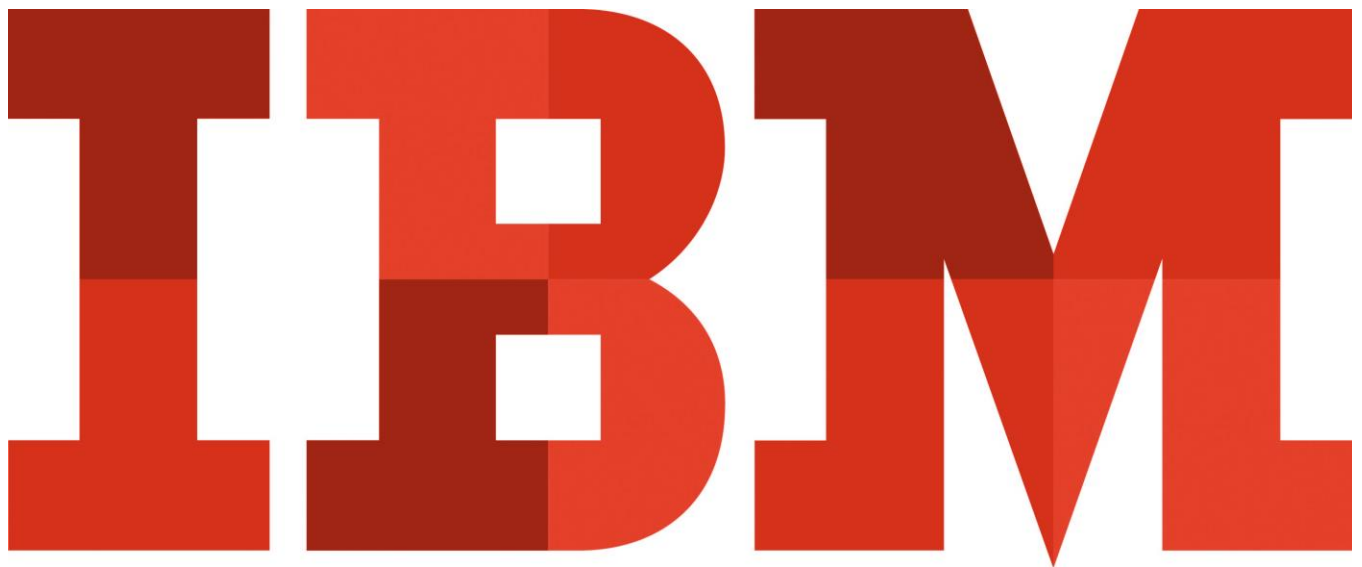


# Python, Watson and IBM Bluemix

A guide for hackathons

Lennart Frantzell [alf@us.ibm.com](mailto:alf@us.ibm.com)

Version 4. 2/5/2017



A digital copy of this lab and code snippets can be found at:

[<<TODO>>](http://ibm.biz/)

## Quick Introduction

---

When I attend Hackathons I am often asked if the IBM Bluemix cloud supports Python and how you can combine Python with Watson and other services on the IBM Bluemix cloud. This little guide aims to provide a brief introduction to Python on Bluemix and show how you can use the Watson Personality Insights cognitive service with Python  
<https://www.ibm.com/watson/developercloud/personality-insights.html>. Enjoy.



# Getting started

1. To work with Python on Bluemix, let's begin by signing up to a 30 day free Bluemix account at <http://bluemix.net>

IBM Bluemix

Sign up for an IBMid and create your Bluemix account  
**Try Bluemix free for 30 days**

**Start building immediately.**  
Your trial doesn't require a credit card. All you need to do is sign up and start building.

**Production app? No problem.**  
We give you 2GB of runtime and container memory free for 30 days, plus access to provision up to 10 services.

**We're here to help.**  
Your trial comes with free help desk support. Ask us anything along the way.

Already have a Bluemix account? [Log in](#)

Email\* Enter an email address.

