

FHIR Interface To Link To Death Data

Team members:

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GitHub link:

<https://github.gatech.edu/gt-hit-fall2016/FHIR-Interface-to-Link-Death-Data>

Introduction

Our Application is a CLI program that gets the deceased provider records from DOHMPPI (Department of Health Master Person Index) Postgres SQL server for various user defined criteria's and updates the FHIR server.

Pre-requisite steps to run the Application

Make sure createPatient.py, DBAccessor.py, doh2fhir.py, and networkConstants.py are in the same folder. Open networkConstants.py in a text editor and make sure the fields for the PostgreSQL server and FHIR server are set. OAuth2 is not yet supported in the client.

Running the Application

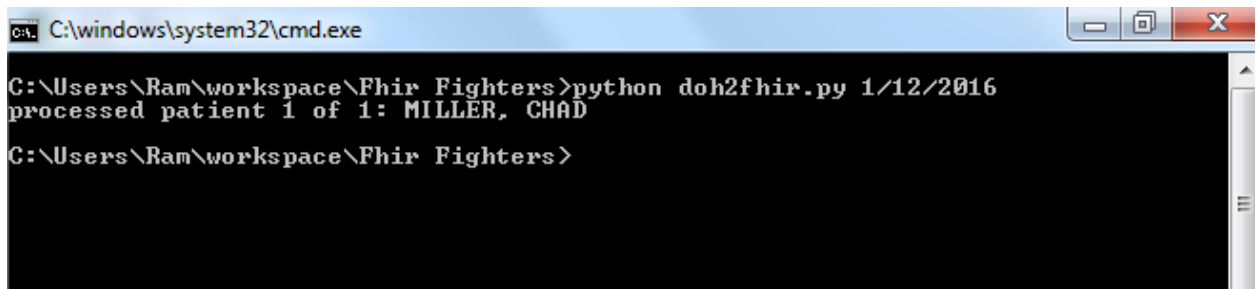
We are going to take Department of Health database and update the FHIR Server.

The screenshot displays a development environment with two main components. On the left, a code editor window titled 'Cloud9' shows several Python files: 'createPat.py', 'DBAccess.py', 'doh2fhir.py', and 'networkC.py'. The 'doh2fhir.py' file is open, showing a list of patient records with fields like date, time, and name. Below the code editor, a terminal window shows a bash prompt and the command 'nlistpottach:~/workspace (master) \$'. On the right, a web browser window displays the 'HAPI FHIR' server interface. The browser's address bar shows 'Server: UHN/HAPI Server (DSTU2 FHIR)'. The interface includes a sidebar with 'Options', 'Server', and 'Resources'. The 'Options' section shows 'Encoding' set to 'JSON' and 'Pretty' set to 'On'. The 'Server' section shows 'Server Home/Actions'. The 'Resources' section lists various FHIR resources with their counts: Observation (20273), Patient (15347), Practitioner (2593), Condition (1468), MedicationStatement (153), Organization (139), ValueSet (1239), Encounter (1538), MedicationOrder (793), QuestionnaireResponse (246), Medication (615), List (522), and Procedure (173). The main content area displays a warning message: 'This is not a production server! Do not store any information here that contains personal health information or any other confidential information. This server will be regularly purged and reloaded with fixed test data.' Below the warning, there are sections for 'Server Actions' and 'Server Home/Actions'.

