# IBM Natural Language Understanding – Node.js

## Cognitive Solutions Application Development

IBM Global Business Partners
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# Table of Contents



## Overview

The IBM Watson Developer Cloud (WDC) offers a variety of services for developing cognitive applications. Each Watson service provides a Representational State Transfer (REST) Application Programming Interface (API) for interacting with the service. Some services, such as the Speech to Text service, provide additional interfaces.

With Natural Language Understanding, developers can analyze semantic features of input text and extract metadata from content, such as categories, concepts, emotion, entities, keywords, metadata, relations, semantic roles, and sentiment. With custom annotation models developed using IBM Watson Knowledge Studio, you can further customize the service to identify domain-specific entities and relations in your content.

Natural Language Understanding can be useful in many scenarios that demand rapid analysis of unstructured text without requiring in-depth natural language processing expertise. For example, you can monitor sentiment and emotion in customer support chat transcripts, or you can quickly categorize blog posts and sort them based on general concepts, keywords, and entities.

The features that are available depend on the language. This list may change over time, so always check this in the online documentation.

The Application we will create uses the Watson Natural Language Understanding (NLU) service available in the IBM Cloud.

This app will be created and run from a local workstation and later to be deployed on the IBM Cloud.

- In a first step, an instance of the Watson NLU service will be created.
- In a second step, this service instance will be used with the Postman REST Client to get accustomed to capabilities of the service.
- Then a Node.js application will be created to use the NLU service from an application.
- Finally, we deploy the Node.js application to IBM Cloud.

## Objectives

- Learn how to use the Cloud Foundry command-line interface to create and manage Watson services
- Learn the capabilities of the NLU service.
- Learn how to implement the NLU application using Node.js
- Learn how to create a Node.js application running in IBM Cloud

## Prerequisites

Before you start the exercises in this guide, you will need to complete the following prerequisite tasks:

- Guide – Getting Started with IBM Watson APIs & SDKs
- Create an IBM Cloud account

You need to have a workstation with the following programs installed:

1. Node.js
2. Npm
3. Git → only for optional **Git clone** at the beginning of Section 2.

**Note:** Copy and Paste from this PDF document does not always produce the desired result, therefore open the code snipptes for this lab in the browser and copy from there!

# Section 1: Create a Natural Language Understanding service in the IBM Cloud with the Command Line Interface

IBM Cloud offers services, or cloud extensions, that provide additional functionality that is ready to use by your application's running code.

You have two options for working with applications and services in IBM Cloud. You can use the IBM Cloud web user interface or the IBM Cloud command-line interface (CLI). This CLI only works when you have completed **Step 4** in the workstation setup document while creating your IBM Cloud Account.

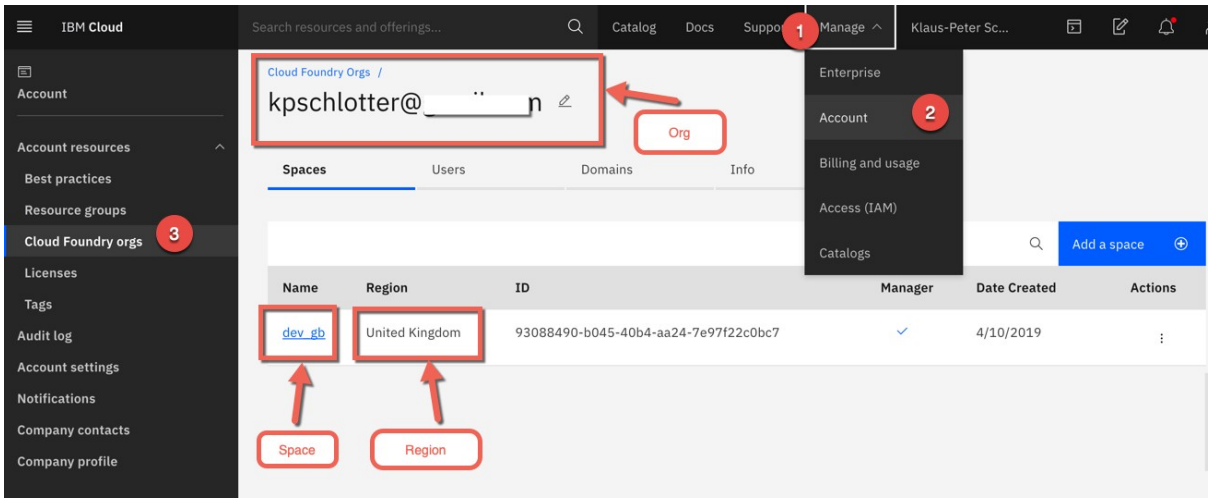
**Note:** This is the option chosen here because it is the base for automated scripts.

**Step 1** Open a Terminal/Command Window and enter the following commands

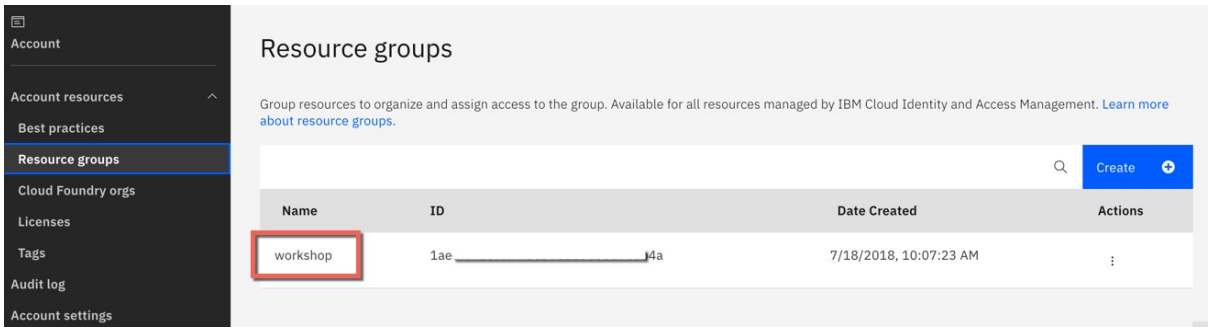
```
ibmcloud api https://cloud.ibm.com
```

```
ibmcloud login -u <your ibmcloud user account> -o <yourOrg> -s
<yourSpace>  -r <yourRegion> -g <yourResourceGroup!
```

You can retrieve the options in the IBM Cloud Console




Your Resource Group




**Enter** your password when prompted!

```
API endpoint:      https://cloud.ibm.com
Region:            eu-gb
User:              kpschlotter@gmail.com
Account:           Klaus-Peter Schlotter's Account (520e7c89ba7d4a449e1ecfd6d0f0
0bbe)
Resource group:    workshop
CF API endpoint:   https://api.eu-gb.cf.cloud.ibm.com (API version: 2.147.0)
Org:               kpschlotter@gmail.com
Space:             dev_gb
```

**Step 2** Create the NLU service

**a)** (Optional) Get information about all services available

```
ibmcloud catalog service-marketplace
```

You should see an entry *natural-language-understanding* that has an option "lite"

```
5932737c-e24b-4836-9e37-d8cead922316                    natural-language-generation-apis
bb6393bc-7d81-446b-9728-61b704f6eca5                    natural-language-understanding
     IBM                                                eu_access,gc_migrate,ibm_created,ibm_dedicated_public,lite,watson
     IBM                                                gc_migrate,ibm_created,rc_compatible,virtual_data_center,vmware
3f5debff-044f-4292-b387-9c9a50ba81fe                    nexmo
```

**b)** Create the free service with name *my-nlu*

```
ibmcloud resource service-instance-create my-nlu natural-language-
understanding free eu-gb
```

**c)** Generate the authentication credentials

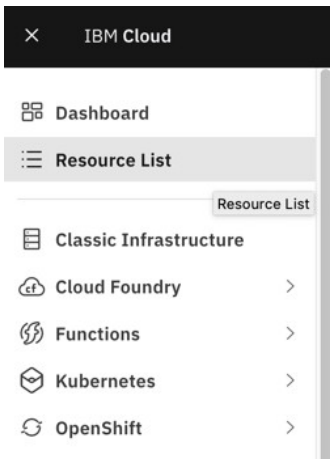
```
ibmcloud resource service-key-create my-nlu-key Manager --instance-
name my-nlu
```

You should see the credentials (**apikey**) and **url** of your "NLU" service. Later in this exercise you will need this values. Feel free to copy these values to a text file or just leave the terminal/command window open until it is needed.