First Name\*

Last Name\*

Company

Once we have signed up to Bluemix we need to take the following preparatory steps:

1. Download the **Git command** for our operating system: <https://git-scm.com/downloads>. We will use Git to pull the Watson code from the GitHub repository where it is hosted down to our laptop.
2. Download the **Cloudfoundry Command Line Interface (CLI)** for our operating system: <https://github.com/cloudfoundry/cli/releases>. We will use the Cloudfoundry cf command to communicate with Bluemix from the command line on our laptops.
3. Download the Watson Developer Cloud Python SDK <https://github.com/watson-developer-cloud/python-sdk> with this command: **pip install --upgrade watson-developer-cloud**. It has been tested on Python from 2.7 to 3.6. This SDK allows us to write Python apps that connect to many of the Watson Cognitive Services
4. And if you don't have Python installed you can do so from this website: <https://www.python.org/downloads/>

Now we are ready to begin and we will find **Python** <https://console.ng.bluemix.net/catalog/starters/python/> and **Python Flask** <https://console.ng.bluemix.net/catalog/starters/python-flask/> listed in the Bluemix catalog.

We will only familiarize ourselves with these two build packs at this moment but not yet launch them.

Later, when we are ready to launch them, we just have to click on the **create button** to get them running in the Bluemix cloud

View all

Create a Cloud Foundry App

Python

Develop, deploy, and scale Python web apps with ease.

Community

View Docs

VERSION 1.5.5  
TYPE Application  
REGION US South

App name:  
Enter a unique name

Host name:  
Enter a unique name

Domain:  
mybluemix.net

Pricing Plans

Monthly prices shown are for country or region: [United States](#)

PLAN	FEATURES	PRICING
Default	Run one or more apps free for 30 days (270 GB-hours free, shared across Bring Your Buildpack and Community runtimes).	\$0.07 USD/GB-Hour

This is a service plan for the IBM Bluemix Platform runtime.

[Terms](#)

Need Help?  
[Contact Bluemix Sales](#)

Estimate Monthly Cost  
[Cost Calculator](#)

\$0.07 USD/GB-Hour [Create](#)

<https://console.ng.bluemix.net/catalog/starters/python/?taxonomyNavigation=apps>

View all

## Create a Cloud Foundry App

---

**Python Flask**

A simple Python Flask application that will get you up and running quickly.

Community

[View Docs](#)

VERSION	0.0
TYPE	Boilerplate
REGION	US South

App name:


Host name:

Domain:

Selected Plan:

Python

**Default**

 Python

[Need Help? Contact Bluemix Sales](#) [Estimate Monthly Cost Cost Calculator](#) [Create](#)

<https://console.ng.bluemix.net/catalog/starters/python-flask/?taxonomyNavigation=apps>

More information on Python on Bluemix can be found on this link:

[https://console.ng.bluemix.net/docs/runtimes/python/index.html#python\\_runtime](https://console.ng.bluemix.net/docs/runtimes/python/index.html#python_runtime)

To use the Watson services with Python we will use the Watson Service APIs, most of which come with Python support:

- **Alchemy Language:** <https://www.ibm.com/watson/developercloud/alchemy-language/api/v1/>
- **Conversation:** <https://www.ibm.com/watson/developercloud/conversation/api/v1/>
- **Document Conversion:** <https://www.ibm.com/watson/developercloud/document-conversion/api/v1/>
- **Language Translator:** <https://www.ibm.com/watson/developercloud/language-translator/api/v2/>
- **Natural Language Classifier:** <https://www.ibm.com/watson/developercloud/natural-language-classifier/api/v1/>
- **Personality Insights:** <https://www.ibm.com/watson/developercloud/personality-insights/api/v3/>
- **Retrieve and Rank:** No Python API support
- **Tone Analyzer:** <https://www.ibm.com/watson/developercloud/tone-analyzer/api/v3/>
- **Speech to Text,** no Python API Support
- **Text to Speech:** no Python API Support
- **Project Into:** no Python API Support
- **Visual Recognition:** <https://www.ibm.com/watson/developercloud/visual-recognition/api/v3/>
- **Alchemy Data News:** <https://www.ibm.com/watson/developercloud/alchemydata-news/api/v1/>
- **Discovery Service:** <https://www.ibm.com/watson/developercloud/discovery/api/v1/>
- **Tradeoff Analytics:** <https://www.ibm.com/watson/developercloud/tradeoff-analytics/api/v1/>

A list of Python sample code with Watson Services can be found at this link: <https://github.com/watson-developer-cloud/python-sdk/tree/master/examples>

## Let's download the Watson Personality Insights starter application repo from GitHub

We are now ready to get to work.