1. Processes all providers for the indicated date.

python doh2fhir.py mm/dd/yyyy

For Example, typing python doh2fhir.py 01/12/2016 in the command prompt we get,

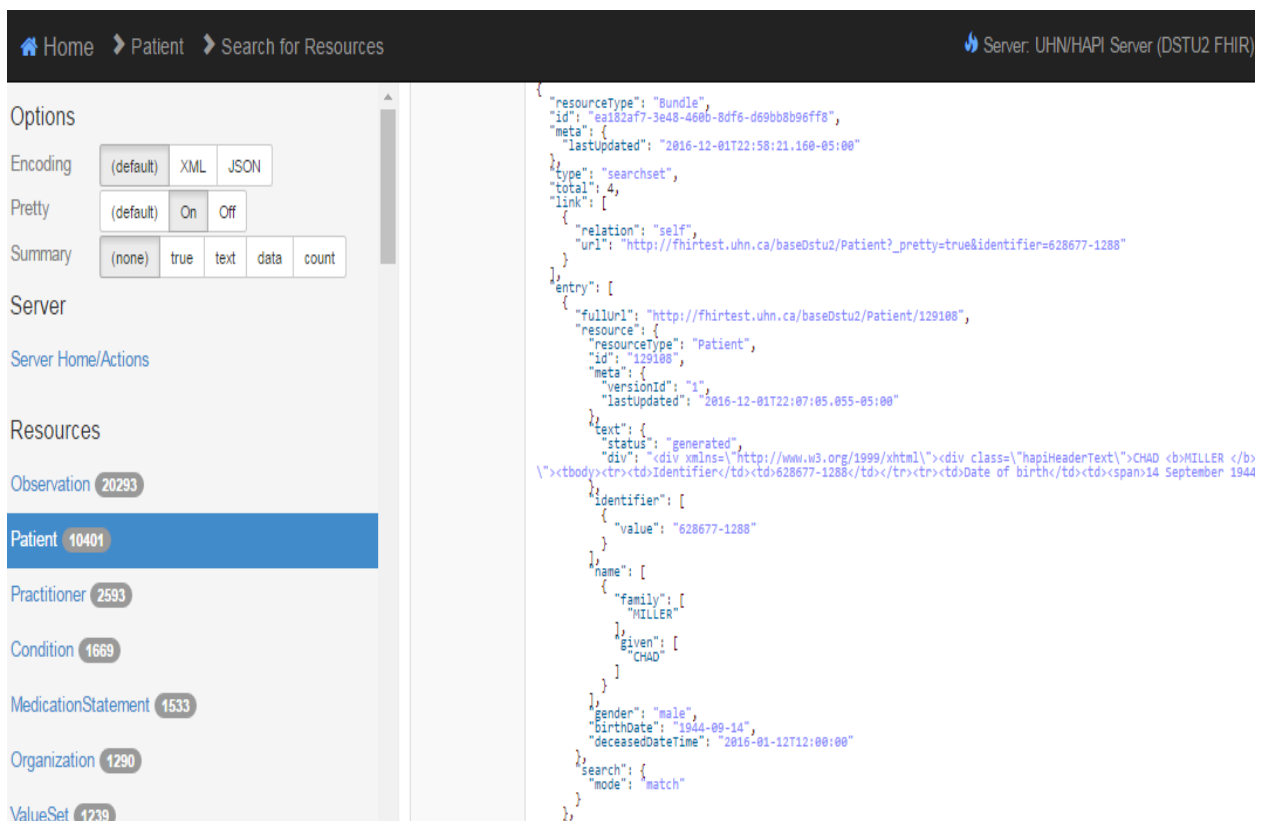


```
C:\windows\system32\cmd.exe

C:\Users\Ram\workspace\Fhir Fighters>python doh2fhir.py 1/12/2016
processed patient 1 of 1: MILLER, CHAD

C:\Users\Ram\workspace\Fhir Fighters>
```

In fhirserver, the record is added as below,



The screenshot shows the UHN/HAPI Server (DSTU2 FHIR) interface. On the left, there's a sidebar with navigation links: Home, Patient, and Search for Resources. Below these are sections for Options (Encoding: default, XML, JSON; Pretty: default, On, Off; Summary: (none), true, text, data, count), Server (Server Home/Actions), and Resources (Observation: 20293, Patient: 10401, Practitioner: 2593, Condition: 1669, MedicationStatement: 1533, Organization: 1290, ValueSet: 1239). The Patient resource is selected, showing a list of patients. The patient 'MILLER, CHAD' is highlighted. On the right, the JSON representation of the patient resource is displayed, showing details like id, meta, type, total, link, entry, and search mode.

```
{
  "resourceType": "Bundle",
  "id": "ca182af7-3e48-480b-8df6-d69bb8b9effa",
  "meta": {
    "lastUpdated": "2016-12-01T22:58:21.160-05:00"
  },
  "type": "searchset",
  "total": 4,
  "link": [
    {
      "relation": "self",
      "url": "http://fhirtest.uhn.ca/baseDstu2/Patient?pretty=true&identifier=628677-1288"
    }
  ],
  "entry": [
    {
      "fullUrl": "http://fhirtest.uhn.ca/baseDstu2/Patient/129108",
      "resource": {
        "resourceType": "Patient",
        "id": "129108",
        "meta": {
          "versionId": "1",
          "lastUpdated": "2016-12-01T22:07:05.055-05:00"
        },
        "text": {
          "status": "generated",
          "div": "<div xmlns='http://www.w3.org/1999/xhtml'><div class='hapiHeaderText'>CHAD <b>MILLER </b></div><tbody><tr><td>Identifier</td><td>628677-1288</td></tr><tr><td>Date of birth</td><td><span>14 September 1944</span></td></tr></tbody></div>"
        },
        "identifier": [
          {
            "value": "628677-1288"
          }
        ],
        "name": [
          {
            "family": [
              "MILLER"
            ],
            "given": [
              "CHAD"
            ]
          }
        ],
        "gender": "male",
        "birthDate": "1944-09-14",
        "deceasedDateTime": "2016-01-12T12:00:00"
      },
      "search": {
        "mode": "match"
      }
    }
  ]
}
```