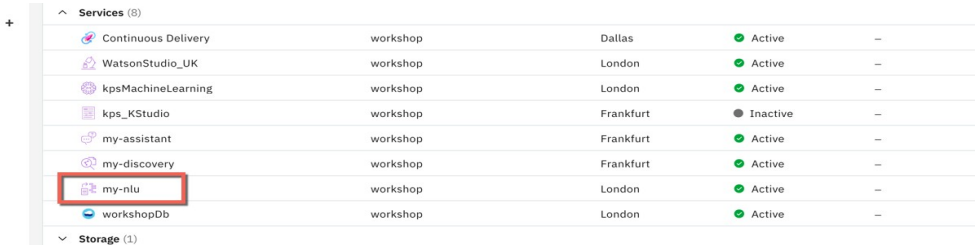
**Step 3** You could have done Step 2 in the IBM Cloud console so let's check what has been created.

**a)** Open a Browser and navigate to https://cloud.ibm.com

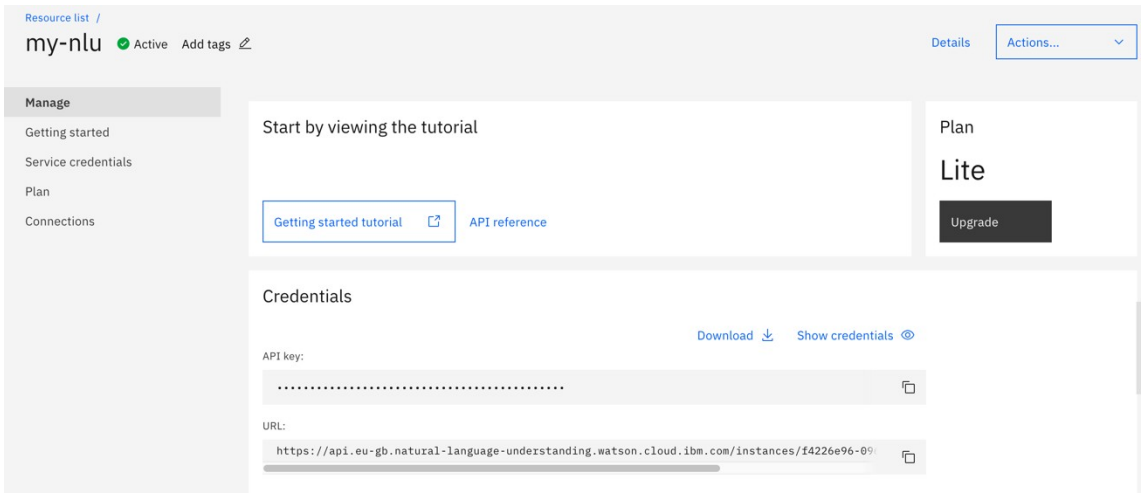
**b)** **Click** the  icon and then **click** *Resource List*.




On the list of services you should see the NLU service *my-nlu* created in previous steps.

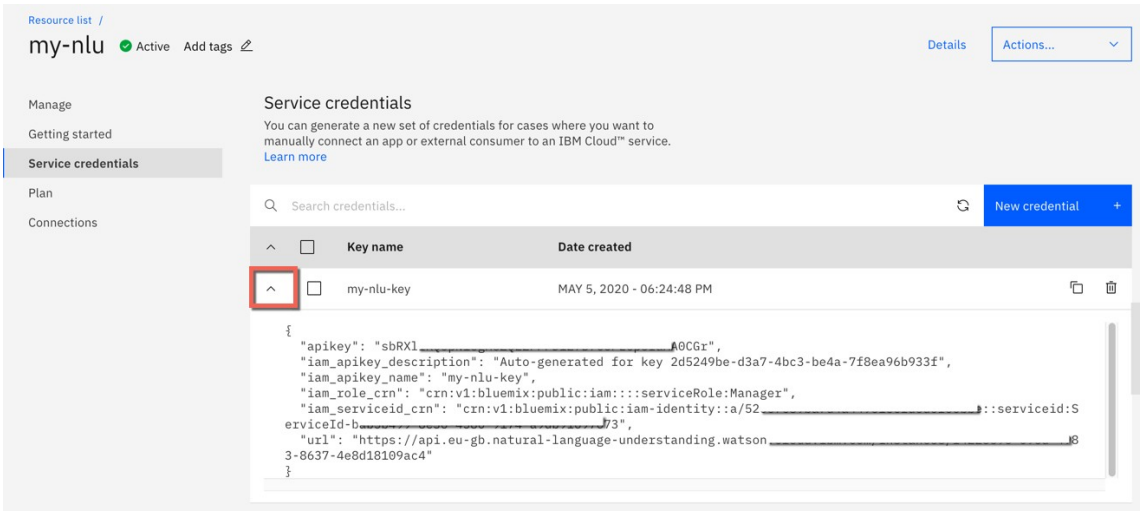



**c)** **Click** the *my-nlu* service to open it. Here you see an overview of your service instance




Here you can see the details of the service you have instantiated in **Step 2**.

**d) Click** the *Service credentials* and **expand** the *my-nlu-key*



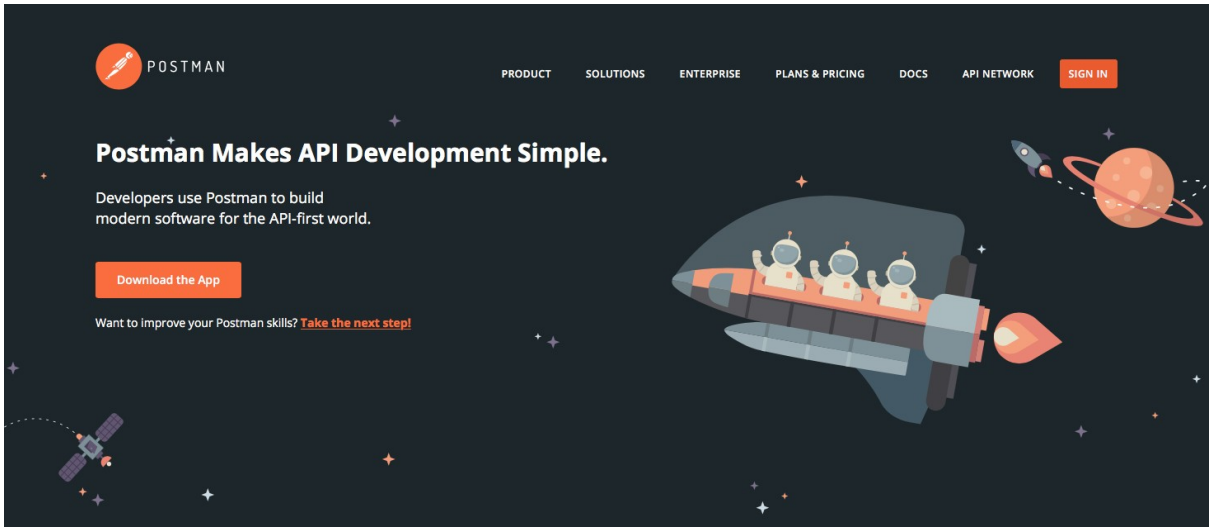

Here you see the credentials created in **Step 2c)**

# Section 2: Work with your Service using Postman (REST Client)

The Watson Services in Bluemix have a REST (Representational State Transfer) interface and therefore they can be easily tested with a REST client like Postman.

You can find the API reference in the Documentation of each service.

**Step 4** Postman is available as an application for MacOS, Windows, and Linux. https://www.postman.com. Download and install it.




**Step 5** Open the Postman client

## *Test Natural Language Understanding (NLU)*

Note: You may Copy and Paste from the code snipptes file.