The Watson Personality Insights service <https://www.ibm.com/watson/developercloud/personality-insights.html> is one of the most popular Watson cognitive services at hackathons and beyond.

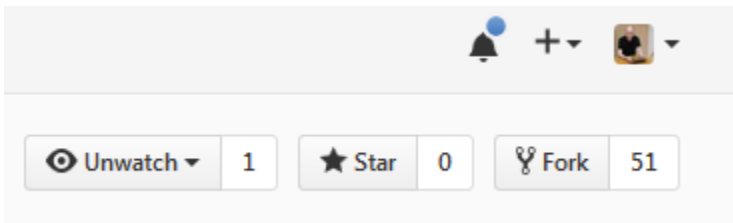
A **Personality Insights Python Starter Application** can be found on <https://github.com/watson-developer-cloud/personality-insights->

Mobile and IBM Bluemix for Hackathons

python. This is client code that allows us to write Python apps that communicate the the Watson Persoanlity Insights service running on Bluemix.

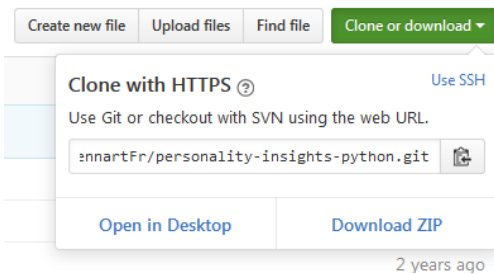
And Please Note that the Personality Insights Python Starter Application calls the Watson Developer Cloud Python SDK that we did a pip install on earlier in this workshop.

We will start by doing a git fork of the original **Personality Insights Python Starter Application** GitHub repository to our own GitHub repository. You do that in the GitHub UI in the personalityinsights-python repo by clicking on the **Fork** button as shown below:



This will create a copy of the official repo in your own GitHub directory.

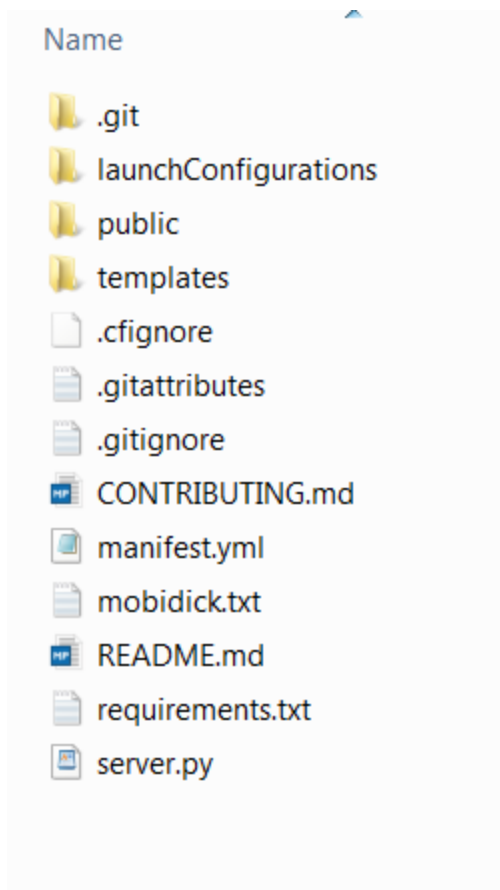
You can then do a git clone of the forked repository to your own drive on your laptop by first clicking on the green “Clode of download” button as shown below. This will show the new url to your repo in your own directory. Make certain that the URL points to your own GitHub directory.



Then, from the console window on your own laptop, issue the git clone command to copy down your own version of the repo. In this case I am copying down my own copy of the repo. Your copy will obviously look different.