2. Processes all providers for dates in the indicated range (from start date to end date).

python doh2fhir.py mm/dd/yyyy mm/dd/yyyy

For Example, typing python doh2fhir.py 09/2/2016 9/05/2016 we get,

```
nistapottaohs:~/workspace (master) $ python doh2fhir.py 9/2/2016 9/5/2016
processed patient 1 of 3: WIMMER, TAWNLETHIA
processed patient 2 of 3: TINEY, COBY JAMES
processed patient 3 of 3: JAMES, BRENT
nistapottaohs:~/workspace (master) $
```

On looking at the recently updated last three records in the FHIR Server we get,

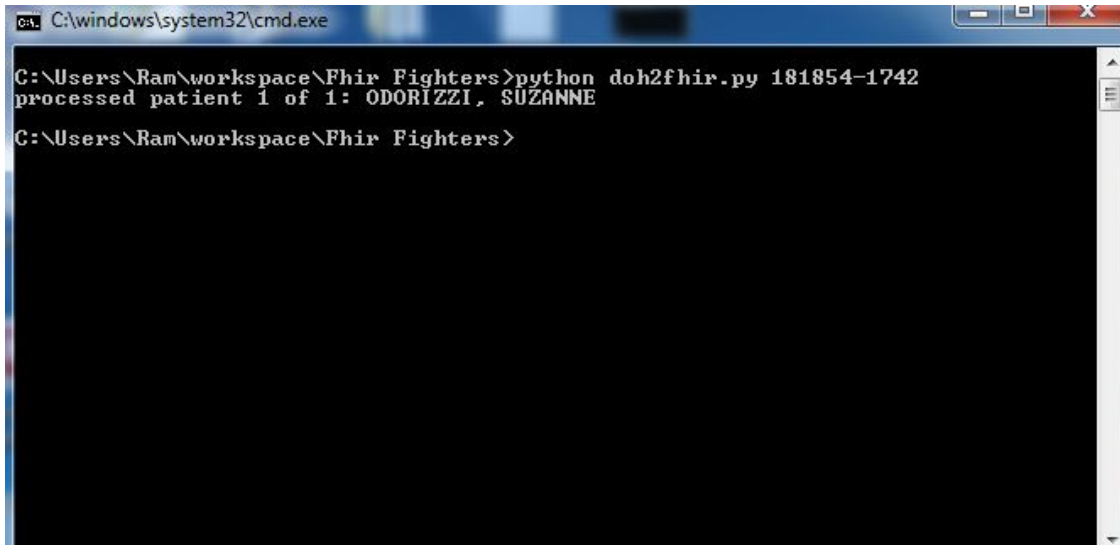
The image displays three side-by-side screenshots of a web browser showing FHIR patient records. Each screenshot shows a JSON response for a patient resource. The records are for Wimmer, Tawlethia; Tiney, Coby James; and James, Brent. The records are generated on 2016-12-01T12:11:03.980-05:00. The records are generated on 2016-09-02T12:00:00.