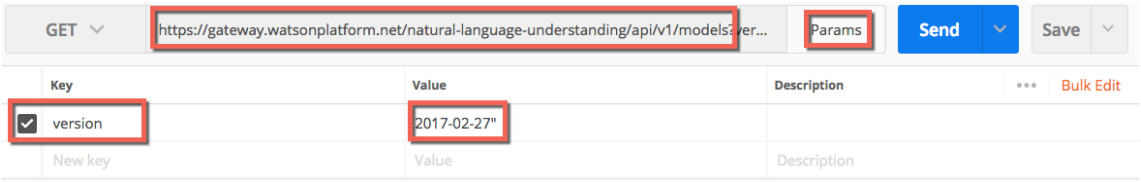
**Step 6** In Postman select **GET** as the HTTP request type to use

A simple first api call will be to retrieve the machine learning models that are associated to the service, a GET request

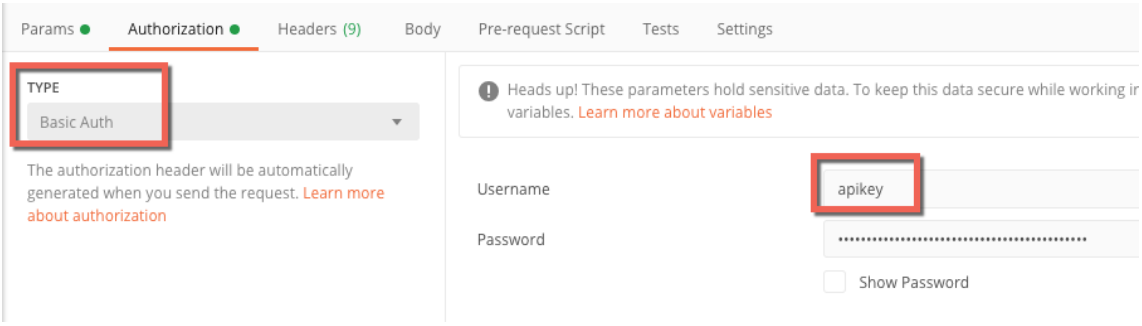
**a)** Get the *url* and the *credentials* retrieved in **Step 2 d)**, or copy the these values from within your **my-nlu service** – **Service credentials** in the IBM Cloud console

**b)** Build the URL for testing with the NLU service (GET request)

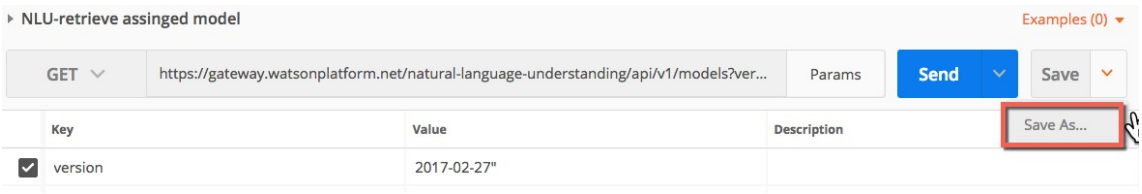
url: **<yourUrlFromStep3c>/v1/models**
params: `version  2019-07-12`




**c)** In the Authorization section select Basic Auth and enter the string *apikey* as username and the **apikey** from the service as password.

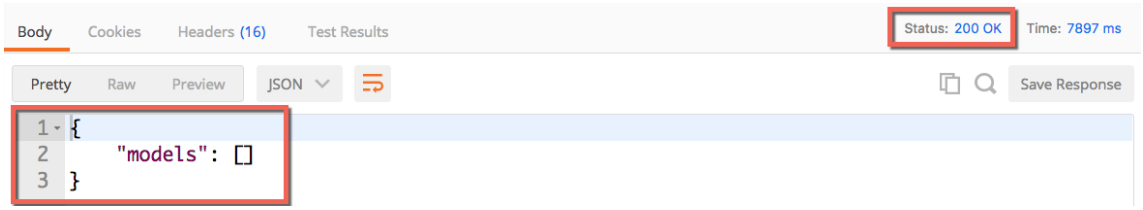



**d)** You can save your request(s) for further use with Save As..



**e)** Click the Send button
When all values are entered correctly you should see a Status 200 OK and json object with an empty models array. With Lab 7 you would see your model id.

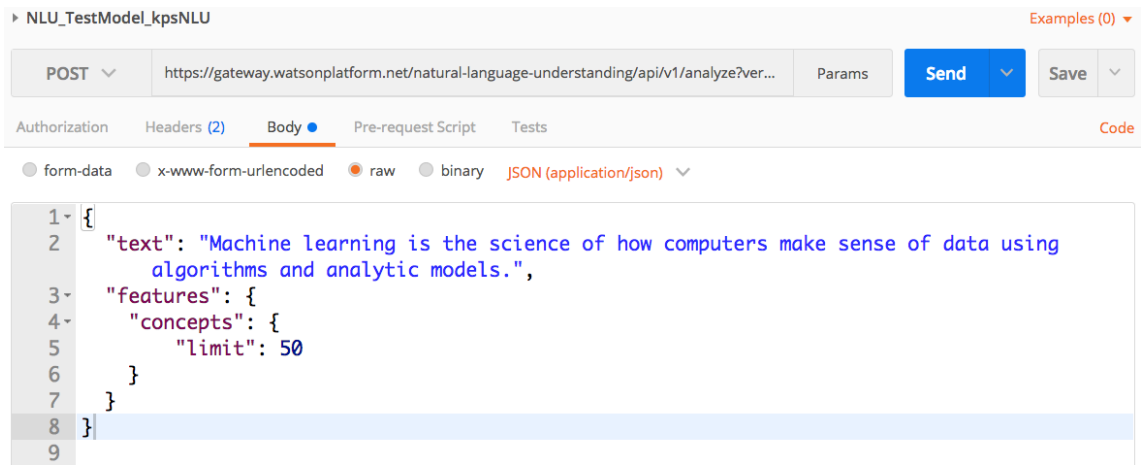



## Step 7 Testing NLU Concepts

The NLU Concepts feature identifies high-level concepts that might not be directly referenced in the input text. Concept-related API functions understand how concepts relate. Concepts that are detected typically have an associated link to a *DBpedia* resource. See the following input and response examples

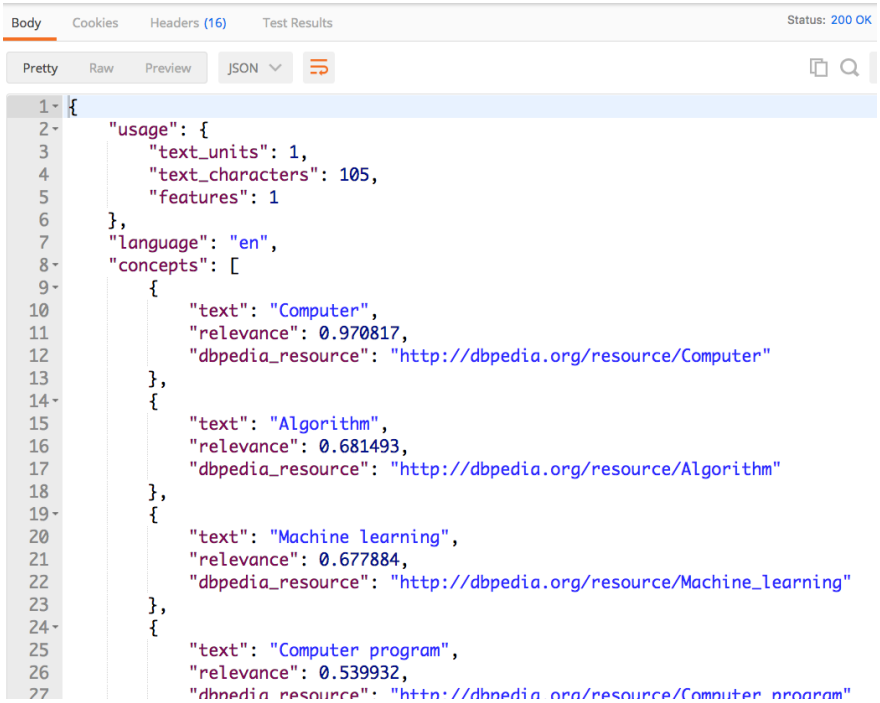
**a)** In Postman you should have the request from previous step. **Select** POST as the request type.
In the **URL** just change the uri **model** to **analyze**.
In the **Body** of the request specify the following json input
In the **Header** specify **Content-Type** (Key) and **application/json** (Value)

```
{
  "text": "Machine learning is the science of how computers make sense of
data using algorithms and analytic models.",
  "features": {
    "concepts": {
      "limit": 50
    }
  }
}
```



You should see the following result:

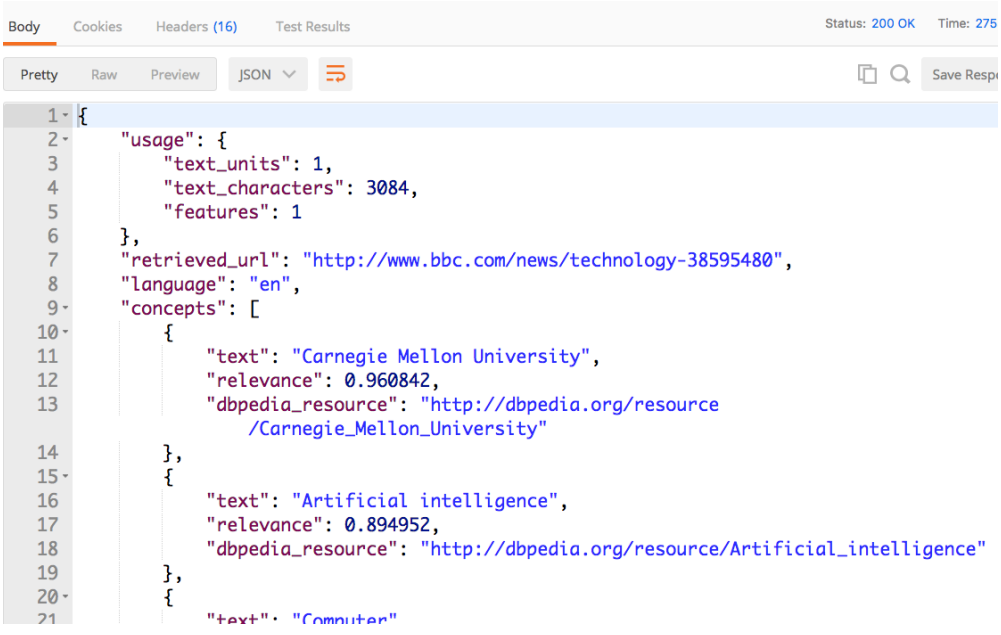



**b)** Instead of text, you can also enter a url instead.

Body:

```
{   "url": "http://www.bbc.com/news/technology-38595480",
    "features": {
       "concepts": {
         "limit": 50
      }
   }
}
```

Result:



## Step 8 Testing NLU Entities

The NLU Entities feature helps you Identify people, cities, organizations, and many other types of entities in your text. It returns items such as persons, places, and organizations that are present in the input text. Entity extraction adds semantic knowledge to content to help understand the subject and context of the text that is being analyzed.

**a)** In the body of the previous Postman POST request change the Body to the following:

```
{  "text": "IBM is an American multinational technology company
headquartered in Armonk, New York, United States, with operations
in over 170 countries.",
  "features": {
    "entities": {
      "limit": 250
    }
  }
}
```

Result:


```
{
    "usage": {
        "text_units": 1,
        "text_characters": 140,
        "features": 1
    },
    "language": "en",
    "entities": [
        {
            "type": "Company",
            "text": "IBM",
            "relevance": 0.33,
            "disambiguation": {
                "subtype": [
                    "SoftwareLicense",
                    "OperatingSystemDeveloper",
                    "ProcessorManufacturer",
                    "SoftwareDeveloper",
                    "CompanyFounder",
                    "ProgrammingLanguageDesigner",
                    "ProgrammingLanguageDeveloper"
                ],
                "name": "IBM",
                "dbpedia_resource": "http://dbpedia.org/resource/IBM"
            },
            "count": 1
        },
        {
            "type": "Location",
            "text": "Armonk",
            "relevance": 0.33,
            "disambiguation": {
                "subtype": [
                    "City"
                ]
            },
            "count": 1
        },
        {
            "type": "Location"
```

**b)** A text in German:
Die Fußball Weltmeisterschaft 2006 hat in Deutschland stattgefunden. Das Finale in Berlin gewann Italien gegen Frankreich. Dritter wurde Deutschland in Stuttgart mit einem Sieg gegen Portugal.

**Step 9** Testing NLU Relations

The NLU Relations feature identifies subject, action, and object relations within sentences in the input content. After parsing sentences into subject, action, and object form, the Relations feature can use this information for subsequent processing by other Natural Language Understanding features such as entities, keywords, and so on.

Relation information can be used to automatically identify buying signals, key events, and other important actions.

**a)** In the Postman change the body of the POST to the following:

Body:

```
{  "text": "Bob Dylan won the Nobel Prize in Literature
in 2016. Bob Dylan was born in Duluth, Minnesota.",
  "features": {
      "relations": {}
  }
}
```

Result:


```
{
    "usage": {
        "text_units": 1,
        "text_characters": 93,
        "features": 1
    },
    "relations": [
        {
            "type": "affectedBy",
            "sentence": "Bob Dylan won the Nobel Prize in Literature in 2016.",
            "score": 0.892004,
            "arguments": [
                {
                    "text": "Bob Dylan",
                    "location": [
                        0,
                        9
                    ],
                    "entities": [
                        {
                            "type": "Person",
                            "text": "Bob Dylan"
                        }
                    ]
                },
                {
                    "text": "won",
                    "location": [
                        10,
                        13
                    ],
                    "entities": [
                        {
                            "type": "EntertainmentAward",
                            "text": "won"
                        }
                    ]
                }
            ]
        },
        {
            "type": "awardedTo",
            "sentence": "Bob Dylan won the Nobel Prize in Literature in 2016.",
```

# Section 3: Watson APIs in Web Applications

## *Running the Sample Application Locally*

In this section we will create a sample application based on Node.js step by step or you can download or clone the completed app from Github.

**Note:** See **Lab 1 Section 2** on how to clone a Github repository.

The following screenshots are based on the **Google Chrome** browser and **Microsoft Visual Studio Code**. Both tools can be downloaded for free. Other browsers and development environments/code editors work as well.

**Step 10** In a Terminal window **create a folder** for your project f.e. *nlutester*

**Step 11** Move into this folder and execute the following command

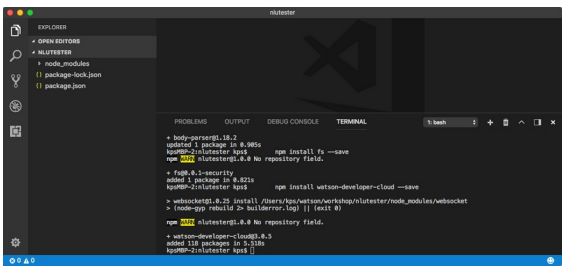
```
npm init
```

Specify a *name*, *description* and *author* when prompted, keep the other *defaults*. The result should be similar to the following in *package.json*: Add the blue lines as show below:

```
{
  "name": "nlutester",
  "version": "1.0.0",
  "description": "A simple Watson Natural Language Understanding tester",
  "main": "index.js",
  "scripts": {
    "start": "node app.js",
    "test": "echo \"Error: no test specified\" && exit 1"
  },
  "engines": {
    "node": "^10.15.0",
    "npm": "^6.4.1"
  },
  "author": "Klaus-Peter Schlotter",
  "license": "ISC"
}
```

**Step 12** Open your project folder in Visual Studio code or you can start Visual Studio Code with the following command from within the project folder. In the menu **select** *View → Integrated Terminal*

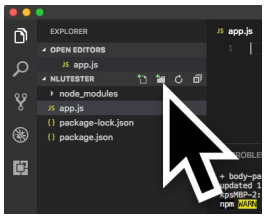
```
code .
```



**Step 13** In the *Intergrated Terminal* or another terminal execute the following commands to install the additional node modules needed for our project

```
npm install --save express ejs body-parser ibm-watson
```

The modules will be stored in the node_modules folder and your *package.json* file should now have a dependencies section.




**Step 14** In the project folder *create* an *app.js* file.
You can create files and folders for your project in the *Visual Studio Code Explorer* on the left.

**Step 15** **Create** *config.js* in the project root folder and enter your service credentials.

```
var config = {
  watson: {
    nlunderstanding: {
      username: "<your service username>",
      password: "<your service password",
      version: "2019-07-12",
    }
  }
};

module.exports = config;
```

```
const config = {
  watson: {
    nlunderstanding: {
      url: "<Url to your service>",
      iam_apikey: "<your API_Key>",
      version: "2019-07-12",
    }
  }
};

module.exports = config;
```

Depending on your service, use *username/password* or *apikey*.

**Step 16** In the project *root* **create** a *folder* named *utils* and in there **create** a *file* named helpers.*js* with the following content: → (utils/helpers.js). **Save** and **close** the file.