**git clone https://github.com/LennartFr/personality-insights-python.git** to download the code from your forked repo.

And the result will be the following files and directories:



Now let's look at some of the key files in our project. The first one is the **manifest.yml** file.

```
---
declared-services:
  personality-insights-service:
    label: personality_insights
    plan: tiered

applications:
- name: personality-insights-python
  command: python server.py
  path: .
  memory: 256M
  services:
  - personality-insights-service
```

The **manifest.yml** file contains the meta information needed by Bluemix to configure and launch our app. For more on this file see: <https://docs.cloudfoundry.org/devguide/deploy-apps/manifest.html>. YAML <http://yaml.org/> is a human-readable data serialization language, commonly used for configuration files.

The most important entries in this file is the declared service which is **personality-insights-service**. Another is the application name, which is **personality-insights-python**. And the amount of memory which is 256M.

We will soon do a **cf push** command to Bluemix to create the application that is currently named as **personality-insights-python** in the YAML file. But first we need to change the name in the YAML file to something unique.

Also, when we do the push command we will create the app in Bluemix. But we will not create the **personality-insights-service** during the push. To create the personality-insights-service we run the following cf command from the command line. Let's do so now:

Mobile and IBM Bluemix for Hackathons

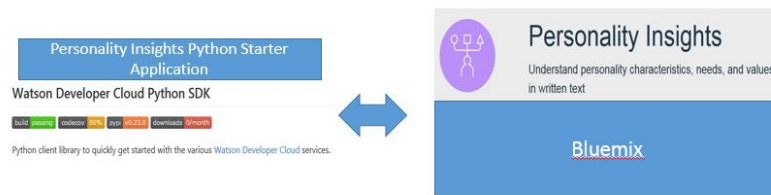
**Attention:** The plan `tiered` of service `personality\_insights` is not free. The instance `personality\_insights\_service1` will incur a cost. Contact your administrator if you think this is in error.

And please notice that generic type name of the service is **personality\_insights** and the name of our instance of the service is **personality\_insights\_service**

personality-insights-service	personality_insights	tiered	personality-insights-python	update succeeded
------------------------------	----------------------	--------	-----------------------------	------------------

**cherrypy**  
**mako**  
**requests**

1. We have installed the Personality Insights cognitive service in Bluemix
2. We have done a pip install of the Watson Developer Cloud Python SDK
3. We have downloaded the Personality Insights Python Starter Application



## Let's push the app to Bluemix


Showing health and status for app personality-insights-python in org alf@us.ibm.com / space dev as alf@us.ibm.com...

requested state: started  
instances: 1/1  
usage: 256M x 1 instances  
urls: personality-insights-python.mybluemix.net  
last uploaded: Fri Feb 3 17:13:51 UTC 2017  
stack: cflinuxfs2  
buildpack: python 1.5.5

	state	since	cpu	memory	disk	details
#0	running	2017-02-03 09:15:52 AM	0.0%	23.6M of 256M	119.1M of 1G	

The app is now running on Bluemix. If we go to the URL shown above we will see it: <http://personality-insights-python.mybluemix.net>

[Learn more about this service](#)[Watson Community](#)[Contact Us](#)[Fork](#)



### Personality Insights Python Starter Application

The Watson Personality Insights service uses linguistic analytics to extract a spectrum of cognitive and social characteristics from the text data that a person generates through text messages, tweets, posts, and more.

[Keep Exploring:](#)  
[Documentation](#)  
[API Details](#)

#### Try the service

Mr. Vice President, my old colleague from Massachusetts and your new Speaker, John McCormack, Members of the 87th Congress, ladies and gentlemen:

This week we begin anew our joint and separate efforts to build the American future. But, sadly, we build without a man who linked a long past with the present and looked strongly to the future. "Mister Sam" Rayburn is gone. Neither this House nor the Nation is the same without him.

6437 words

ClearAnalyze

#### Your Personality\*

You are shrewd, somewhat critical and particular.

You are self-controlled: you have control over your desires, which are not particularly intense. You are mild-tempered: it takes a lot to get you angry. And you are assertive: you tend to speak up and take charge of situations, and you are comfortable leading groups.

More than most people, your choices are driven by a desire for organization.

You are relatively unconcerned with both taking pleasure in life and achieving success. You prefer activities with a purpose greater than just personal enjoyment. And you make decisions with little regard for how they show off your talents.