Record	Resource Type	ID	Version ID	Last Updated	Status	Identifier	Name	Gender	Birth Date	Deceased Date Time
1	Patient	129123	1	2016-12-01T12:11:03.980-05:00	generated	081423-3117	JAMES	male	1942-04-13	2016-09-02T12:00:00
2	Patient	129123	1	2016-12-01T12:11:03.980-05:00	generated	178869-1773	TAWNLETHIA	female	1948-07-05	2016-09-02T12:00:00
3	Patient	129123	1	2016-12-01T12:11:03.980-05:00	generated	284738-1889	TINEY	male	1942-04-08	2016-09-02T12:00:00

3. Process the provider with the indicated provider number.

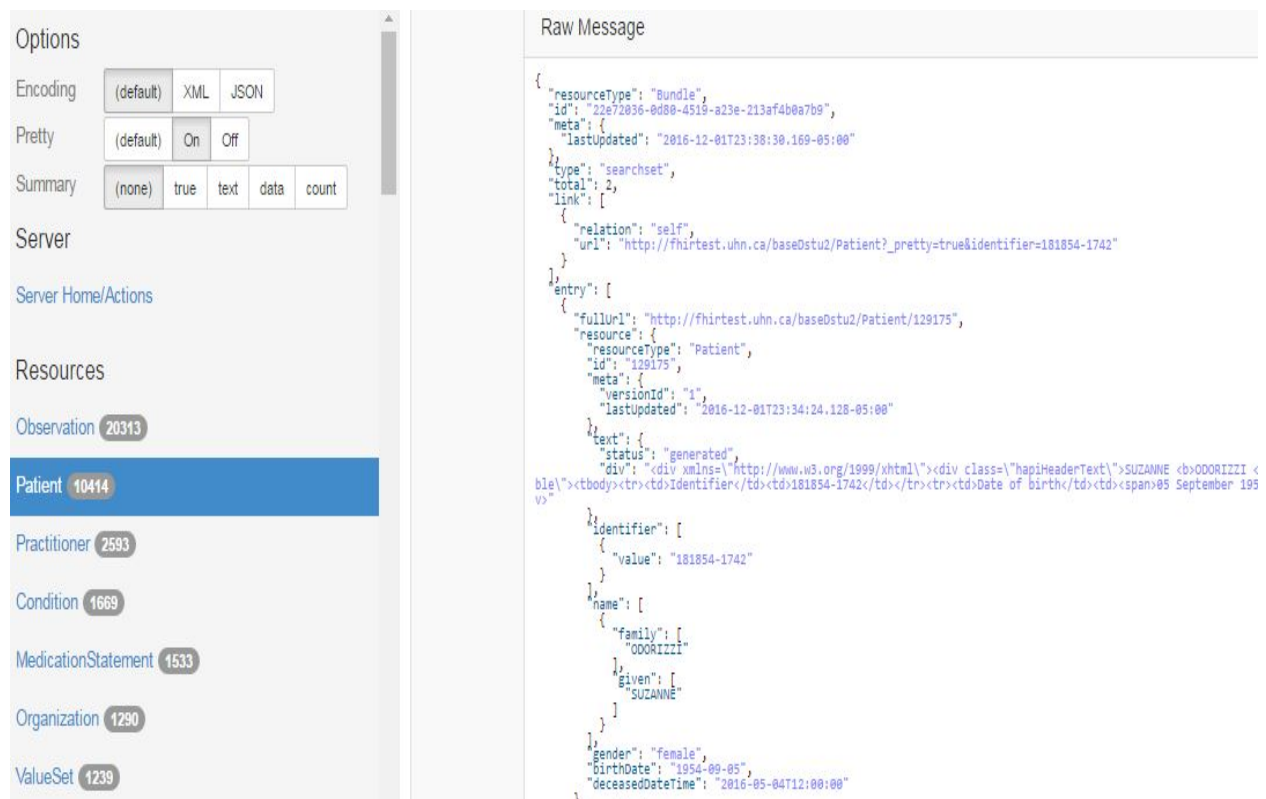
python doh2fhir.py providernumber

For Example python doh2fhir.py 181854-1742 we get,



```
C:\windows\system32\cmd.exe
C:\Users\Ram\workspace\Fhir Fighters>python doh2fhir.py 181854-1742
processed patient 1 of 1: ODORIZZI, SUZANNE
C:\Users\Ram\workspace\Fhir Fighters>
```