*setSelection()* transforms the received array of selected checkboxes into the appropriate selection properties.

```
exports.setSelection = (items, selectedItems) => {
  const selection = [];
  items.forEach(f => {
    if (selectedItems.indexOf(f) > -1) {
      selection.push(true);
    } else {
      selection.push(false);
    }
  });
  return selection;
}
```

*buildFeaturesRequest()* transforms the Watson Natural Language service attributes received with the request to the appropriate parameter object.

```
exports.buildFeatureRequest = (features, model) => {
  let reqFeatures = {
    features: {}
  };
  features.forEach(f => {
    if (f === 'entities' || f === 'relations') {
      if (model[f]) {
        reqFeatures.features[f] = {
          model: model.ids[0]
        };
      } else {
        reqFeatures.features[f] = {};
      }
    } else {
      reqFeatures.features[f] = {};
    }
  });
  return reqFeatures;
};
```

**Step 17** In app.js enter the following code to import the dependencies and instantiate the variables. **Save** and **close** the file.

```
const path = require('path');

const express = require('express');
const bodyParser = require('body-parser');

const app = express();
app.use(bodyParser.urlencoded({ extended: false }));
app.use(express.static(path.join(__dirname, 'public')));

const port = process.env.PORT || 3000;
app.set('view engine', 'ejs');
app.set('views', 'views');

const watsonRoutes = require('./routes/watson');
app.use(watsonRoutes);

app.use(function (requst, response) {
  response.status(404).render("404");
});

app.listen(port, () => {
  console.log('Express app started on port ' + port);
})
```

**Step 18** In the project *root* **create** a *folder* named *routes* and in there **create** a *file* named *watson.js* with the following content: → (routes/watson.js). **Save** and **close** the file.

```
const express = require('express');

const watsonController = require('../controllers/watson');

const router = express.Router();

router.get('/', watsonController.getIndex);

router.post('/', watsonController.postNlu);

router.get('/getmodel', watsonController.getNluModel);

module.exports = router;
```

The router defines the urls we accept from the web with an appropriate function called that is defined in the controller file.

**Step 19** In the project *root* **create** a *folder* named *controllers* and in there **create** a *file* named *watson.js* with the following content: → (controllers/watson.js)

In line 1 – 25 add the following code:

```
const  NaturalLanguageUnderstandingV1  =  require('ibm-watson/natural-language-under-
standing/v1');
const { IamAuthenticator } = require('ibm-watson/auth');
const config = require('../config');
const { setSelection, buildFeatureRequest } = require('../utils/helpers');

const nlu = new NaturalLanguageUnderstandingV1({
  version: config.watson.nlunderstanding.version,
  authenticator: new IamAuthenticator({
    apikey: config.watson.nlunderstanding.iam_apikey
  }),
  url: config.watson.nlunderstanding.url
});

// fixed values for rendered page
const features = ["categories", "concepts","emotion", "entities",
  "keywords", "metadata", "relations", "semantic_roles" ];
const inputTypes = ["url", "text"];

let model = {
  label: '',
  ids: [''],
  selected: false,
  entities: false,
  relations: false
}
```

**Step 20** The **getIndex** function renders the initial page. (Line 27 – 42)

```
exports.getIndex = (req, res, next) => {
  let result = '';
  let bodyText = '';
  model.selected = false;
  model.entities = false;
  model.relations = false;
  res.render('index', {
    result: result,
    bodyText: bodyText,
    features: features,
    inputTypes: inputTypes,
    fselected: setSelection(features, features[3]),
    iselected: setSelection(inputTypes, inputTypes[1]),
    model: model
  });
};
```

Initial page load, forces certain default values.

**Step 21** The getNluModel function, called when the browser page is loaded (*app/scripts/jqhelpers.js getModel()*), checks for a deployed model and displays it when found. (Line 44 – 62)

```
exports.getNluModel = (req, res, next) => {
  nlu.listModels()
    .then(response => {
      console.log(JSON.stringify(response, null, 2));
      if (response.result.models.length > 0) {
        model.label = 'Model: '
        model.ids[0] = response.result.models[0].model_id;
        console.log(model.ids[0]);
        res.send({modelId: model.ids[0]});
      } else {
        console.log("no model deployed to service");
        res.send({text: "no model deployed to service"});
      }
    })
    .catch(err => {
      console.log('error:', err.message);
      res.status(200).send({text: "checkModel(): " + err.message});
    });
};
```

**Step 22** When the submit (form action=post) button on the *index* page is pressed, the POST for the root url "/" gets called. (64 – 118)

```
exports.postNlu = (req, res, next) => {
  if (!req.body.inputType || !req.body.body || !req.body.features) {
    res.status(400).send("All fields required!");
    return;
  }
  const bodyText = req.body.body;
  let receivedFeatures;
  model.selected = false;
  model.entities = false;
  model.relations = false;
  if (req.body.mlModel) {
    model.selected = true;
    if (req.body.mlEntities) {
      model.entities = true;
    }
    if (req.body.mlRelations) {
      model.relations = true;
    }
  }
  if (Array.isArray(req.body.features)) {
    receivedFeatures = req.body.features;
  } else {
    receivedFeatures = req.body.features.split(',');
  }
  reqFeatures = buildFeatureRequest(receivedFeatures, model);
  const parameters = {
    [req.body.inputType]: bodyText,
    features: reqFeatures.features
  }
  nlu.analyze(parameters)
    .then(response => {
      result = JSON.stringify(response.result, null, 2);
      res.status(200).render("index",{
        result: result,
        bodyText: bodyText,
        inputTypes: inputTypes,
        features: features,
        fselected: setSelection(features, req.body.features),
        iselected: setSelection(inputTypes, req.body.inputType),
        model: model
      });
    })
    .catch(err => {
      result = JSON.stringify(err, null, 2);
      res.status(200).render("index",{
        result: result,
        bodyText: bodyText,
        inputTypes: inputTypes,
        features: features,
        fselected: setSelection(features, req.body.features),
        iselected: setSelection(inputTypes, req.body.inputType),
        model: model
      });
    });
};
```

Within the **postNlu** function the request parameters for the Watson NLU service are extracted from the request body and the analyze function of the nlu object gets called. In case of success and error a result object gets created and returned to the browser with the *res.render* command.

**Step 23** In the root folder **create** a folder named *views*.

**Step 24** In the *views* folder **create** a *header.ejs* file with the following content:

```
<!DOCTYPE html>
<html>
  <head>
    <meta charset="utf-8">
    <title>EAG NLU-Tester</title>
    <link rel="stylesheet"
href="//maxcdn.bootstrapcdn.com/bootstrap/3.3.6/css/bootstrap.min.css">
  </head>
<body class="container">
  <h2>
    IBM EAG NLU-Tester
  </h2>
```

**Step 25** In the *views* folder **create** a *footer.ejs* file with the following content:

```
  <p><small>IBM Ecosystem Advocacy Group - 2019</small></p>
</body>
</html>
```

**Step 26** In the *views* folder **create** a *404.ejs* file with the following content:

```
<% include header %>
<h2>404! Page not found.</h2>
<% include footer %>
```