\*Compared to most people who participated in our surveys.

## And now let's run the app on our laptop

### Important note:

In order to run our app locally on our laptop we need to configure the app to recognize the credentials from the service running on Bluemix that we just created. To get those credentials we do a **cf env** command for our app on our laptop like this: **cf env personality-insights-python**.

```
System-Provided:
{
  "VCAP_SERVICES": {
    "personality_insights": [
      {
        "credentials": {
          "password": "kClpmximxxxx",
          "url": "https://gateway.watsonplatform.net/personality-insights/api",
          "username": "971b73b4-abaa-4429-9c76-ec803f93xxxx"
        },
        "label": "personality_insights",
        "name": "personality-insights-service",
        "plan": "tiered",
        "provider": null,
        "syslog_drain_url": null,
        "tags": [
          "watson",
```

```

    "ibm_created",
    "ibm_dedicated_public"
  ]
}
]
}
}
}

```

We need to insert the **userid**, **password** and **url** from the VCAP Services into the **server.py** file on our laptop as shown below:

```

class PersonalityInsightsService:
    """Wrapper on the Personality Insights service"""

    def __init__(self, vcapServices):
        """
        Construct an instance. Fetches service parameters from VCAP_SERVICES
        runtime variable for Bluemix, or it defaults to local URLs.
        """

        # Local variables

```

```

        self.url = "https://gateway.watsonplatform.net/personality-insights/api"
        self.username = "6da14925-e64a-447b-a3cb-a2e3e4d6xxxx"
        self.password = "03WsTqyvxxxx"

```

We are now ready to run our Python app on our local laptop drive by doing: **python server.py**

When we do so we may be asked to install cherrypy and mako, in case we don't already have them installed. Which we do with pip <https://pypi.python.org/pypi/pip>, Python's install manager.

```

E:\Mina Projekt\testgitclone\gitclone\personality-insights-python1\personality-insights-python>python server.py
Listening on 127.0.0.1:3000
[03/Feb/2017:10:06:09] ENGINE Listening for SIGTERM.
[03/Feb/2017:10:06:09] ENGINE Bus STARTING
[03/Feb/2017:10:06:09] ENGINE Set handler for console events.
[03/Feb/2017:10:06:09] ENGINE Started monitor thread 'Autoreloader'.
[03/Feb/2017:10:06:09] ENGINE Started monitor thread '_TimeoutMonitor'.
[03/Feb/2017:10:06:10] ENGINE Serving on http://127.0.0.1:3000
[03/Feb/2017:10:06:10] ENGINE Bus STARTED

```

We are now up and running on our laptop on IP address

You should now see the same GUI as when the app is running in Bluemix. And we can analyze personalities just as we can when our app is running on Bluemix.



[Learn more about this service](#)
[Watson Community](#)
[Contact Us](#)
[Fork](#)



## Personality Insights Python Starter Application

The Watson Personality Insights service uses linguistic analytics to extract a spectrum of cognitive and social characteristics from the text data that a person generates through text messages, tweets, posts, and more.

### Keep Exploring:

[Documentation](#)  
[API Details](#)

## Try the service

Mr. Vice President, my old colleague from Massachusetts and your new Speaker, John McCormack, Members of the 87th Congress, ladies and gentlemen:

This week we begin anew our joint and separate efforts to build the American future. But, sadly, we build without a man who linked a long past with the present and looked strongly to the future. "Mister Sam" Rayburn is gone. Neither this House nor the Nation is the same without him.

6437 words

## Your Personality\*

You are shrewd, somewhat critical and particular.

You are self-controlled: you have control over your desires, which are not particularly intense. You are mild-tempered: it takes a lot to get you angry. And you are assertive: you tend to speak up and take charge of situations, and you are comfortable leading groups.

More than most people, your choices are driven by a desire for organization.

You are relatively unconcerned with both taking pleasure in life and achieving success. You prefer activities with a purpose greater than just personal enjoyment. And you make decisions with little regard for how they show off your talents.

\*Compared to most people who participated in our surveys.

