with value `true`, and `_id` with value `597509`. These three rows are highlighted with a red circle. Below the table is a 'Body' section with a status bar showing 'Status: 400 Bad Request', 'Time: 216ms', 'Size: 1.52 KB', and a 'Save Response' button.

KEY	VALUE	DESCRIPTION
<input checked="" type="checkbox"/> _format	json	
<input checked="" type="checkbox"/> _pretty	true	
<input checked="" type="checkbox"/> _id	597509	
Key	Value	Description

2.4. Set parameters “Content_type” to “application/json+fhir” under “Headers” tab.

The screenshot shows the REST Client interface with the URL `http://hapi.fhir.org/baseR4/Patient?_format=json&_pretty=true&id=597509`. The **Headers** tab is selected, and the **Content-Type** header is set to `application/json+fhir`. The **Send** button is visible in the top right corner.

KEY	VALUE	DESCRIPTION
<input checked="" type="checkbox"/> Content-Type	application/json+fhir	
Key	Value	Description

Response

Hit Send to get a response

For you

[Learn how to monitor a collection](#) [Start](#)

2.5. Press “Send” button. If the returned information indicates the Status is “200 OK”, the GET action was successful.

The screenshot shows the REST Client interface after pressing the **Send** button. The **Status** is `200 OK`, **Time** is `170ms`, and **Size** is `2.17 KB`. The response body is displayed in JSON format.

```
1 {
2   "resourceType": "Bundle",
3   "id": "7c9ef9bd-a1a1-41bf-be5c-761c2b4bd509",
4   "meta": {
5     "lastUpdated": "2020-02-04T14:30:08.229+00:00"
6   },
7   "type": "searchset",
8   "total": 1,
9   "link": [
10    {
11      "relation": "self",
12      "url": "http://hapi.fhir.org/baseR4/Patient?_format=json&_id=597509&_pretty=true"
13    }
14  ],
15   "entry": [
16     {
17       "fullUrl": "http://hapi.fhir.org/baseR4/Patient/597509",
18       "resource": {
19         "resourceType": "Patient",
20         "id": "597509",
```