In fhirserver, the record is added as below,

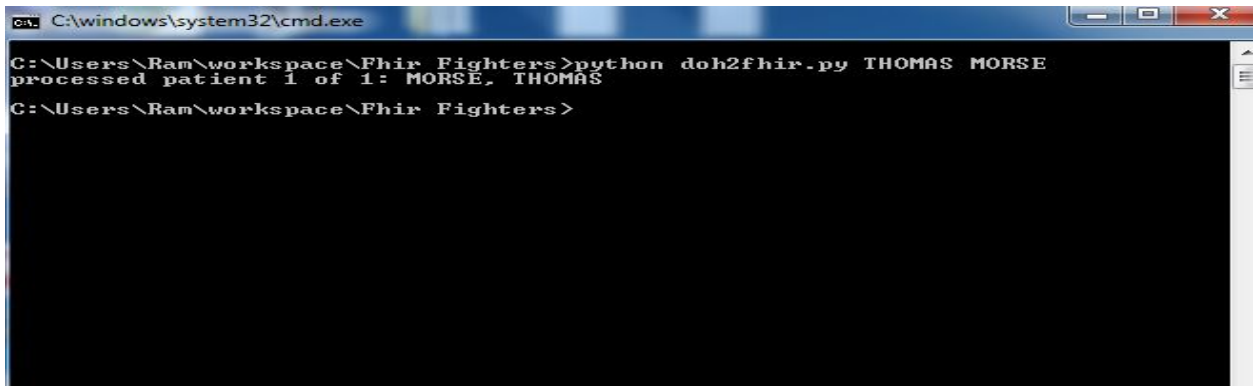


The screenshot shows the FHIR Server interface. On the left, the 'Options' panel is visible with settings for Encoding (default), Pretty (On), and Summary (none). The 'Server' section shows 'Server Home/Actions'. The 'Resources' section lists various resource types with counts: Observation (20313), Patient (10414), Practitioner (2593), Condition (1669), MedicationStatement (1533), Organization (1290), and ValueSet (1239). The 'Patient' resource is selected, showing details for Patient 10414. On the right, the 'Raw Message' panel displays the JSON representation of the patient resource, including fields like 'resourceType', 'id', 'meta', 'type', 'total', 'link', 'entry', 'fullUrl', 'resource', 'meta', 'text', 'status', 'div', 'identifier', 'name', 'gender', 'birthDate', and 'deceasedDateTime'.