We can now begin to modify the app on our laptop and create a new version that we push up to Bluemix. Please note that when we run the app locally on our laptop we still connect to the Watson Personal Insights service running on Bluemix.

# Let's now strip the app down to the bare minimum

And please note that if we want we can create a Python app on our laptop that does not run at all on Bluemix, but only connects to the Watson cognitive service running on Bluemix. Let's do so now.

Let's strip our app down to bare essentials. The version below should run on your laptop without problem. Please notice how it connects to the Watson Service on Bluemix.

```
import os
import json
from jinja2 import Template
import requests
from flask import Flask, render_template, request, url_for

url = "https://gateway.watsonplatform.net/personality-insights/api"
username = "6da14925-e64a-447b-a3cb-a2e3e4d6xxxx"
password = "03WsTqvxxxxx"

text=("From the moment that the French defenses at Sedan and on the Meuse were broken at the end of the second week of May,"
      " only a rapid retreat to Amiens and the south could have saved the British and French Armies who had entered Belgium"
      " at the appeal of the Belgian King; but this strategic fact was not immediately realized."
      " The French High Command hoped they would be able to close the gap, and the Armies of the north were under their
orders."
      " Moreover, a retirement of this kind would have involved almost certainly the destruction of the fine Belgian Army of
over"
      " 20 divisions and the abandonment of the whole of Belgium. Therefore, when the force and scope of the German
penetration were"
      " realized and when a new French Generalissimo, General Weygand, assumed command in place of General Gamelin, an
```

effort was made"

" by the French and British Armies in Belgium to keep on holding the right hand of the Belgians and to give their own right hand"

" to a newly created French Army which was to have advanced across the Somme in great strength to grasp it.")

```
response = requests.post(url + "/v2/profile",
    auth=(username, password),
    headers = {"content-type": "text/plain"},
    data=text
)
```

try:

```
    print (json.loads(response.text))
except:
    raise Exception("Error processing the request, HTTP: %d" % response.status_code)
```