2.6. The acquired resource is shown below. Note that line 28 of the resource is too long to be fully demonstrated here.

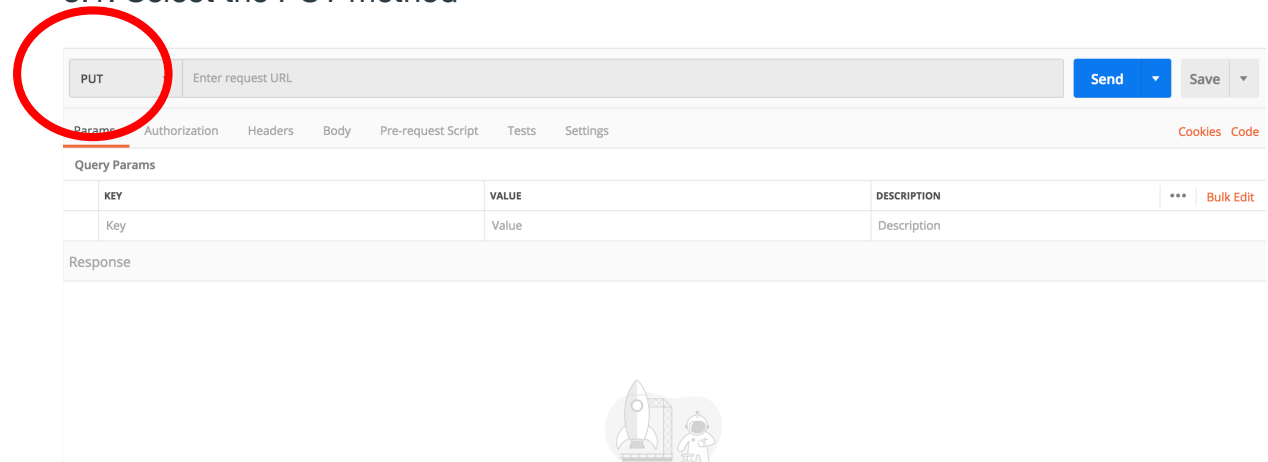
```

1  {
2    "resourceType": "Bundle",
3    "id": "7c9ef9bd-81a1-41bf-be5c-761c2b4bd509",
4    "meta": {
5      "lastUpdated": "2020-02-04T14:38:08.229+00:00"
6    },
7    "type": "searchset",
8    "total": 1,
9    "link": [
10     {
11       "relation": "self",
12       "url": "http://hapi.fhir.org/baseR4/Patient?format=json&id=597589&pretty=true"
13     }
14   ],
15   "entry": [
16     {
17       "fullUrl": "http://hapi.fhir.org/baseR4/Patient/597589",
18       "resource": {
19         "resourceType": "Patient",
20         "id": "597589",
21         "meta": {
22           "versionId": "1",
23           "lastUpdated": "2020-02-04T07:42:59.202+00:00",
24           "source": "#TVBSZ0pMUvswG8Z5"
25         },
26         "text": {
27           "status": "generated",
28           "div": "<div xmlns='http://www.w3.org/1999/xhtml'><div class='hapiHeaderText'>Smith <b>JOE </b></div><table class='hapiPropertyTable'><tbody><tr><td>Identifier</td><td>hxia40</td></tr><tr><td>Address</td><td><span>
29         },
30         "identifier": [
31           {
32             "value": "hxia40"
33           }
34         ],
35         "name": [
36           {
37             "family": "Joe",
38             "given": [
39               "Smith"
40             ]
41           }
42         ],
43         "telecom": [
44           {
45             "system": "phone",
46             "value": "1(234)567-8910",
47             "use": "mobile"
48           }
49         ],
50         "gender": "male",
51         "birthDate": "2002-02-20",
52         "address": [
53           {
54             "line": [
55               "8305 Knight Road"
56             ],
57             "city": "Houston",
58             "state": "Texas",
59             "country": "USA"
60           }
61         ],
62         "search": {
63           "mode": "match"
64         }
65       }
66     }
67   ]
68 }

```

- Using the Resource you retrieved in task 2, alter the line, city, state and telecom to different ones and send your edited resource for update to the server.

3.1. Select the PUT method



The screenshot shows a REST client interface. The 'PUT' method is selected and highlighted with a red circle. The 'Enter request URL' field is empty. The 'Send' button is visible. Below the method selection, there are tabs for 'Params', 'Authorization', 'Headers', 'Body', 'Pre-request Script', 'Tests', and 'Settings'. The 'Query Params' table is empty. The 'Response' section is also empty. At the bottom, there is a small illustration of a rocket and an astronaut.

3.2. Input HAPI FHIR address, which has been used in **Section 2.5**. Doing so will set parameters automatically under “Params” tab.

PUT ▼ http://hapi.fhir.org/baseR4/Patient?_format=json&_pretty=true&_id=597509 Send Save ▼

Params ● Authorization ● Headers (9) ● Body ● Pre-request Script ● Tests ● Settings ● Cookies ● Code

Query Params

KEY	VALUE	DESCRIPTION
<input checked="" type="checkbox"/> _format	json	
<input checked="" type="checkbox"/> _pretty	true	
<input checked="" type="checkbox"/> _id	597509	
	Value	Description

3.3. Set parameters “Content_type” to “application/json” under “Headers” tab.

PUT ▼ http://hapi.fhir.org/baseR4/Patient?_format=json&_pretty=true&_id=597509 Send Save ▼

Params ● Authorization ● Headers (9) ● Body ● Pre-request Script ● Tests ● Settings ● Cookies ● Code

Headers (1)

KEY	VALUE	DESCRIPTION
<input checked="" type="checkbox"/> Content-Type	application/json	
	Value	Description

Temporary Headers (8) ●

3.4. Input the resource code that I have created in task 2, alter the line, city, state and telecom to different ones.

PUT ▼ http://hapi.fhir.org/baseR4/Patient?_format=json&_pretty=true&_id=597509 Send Save ▼