**Step 27** In the views folder create an index.ejs file with the following content:

```
<% include header %>
<script src="https://ajax.googleapis.com/ajax/libs/jquery/3.3.1/jquery.min.js"></script>
<script src="../scripts/jqhelpers.js"></script>
<h3>Analyze text with IBM Watson Natural Language Understanding service</h3>
<form method="post" role="form">
  <hr>
  <div class="form-group" id="inputType">
  <% if (inputTypes.length) { %>
  <% for(var i=0; i < inputTypes.length; i++) { %>
  <input style="margin-right: 5px" type="radio" id=<%= inputTypes[i] %> name="inputType" value=<%= inputTypes[i] %> <%= ise-
lected[i] ? "checked" : "" %>>
  <label style="margin-right: 5px" for=<%= inputTypes[i] %>><%= inputType[i]%></label>
  <% } } %>
  </div>
  <div class="form-group checkbox-group required" id="features">
    <% if (features.length) { %>
    <% for(var x=0; x < features.length; x++) { %>
    <input style="margin-right: 5px" type="checkbox" id=<%= features[x] %> name="features" value=<%= features[x] %> <%= fse-
lected[x] ? "checked" : "" %>>
    <label style="margin-right: 5px" for=<%= features[x] %>><%= features[x] %></label>
    <% }} %>
  </div>
  <div class="form-group" style="display:none; margin-left: 20px" id="modelGroup">
    <input style="margin-right: 5px" type="checkbox" id="mlModel" name="mlModel" value="mlModel" <%= model.selected ?
"checked" : "" %>>
    <label style="margin-right: 5px" id="modelLabel" for="mlModel"><%= model.label + model.ids[0] %></label>
    <div style="display:none; margin-left: 20px" id="mlEntGroup">
  <input style="margin-right: 5px" type="checkbox" id="mlEntities" name="mlEntities" value="mlEntities" <%= model.entities ?
"checked" : "" %>>
      <label style="margin-right: 5px" for="mlEntities">Entities</label>
    </div>
    <div style="display:none; margin-left: 20px" id="mlRelGroup">
      <input style="margin-right: 5px" type="checkbox" id="mlRelations" name="mlRelations" value="mlRelations" <%= model.re-
lations ? "checked" : "" %>>
      <label style="margin-right: 5px" for="mlRelations">Relations</label>
    </div>
  </div>
  <hr>
  <div class="form-group">
    <label for="content">Enter text or url</label>
    <textarea class="form-control" id="body" name="body" placeholder="Enter text or an URL." rows="3" required><%= bodyText
%></textarea>
  </div>
  <div class="form-group">
    <input type="submit" id="submit" value="Post entry" class="btn btn-primary">
    <input type="button" id="reload" value="Page reset" class="btn btn-primary">
  </div>
</form>
<p><small>Result:</small></p>
<div><pre id="result"><%= result %></pre></div>
<script>
  $( document ).ready(documentReady);
  $('#features').click(checkFeatures);
  $("#modelGroup").click(checkModel);
  $('#reload').click(function () {
    window.location.replace("/");
  });
</script>
<% include footer %>
```

**Step 28** To control the checkboxes and the section where the Machine Learning model is displayed some jQuery helper functions are needed.
In the project root folder **create** a *js* folder and then **create** a *jqhelpers.js* file with the following content: → (public/js/jqhelpers.js). **Save** and **close** the file.

```
function documentReady() {
  $('#mlEntGroup').toggle(false);
  $('#mlRelGroup').toggle(false);
  checkFeatures();
  if (($("#modelLabel").text().indexOf("Model:") != 0) && ($("#modelLa-
bel").text().indexOf("no model") != 0)) {
    $('#modelGroup').toggle(false);
    getModel();
}};
function checkFeatures(){
  if($('div.checkbox-group.required :checkbox:checked').length == 0 ) {
    $('#submit').prop('disabled', true);
  } else {
    $('#submit').prop('disabled', false);
    checkModel();
  }
  if ($("#modelLabel").text().indexOf("Model:") == 0) {
    if($("#entities").is(':checked') || $("#relations").is(':checked')) {
      $('#modelGroup').toggle(true);
    } else {
      $('#modelGroup').toggle(false);
      $('#mlModel').prop("checked", false);
      $('#mlEntities').prop("checked", false);
      $('#mlRelations').prop("checked", false);
}}}
function checkModel (){
  if ($("#modelLabel").text().indexOf("Model:") == 0) {
    if($("#mlModel").is(':checked') && !$("#mlEntities").is(':checked') && !$("#ml-
Relations").is(':checked')) {
      $('#submit').prop('disabled', true);
    } else {
      $('#submit').prop('disabled', false);
    }
    if($("#mlModel").is(':checked') && $("#entities").is(':checked')) {
      $('#mlEntGroup').toggle(true);
    } else {
      $('#mlEntGroup').toggle(false);
      $('#mlEntities').prop("checked", false);
    }
    if($("#mlModel").is(':checked') && $("#relations").is(':checked')) {
      $('#mlRelGroup').toggle(true);
    } else {
      $('#mlRelGroup').toggle(false);
      $('#mlRelations').prop("checked", false);
    }
  } else {
    $('#modelGroup').toggle(false);
} }
function getModel() {
  $.get( "/getmodel", function( data ) {
    if (data.hasOwnProperty('modelId')) {
      $("#modelLabel").text("Model: " + data.modelId);
      $('#modelGroup').toggle(true);
    } else {
```

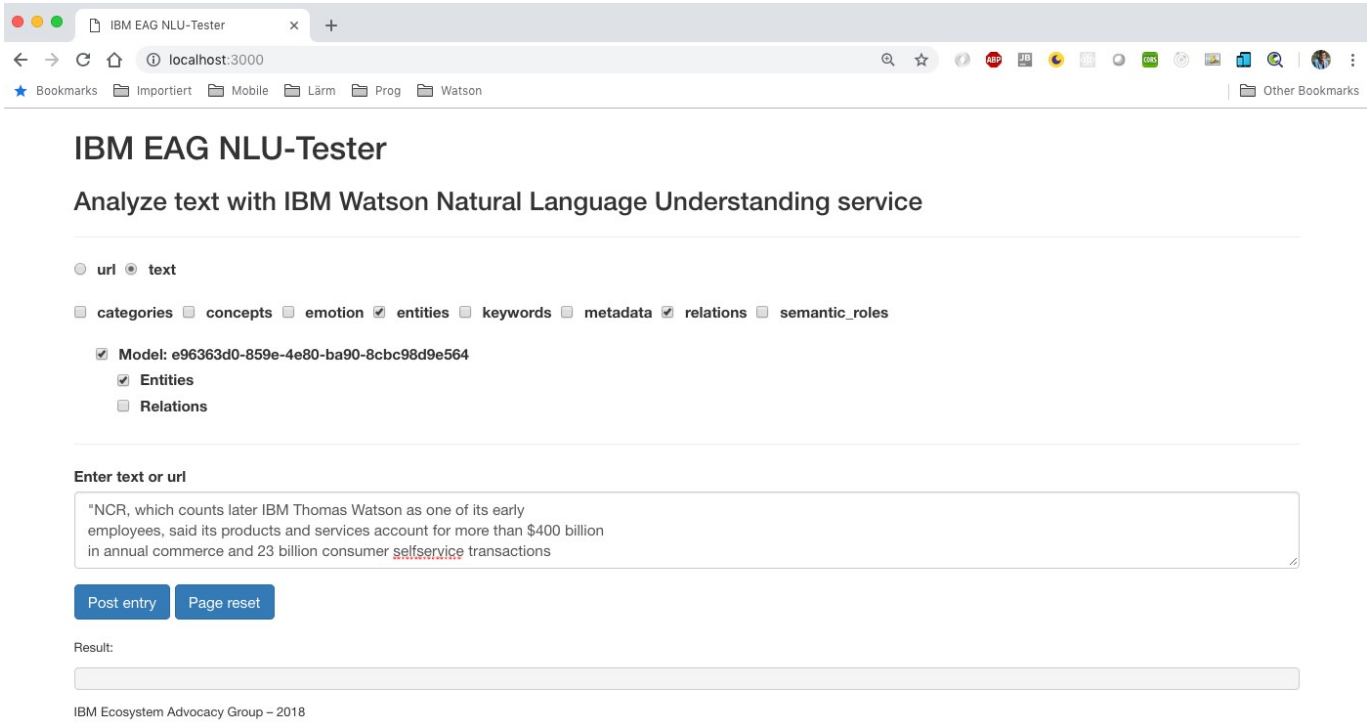
```
        $("#result").text(data.text);
    }});
}
```