Invoking this stripped app on our laptop gives us this output:

```
E:\test\personality-insights-python>python laptopapp.py
{'tree': {'id': 'r', 'name': 'root', 'children': [{'id': 'personality', 'name': 'Big 5', 'children': [{'category': 'personality', 'id': 'Openness_parent', 'name': 'Openness', 'children': [{'name': 'Openness', 'children': [{'category': 'personality', 'id': 'Adventurousness', 'name': 'Adventurousness', 'sampling_error': 0.0539097484, 'percentage': 0.4757172877125303}, {'category': 'personality', 'id': 'Artistic interests', 'name': 'Artistic interests', 'sampling_error': 0.1097414144, 'percentage': 0.9679908476392554}, {'category': 'personality', 'id': 'Emotionality', 'name': 'Emotionality', 'sampling_error': 0.050441622400000004, 'percentage': 0.5872606987877054}, {'category': 'personality', 'id': 'Imagination', 'name': 'Imagination', 'sampling_error': 0.0680641844, 'percentage': 0.7304094200245063}, {'category': 'personality', 'id': 'Intellect', 'name': 'Intellect', 'sampling_error': 0.097492336, 'percentage': 0.9985641463714839}, {'category': 'personality', 'id': 'Liberalism', 'name': 'Authority-challenging', 'sampling_error': 0.08779632679999999, 'percentage': 0.9987290906532491}], 'category': 'personality', 'id': 'Openness', 'sampling_error': 0.0645750316, 'percentage': 0.998798993975366}, {'name': 'Conscientiousness', 'children': [{'category': 'personality', 'id': 'Achievement striving', 'name': 'Achievement striving', 'sampling_error': 0.1038650008, 'percentage': 0.7778965474353808}, {'category': 'personality', 'id': 'Cautiousness', 'name': 'Cautiousness', 'sampling_error': 0.0961618044, 'percentage': 0.8971738462214329}, {'category': 'personality', 'id': 'Dutifulness', 'name': 'Dutifulness', 'sampling_error': 0.064850272, 'percentage': 0.7591579992991817}, {'category': 'personality', 'id': 'Orderliness', 'name': 'Orderliness', 'sampling_error': 0.0739024068, 'percentage': 0.14120868450178892}, {'category': 'personality', 'id': 'Self-discipline', 'name': 'Self-discipline', 'sampling_error': 0.0494612016, 'percentage': 0.10539466496402566}, {'category': 'personality', 'id': 'Self-efficacy', 'name': 'Self-efficacy', 'sampling_error': 0.0971073876, 'percentage': 0.7245635717567557}], 'category': 'personality', 'id': 'Conscientiousness', 'sampling_error': 0.08064647520000001, 'percentage': 0.5776000093587051}, {'name': 'Extraversion', 'children': [{'category': 'personality', 'id': 'Activity level', 'name': 'Activity level', 'sampling_error': 0.0824344144, 'percentage': 0.6532898525030351}, {'category': 'personality', 'id': 'Assertiveness', 'name': 'Assertiveness', 'sampling_error': 0.0877454512, 'percentage': 0.5729149805473628}, {'category': 'personality', 'id': 'Cheerfulness', 'name': 'Cheerfulness', 'sampling_error': 0.1103904608, 'percentage': 0.006174126673610447}, {'category': 'personality', 'id': 'Excitement-seeking', 'name': 'Excitement-seeking', 'sampling_error': 0.08424550080000001, 'percentage': 0.18850510604321014}, {'category': 'personality', 'id': 'Friendliness', 'name': 'Outgoing', 'sampling_error': 0.0792927336, 'percentage': 0.03951013686121535}, {'category': 'personality', 'id': 'Gregariousness', 'name': 'Gregariousness', 'sampling_error': 0.060546519599999994, 'percentage': 0.007834403339712415}], 'category': 'personality', 'id': 'Extraversion', 'sampling_error': 0.060327493600000004, 'percentage': 0.1051739589042871}, {'name': 'Agreeableness', 'children': [{'category': 'personality', 'id': 'Altruism', 'name': 'Altruism', 'sampling_error': 0.0747597584, 'percentage': 0.8126695466976206}, {'category': 'personality', 'id': 'Cooperation', 'name': 'Cooperation', 'sampling_error': 0.0834654396, 'percentage': 0.677171859602147}, {'category': 'personality', 'id': 'Modesty', 'name': 'Modesty', 'sampling_error': 0.0596197876, 'percentage': 0.3145221820771268}, {'category': 'personality', 'id': 'Morality', 'name': 'Uncompromising', 'sampling_error': 0.066417394,
```

```
{