Params ● Authorization ● Headers (9) ● Body ● Pre-request Script ● Tests ● Settings ● Cookies ● Code

Body

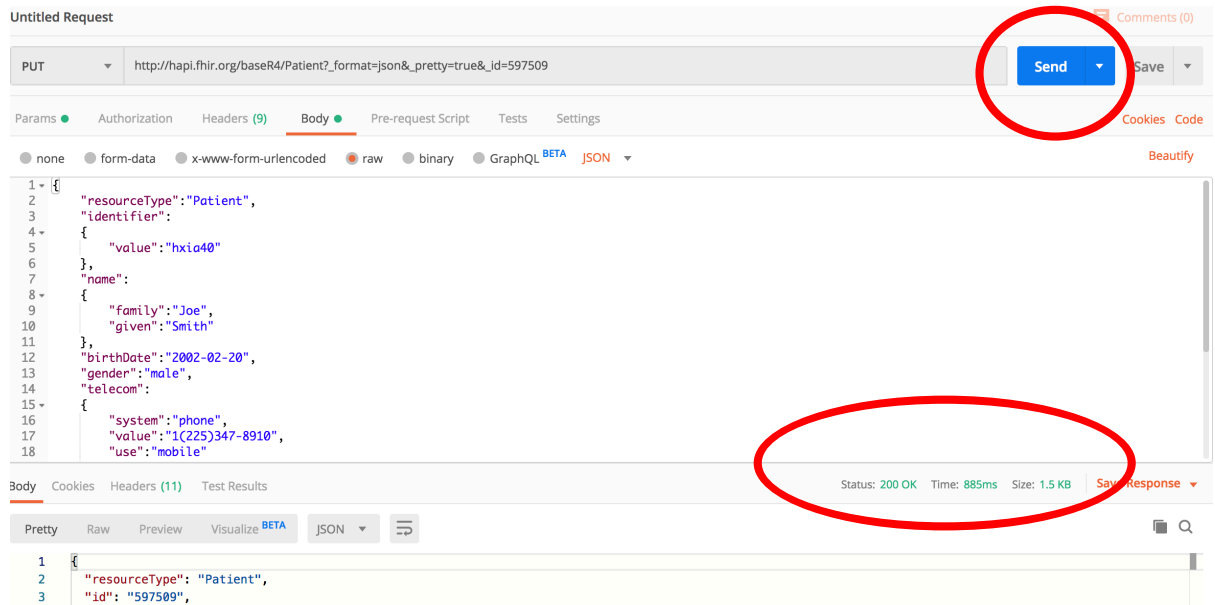
non-form-data x-www-form-urlencoded raw GraphQL BETA JSON ▼ Beautify

```

{
  "resourceType": "Patient",
  "identifier": {
    "value": "hxia40"
  },
  "name": {
    "family": "Joe",
    "given": "Smith"
  },
  "birthDate": "2002-02-20",
  "gender": "male",
  "telecom": {
    "system": "phone",
    "value": "1(225)347-8910",
    "use": "mobile"
  },
  "address": {
    "line": "3500 Goodwill Street",
    "city": "Ruston",
    "state": "Louisiana",
    "postcode": "71272",
    "country": "USA"
  }
}

```

3.5. Press “Send” button. If the returned information indicates the Status is “200 OK”, the PUT action was successful.



Untitled Request

PUT http://hapi.fhir.org/baseR4/Patient?_format=json&_pretty=true&_id=597509

Send Save

Params Authorization Headers (9) Body Pre-request Script Tests Settings Cookies Code

none form-data x-www-form-urlencoded raw binary GraphQL BETA JSON Beautify

```

1 {
2   "resourceType": "Patient",
3   "identifier":
4     {
5       "value": "hxia40"
6     },
7   "name":
8     {
9       "family": "Joe",
10      "given": "Smith"
11     },
12   "birthDate": "2002-02-20",
13   "gender": "male",
14   "telecom":
15     {
16       "system": "phone",
17       "value": "1(225)347-8910",
18       "use": "mobile"
19     }
20 }