**Step 29** In the terminal you can now start the app with the following command:

```
node app.js
```


**Step 30** In the Browser load the index.js with the url

http://localhost:3000



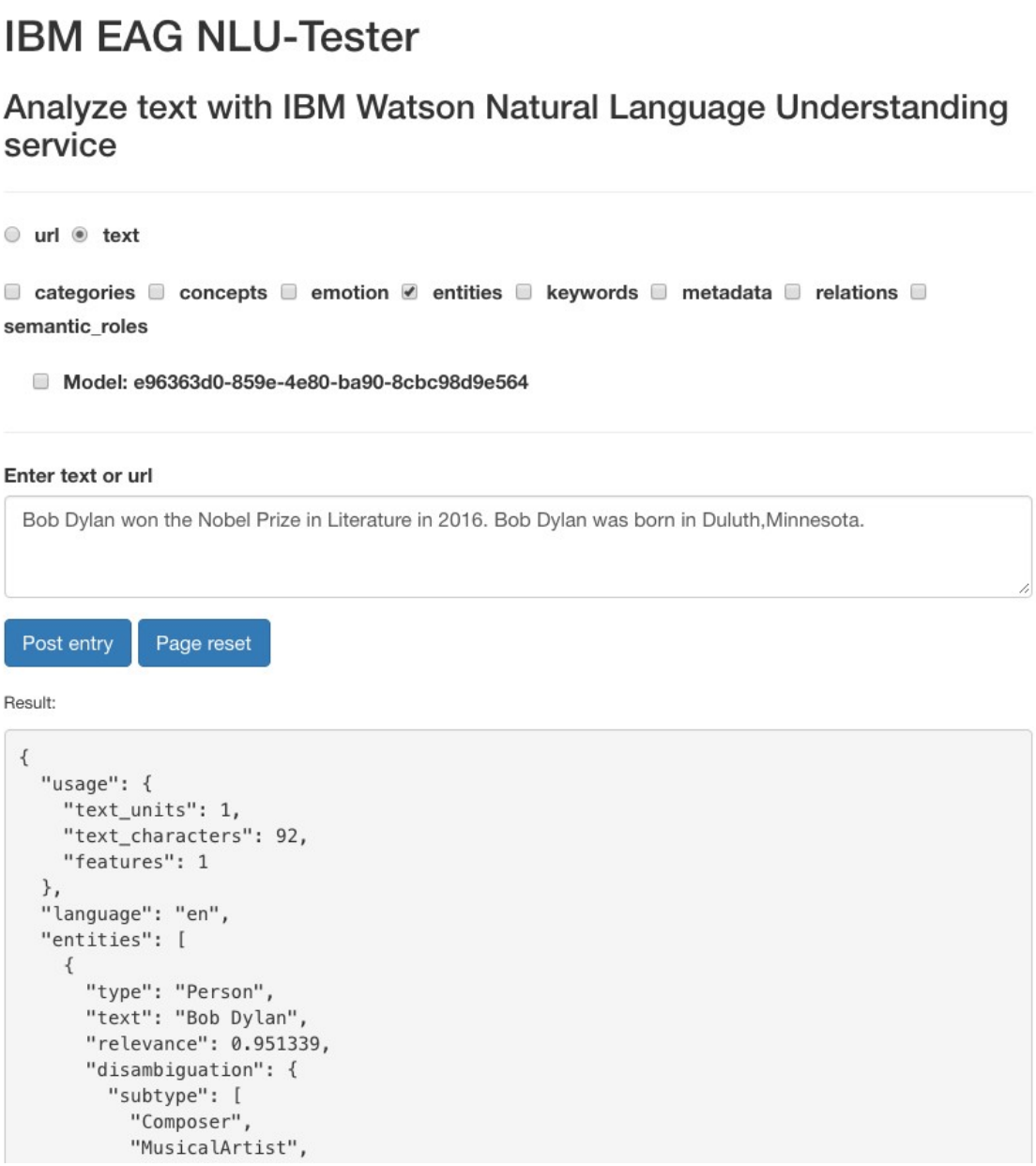

The model section only appears, when you have a machine learning model deployed via Watson Knowledge Studio. See the demo document on how to create and deploy a model. This demo will be shown at the end of the workshop.

**Step 31** F.e. past the following text into the textarea and see the result

Bob Dylan won the Nobel Prize in Literature in 2016. Bob Dylan was born in Duluth,Minnesota.

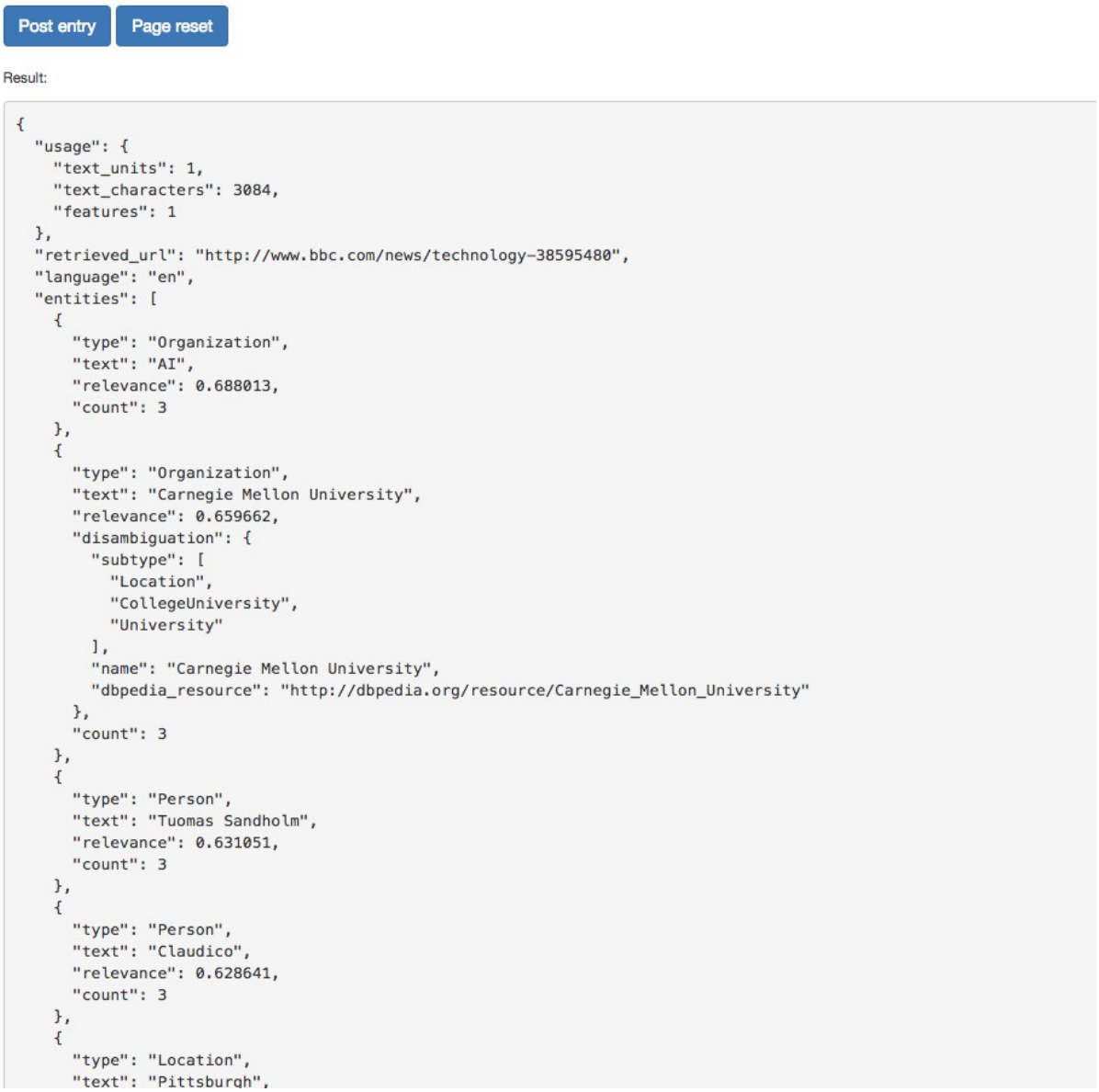
A formatted json view is diplayed in the *Result* field.



**Step 32** By selecting the URL Radio button you can f.e. paste the url for a new article and see the result.

http://www.bbc.com/news/technology-38595480




**Step 33** Select other features for your urls or text entries and see the results.

**Step 34** With the Page reset button, you can re-initialize the page.

## *Push the local Web Application to IBM Cloud*

The final step of this lab is to push the application that runs locally on your machine into your Bluemix account and make it publicly available.