  'percentage': 0.3468313696696078}, {'category': 'personality', 'id': 'Sympathy', 'name': 'Sympathy', 'sampling_error': 0.1024640644, 'percentage': 0.9939371896101595}, {'category': 'personality', 'id': 'Trust', 'name': 'Trust', 'sampling_error': 0.0604120784, 'percentage': 0.9722486467505242}], 'category': 'personality', 'id': 'Agreeableness', 'sampling_error': 0.10125405, 'percentage': 0.007412874064475772}, {'name': 'Emotional range', 'children': [{'category': 'personality', 'id': 'Anger', 'name': 'Fiery', 'sampling_error': 0.0985949952, 'percentage': 0.554783230873663}, {'category': 'personality', 'id': 'Anxiety', 'name': 'Prone to worry', 'sampling_error': 0.0583679468, 'percentage': 0.592202679424692}, {'category': 'personality', 'id': 'Depression', 'name': 'Melancholy', 'sampling_error': 0.0625670476, 'percentage': 0.9167665686355615}, {'category': 'personality', 'id': 'Immoderation', 'name': 'Immoderation', 'sampling_error': 0.05616976, 'percentage': 0.6191321068676958}, {'category': 'personality', 'id': 'Self-consciousness', 'name': 'Self-consciousness', 'sampling_error': 0.060505887200000004, 'percentage': 0.9010980518035747}, {'category': 'personality', 'id': 'Vulnerability', 'name': 'Susceptible to stress', 'sampling_error': 0.09014683999999999, 'percentage': 0.4590151036667137}], 'category': 'personality', 'id': 'Neuroticism', 'sampling_error': 0.095721062, 'percentage': 0.7260945739455659}], 'percentage': 0.9987998993975366}], {'id': 'needs', 'name': 'Needs', 'children': [{'category': 'needs', 'id': 'Liberty', 'name': 'Liberty', 'children': [{'category': 'needs', 'id': 'Challenge', 'name': 'Challenge', 'sampling_error': 0.087061484, 'percentage': 0.02955560220212583}, {'category': 'needs', 'id': 'Closeness', 'name': 'Closeness', 'sampling_error': 0.0859332952, 'percentage': 0.0262450435966487}, {'category': 'needs', 'id': 'Curiosity', 'name': 'Curiosity', 'sampling_error': 0.1243616188, 'percentage': 0.39030178416497313}, {'category': 'needs', 'id': 'Excitement', 'name': 'Excitement', 'sampling_error': 0.1135503056, 'percentage': 0.04358807383818103}, {'category': 'needs', 'id': 'Harmony', 'name': 'Harmony', 'sampling_error': 0.113754904, 'percentage': 0.00944920261173171}, {'category': 'needs', 'id': 'Ideal', 'name': 'Ideal', 'sampling_error': 0.1031497164, 'percentage': 0.030451937304600996}, {'category': 'needs', 'id': 'Liberty', 'name': 'Liberty', 'sampling_error': 0.1501821348, 'percentage': 0.002051373166778392}, {'category': 'needs', 'id': 'Love', 'name': 'Love', 'sampling_error': 0.1046808284, 'percentage': 0.004900993820087518}, {'category': 'needs', 'id': 'Practicality', 'name': 'Practicality', 'sampling_error': 0.0909585948, 'percentage': 0.004024173522066021}, {'category': 'needs', 'id': 'Self-expression', 'name': 'Self-expression', 'sampling_error': 0.0846391764, 'percentage': 0.0051012956687302435}, {'category': 'needs', 'id': 'Stability', 'name': 'Stability', 'sampling_error': 0.11063459760000001, 'percentage': 0.04135023623323253}, {'category': 'needs', 'id': 'Structure', 'name': 'Structure', 'sampling_error': 0.0831281048, 'percentage': 0.6024223462382614}], 'percentage': 0.002051373166778392}], {'id': 'values', 'name': 'Values', 'children': [{'category': 'values', 'id': 'Hedonism', 'name': 'Hedonism', 'children': [{'category': 'values', 'id': 'Conservation', 'name': 'Conservation', 'sampling_error': 0.0706480588, 'percentage': 0.07328857952782603}, {'category': 'values', 'id': 'Openness to change', 'name': 'Openness to change', 'sampling_error': 0.06778235, 'percentage': 0.3330974091577948}, {'category': 'values', 'id': 'Hedonism', 'name': 'Hedonism', 'sampling_error': 0.14212298439999999, 'percentage': 0.007424223711857192}, {'category': 'values', 'id': 'Self-enhancement', 'name': 'Self-enhancement', 'sampling_error': 0.10781349159999999, 'percentage': 0.09418805332865399}, {'category': 'values', 'id': 'Self-transcendence', 'name': 'Self-transcendence', 'sampling_error': 0.08574562599999999, 'percentage': 0.03830133136347541}], 'percentage': 0.007424223711857192}], 'source': '*UNKNOWN*', 'word_count_message': 'There were 188 words in the input. We need a minimum of 600, preferably 1,200 or more, to compute statistically significant estimates', 'id': '*UNKNOWN*', 'processed_lang': 'en', 'word_count': 188, 'warnings': [{'message': 'There were 188 words in the input. We need a minimum of 600, preferably 1,200 or more, to compute statistically significant estimates', 'warning_id': 'WORD_COUNT_MESSAGE'}]}
```

We can now build up our own app from this minimal version, leveraging the Watson Cognitive services on Bluemix.

## Wrapping up and Git commands

We leave it as an exercise to modify the application. When ready, use the following Git commands:

- **git status** to see changes

- **git add filename** to add any untracked files you might have added
- **git commit -m "message"** to commit the changes
- **git pull** to pull down any changes you may have made on JazzHub
- **git push origin master** to push back to the git repo

And as we make changes to our code we update our GitHub repository.

We can use the same method to develop apps with the other Watson Cognitive Services listed above..

This concludes this lab.