4. Processes the provider with the indicated first and last name.

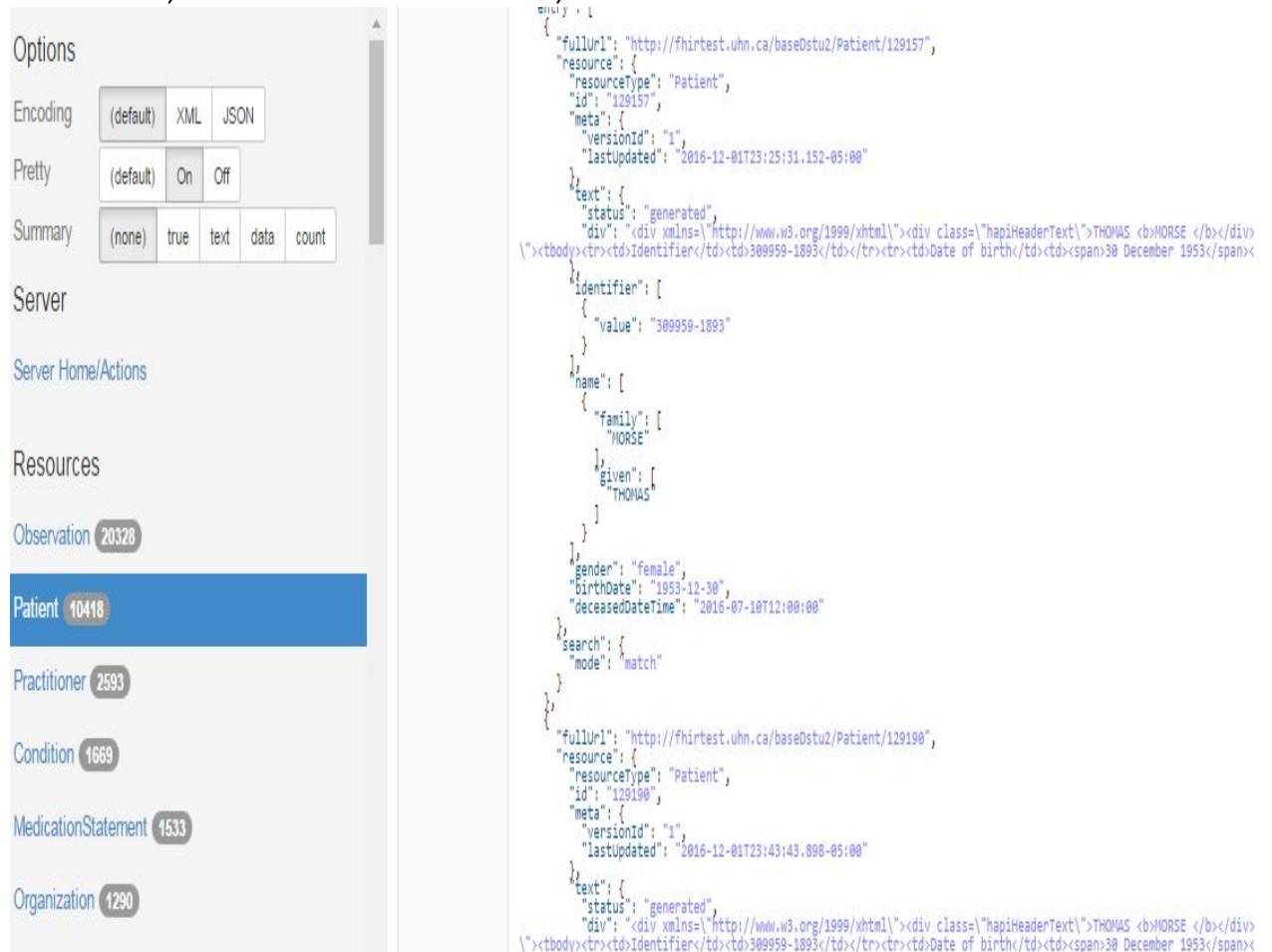
python doh2fhir.py fname lname

For Example, typing python doh2fhir.py THOMAS MORSE we get



```
C:\Users\Ram\workspace\Fhir Fighters>python doh2fhir.py THOMAS MORSE
processed patient 1 of 1: MORSE, THOMAS
C:\Users\Ram\workspace\Fhir Fighters>
```

In fhirserver, the record is added as below,



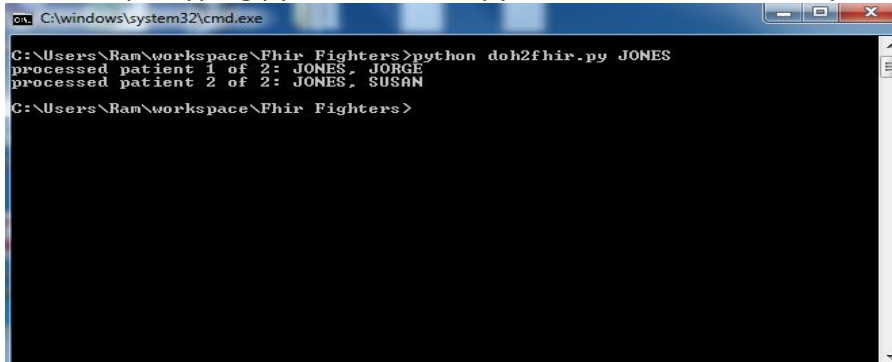
The screenshot shows the FHIR Server interface. On the left, the 'Options' tab is selected, showing settings for Encoding (default), Pretty (default), and Summary (none). The 'Server' section shows 'Server Home/Actions'. The 'Resources' section shows a list of resources: Observation (20328), Patient (10418), Practitioner (2593), Condition (1669), MedicationStatement (1533), and Organization (1290). The 'Patient' resource is highlighted. On the right, the JSON representation of the patient record is displayed. The record is for 'MORSE, THOMAS' with ID '129157' and is a 'Patient' resource. The JSON includes fields for 'fullUrl', 'resourceType', 'id', 'meta', 'text', 'gender', 'birthDate', 'deceasedDateTime', and 'search'.

```
{
  "fullUrl": "http://fhirtest.uhn.ca/baseDstu2/Patient/129157",
  "resource": {
    "resourceType": "Patient",
    "id": "129157",
    "meta": {
      "versionId": "1",
      "lastUpdated": "2016-12-01T23:25:31.152-05:00"
    },
    "text": {
      "status": "generated",
      "div": "<div xmlns='http://www.w3.org/1999/xhtml'><div class='hapiHeaderText'>THOMAS <b>MORSE </b></div>\\><tbody><tr><td>Identifier</td><td>309959-1893</td></tr><tr><td>Date of birth</td><td><span>30 December 1953</span></td></tr></tbody></div>"
    },
    "gender": "female",
    "birthDate": "1953-12-30",
    "deceasedDateTime": "2016-07-10T12:00:00"
  },
  "search": {
    "mode": "match"
  }
}
```