**Step 35** Create a manifest.yml file in the project folder with the following content: Use the name of you NLU service created in **Step 2c)**. As name you should specify a unique name. There is also an option available to automatically generate unique names. You have to insert below your name:

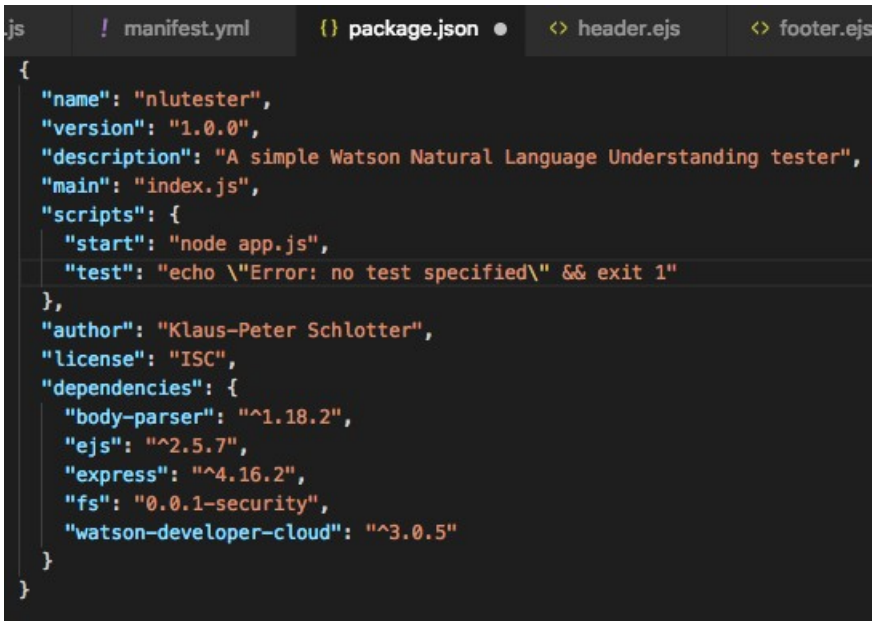
```
random-route: true
```

```
applications:
- name: xxx-nlu-demo
  path: .
  buildpack: sdk-for-nodejs
  command: node app.js
  memory: 256M
services:
  - my-nlu
```

**Step 36** **Save** the manifest.yml file.

**Step 37** We have to update the package.json file with a start script.

```
"start": "node app.js"
```



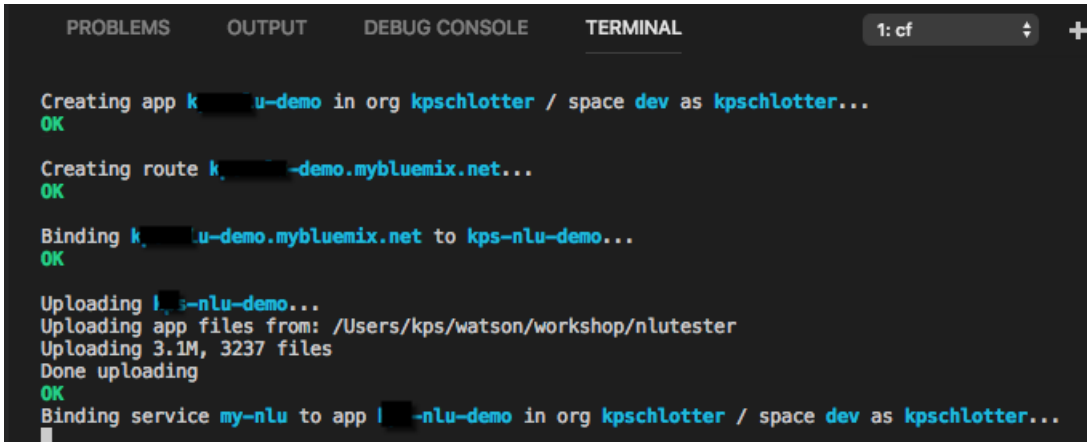

 

**Step 38** Depending on your account, to avoid an “exceeding memory limit” error you should stop applications that are already running on your account.

**Step 39** Make sure you are logged in to your IBM Cloud account.
(**See Workstation Setup document Step 9**)

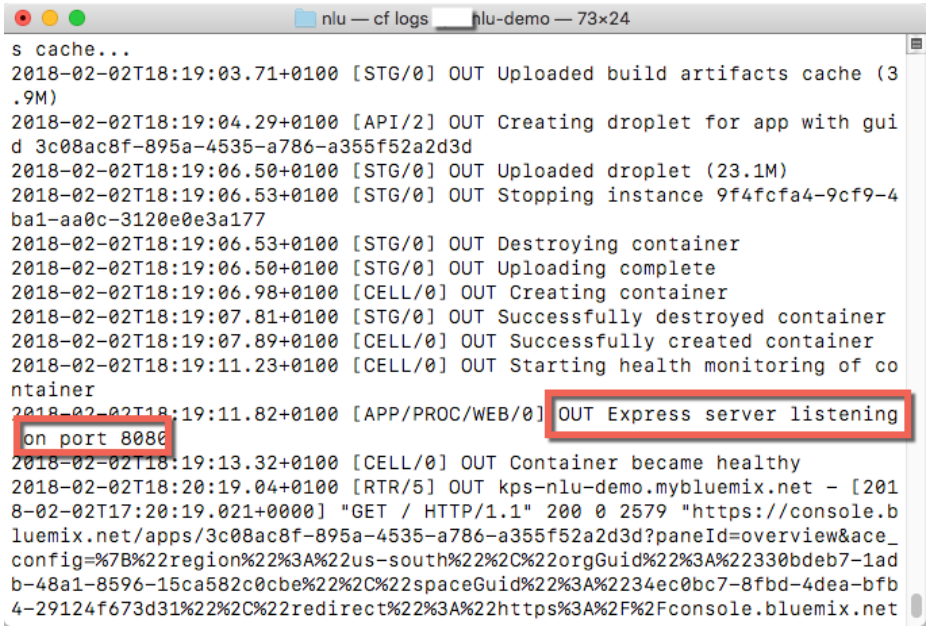
**Step 40** In the terminal (in the project folder) push your app to the IBM Cloud using the follwing command.

```
ibmcloud app push
```




**Step 41** You can display the server console from IBM Cloud in your Terminal with the following command

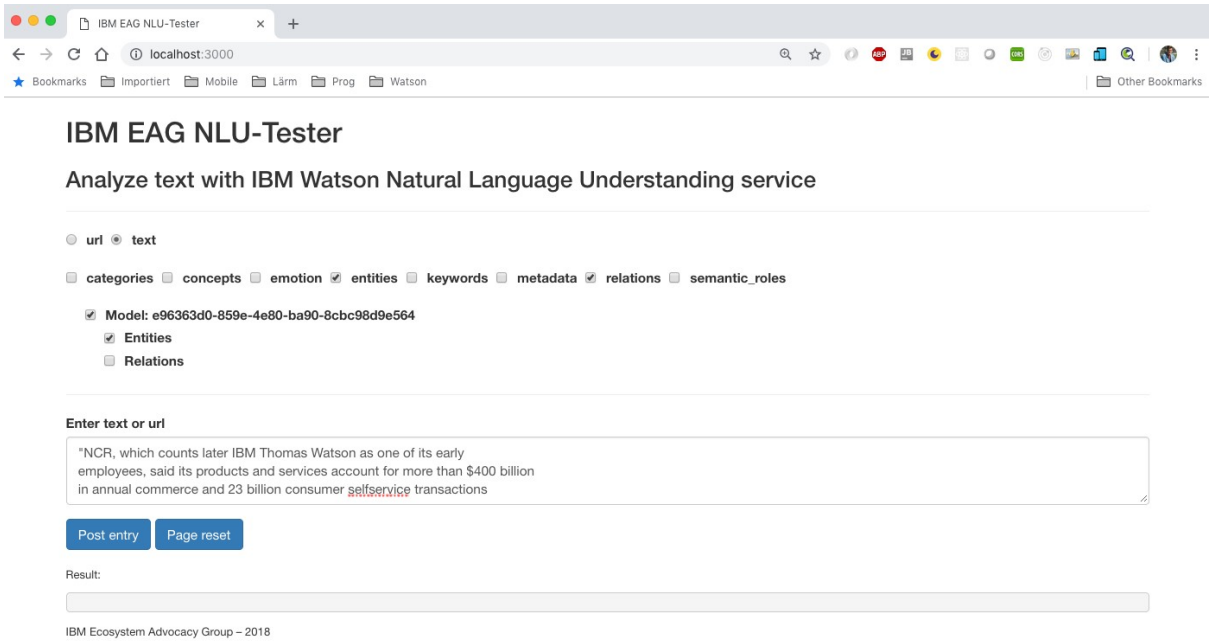
```
ibmcloud app logs xxx-nlu-demo
```



**Step 42** Now open the browser with the URL pointing to your app in the IBM Cloud

https://xxx-nlu-demo.mybluemix.net




**Step 43** Analyze the text from Step 35