```

Status: 200 OK Time: 885ms Size: 1.5 KB Save Response

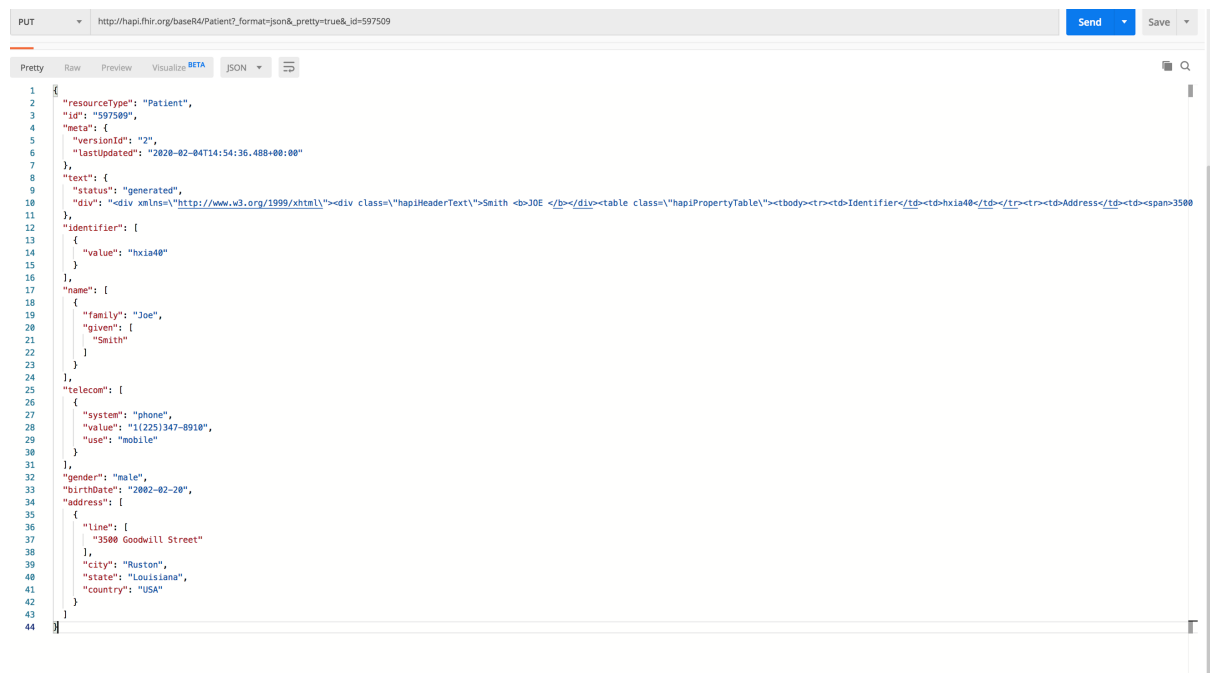
Pretty Raw Preview Visualize BETA JSON

```

1 {
2   "resourceType": "Patient",
3   "id": "597509",

```

3.6. The modified resource is shown below. Note that line 10 of the resource is too long to be fully demonstrated here.



PUT http://hapi.fhir.org/baseR4/Patient?_format=json&_pretty=true&_id=597509

Send Save

Pretty Raw Preview Visualize BETA JSON

```

1 {
2   "resourceType": "Patient",
3   "id": "597509",
4   "meta": {
5     "versionId": "2",
6     "lastUpdated": "2020-02-04T14:54:36.408+00:00"
7   },
8   "text": {
9     "status": "generated",
10    "div": "<div xmlns='http://www.w3.org/1999/xhtml'><div class='hapiHeaderText'>Smith <b>JOE </b></div><div class='hapiPropertyTable'><tbody><tr><td>Identifier</td><td>hxia40</td></tr><tr><td>Address</td><td>span=3500

```