5. Processes all providers with the indicated last name.

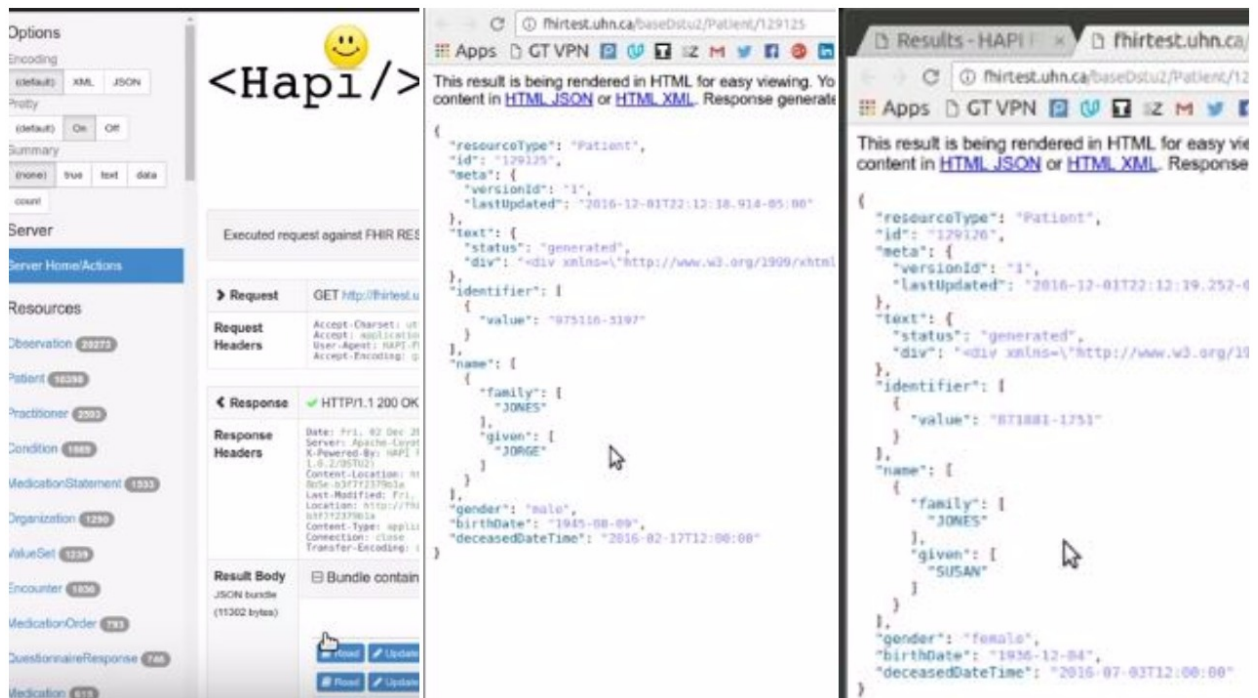
python doh2fhir.py lname

For example typing python doh2fhir.py JONES in the command prompt we get,



```
C:\Users\Ram\workspace\Fhir_Fighters>python doh2fhir.py JONES
processed patient 1 of 2: JONES, JORGE
processed patient 2 of 2: JONES, SUSAN
C:\Users\Ram\workspace\Fhir_Fighters>
```

On looking at the recently updated last two records in the Fhirserver we get,



The first screenshot shows the 'Options' tab of the FHIR server interface. The 'Encoding' section has 'JSON' selected. The 'Summary' section has 'text' selected. The 'Server' section shows 'Server Home/Actions'. The 'Resources' section lists various resources with counts: Observation (20275), Patient (10238), Practitioner (2092), Condition (1889), MedicationStatement (1533), Organization (1290), ValueSet (1238), Encounter (1856), MedicationOrder (793), QuestionnaireResponse (746), and Medication (615).

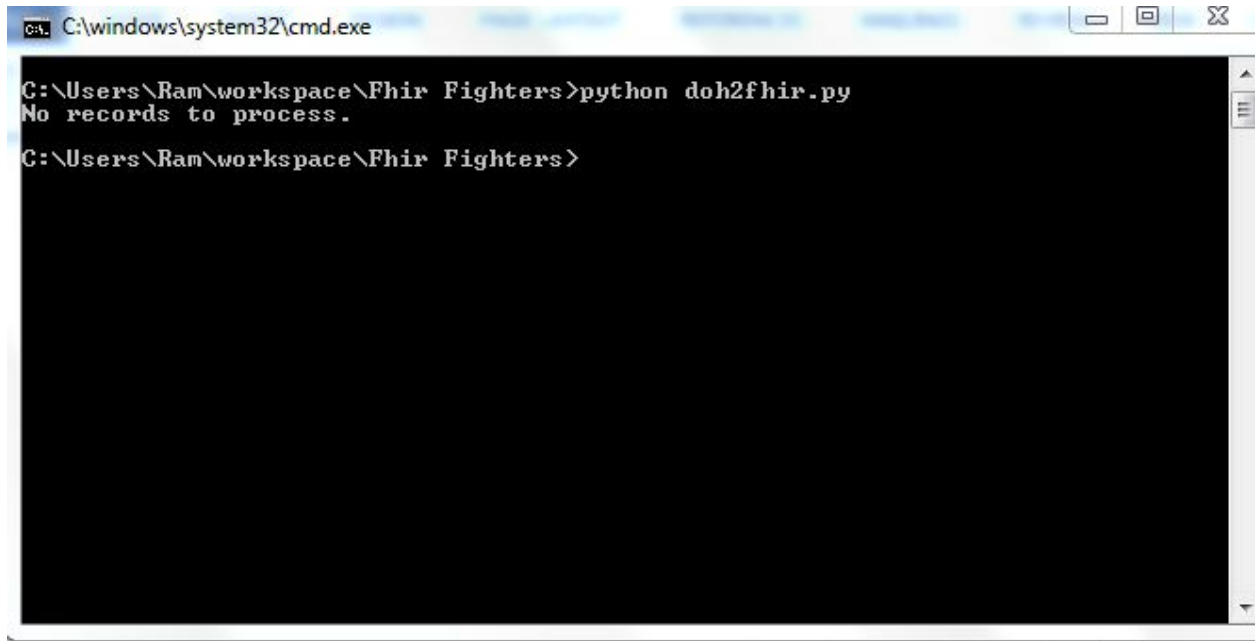
The second screenshot shows the 'Request' and 'Response' details for a GET request to /Patient/129125. The 'Request' section shows 'GET http://fhirtest.uhn.ca/Patient/129125'. The 'Response' section shows 'HTTP/1.1 200 OK'. The 'Result Body' section shows a JSON bundle containing two patients.

The third screenshot shows the 'Results - HAPI' tab displaying the JSON response for the patient. The response is a JSON bundle containing two patients: JONES, JORGE and JONES, SUSAN.

6. Processes all providers for the current date.

python doh2fhir.py

For Example typing python doh2fhir.py in the command prompt we get,

A screenshot of a Windows command prompt window. The title bar at the top reads "C:\windows\system32\cmd.exe". The command prompt shows the following text: "C:\Users\Ram\workspace\Fhir Fighters>python doh2fhir.py", followed by the output "No records to process.", and then the prompt "C:\Users\Ram\workspace\Fhir Fighters>". The background of the command prompt is black, and the text is white. The window has standard Windows window controls (minimize, maximize, close) in the top right corner.

```
C:\windows\system32\cmd.exe
C:\Users\Ram\workspace\Fhir Fighters>python doh2fhir.py
No records to process.
C:\Users\Ram\workspace\Fhir Fighters>
```

(Since there are no providers for the current date it shows “No Records to process”)