

Deploying a Cognitive Solution using IBM Watson on Bluemix

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Abstract - In this research our goal is to study cognitive computing and its applications in real life situation. Cognitive computing is the ability to simulate human thought processes in a computerized model. Using this self-learning algorithms that uses data mining, pattern recognition and natural language processing, we can mimic the way the human brain works. Our research focuses on understanding the deployment mechanism using which Watson services and its applications can be best used from.

Key Words: Cognitive Computing, IBM Watson, Bluemix, Conversation Chat Service, Cloud Computing

1.INTRODUCTION

IBM Watson is an cognitive computing solution system which works on cloud platform and technologies to deliver services in the fields of health, finance, IoT, education etc. The IBM Watson system first performed in real world by defeating human contestants on the television show "Jeopardy!". This remarked as the very first public trial of a cognitive system. Cognitive computing is an advanced form of computing in which a system is trained to learn based on interactions and outcomes. These systems are programmed in a way that they can challenge a human's ability to answer questions posed in natural language with speed and accuracy. One of the goal of cognitive computing is to generate a computerized model from the human thought processes. Watson is able to learn from additional information, questions and mistakes to improve accuracy over time. One of the things watson is designed to take on the real-world challenges such as Big Data in the industry

mainly in the fields like healthcare and finance to deal with the unstructured data.

1.1 Bluemix

IBM Bluemix is a cloud platform as a service (PaaS) developed by IBM. It is an implementation of IBM's Open Cloud Architecture based on Cloud Foundry, an open source PaaS. Bluemix delivers enterprise-level services that can easily integrate with your cloud applications without you needing to know how to install or configure them. It supports several programming languages and services as well as integrated DevOps to build, run, deploy and manage applications on the cloud. Bluemix supports several programming languages including Java, Node.js, Go, PHP, Swift, Python, Ruby Sinatra, Ruby on Rails and can be extended to support other languages such as Scala through the use of buildpacks. The Watson based cognitive services, integrated DevOps, range of mobile backend services, database & analytics services makes IBM Bluemix a very rich platform.

1.2 Benefits of Bluemix

Some of the benefits of working in Bluemix.

1. Speed and simplicity: Delivering optimal performance with speed and simplicity.
2. Agility: Focus on delivering business value, rather than on maintenance.
3. Tools: Bluemix supports various different tooling methodologies.
4. Source control: The source code can be used from multiple sources such as GitHub, Bitbucket etc

5. Services marketplace: Large no. of Services are offered by Bluemix in its catalog.

2. DESIGN AND WORKING

The workflow of our model using which we plan to deploy our code in production with Watson can be best simulated as below.

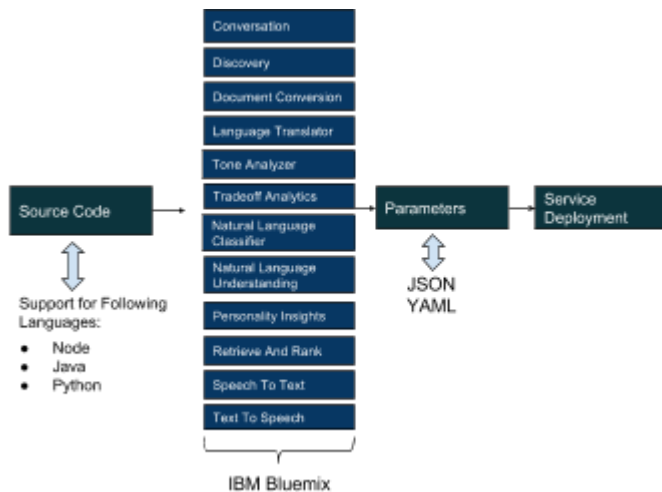


Figure -1: Workflow of Deploying Services using IBM Watson

Here, we first start with our sample source code. This source code can be taken from various Source Code Repositories such as Git, maven etc. The support of multiple languages such as Node, Java, Python etc. by blue mix helps us in choosing our languages without any efforts. The Bluemix Watson services such as conversation, discovery, document conversion, language translator etc help us to define our application and its usage in a certain bounded context. Over Bluemix these services are integrated and compatible with the Watson offerings and support. The service parameters of our application can be defined in a JSON or YAML file. The ease of using Bluemix dashboard and command line helps us in making the whole process smooth and lucrative.

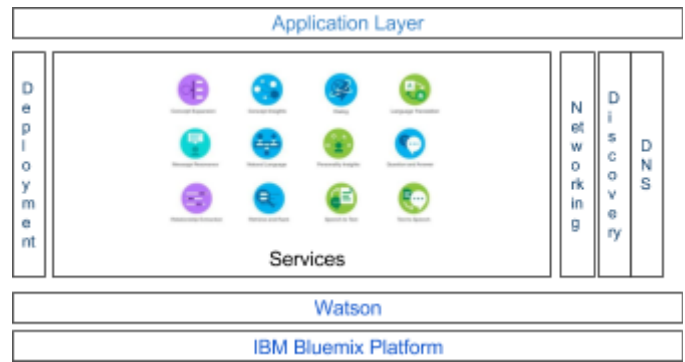


Figure -2: High Level Architecture of Watson on Bluemix

At the base of the architecture the Bluemix cloud platform is present. This provides us with IBM's offerings. Our cognitive solution, Watson is present above the base layer. Watson provides us with multiple services for deploying our application. The services deploying using Watson also depend upon some basic fundamentals such as DNS, Networking, discovery etc. These services can be viewed on our Bluemix dashboard. The application layer is the external layer of our architecture which interacts with the external world.

3. APPLICATION

3.1 Education

Watson has the potential to greatly change the working of education in both online courses and in traditional classrooms.

3.1 Health

Watson is a big boost to the health care systems. It uses evidence-based learning and natural language capabilities to support medical professionals in making decisions. Watson helps in treatment guidelines, electronic medical record data, doctor's and nurse's notes, clinical studies and patient information analysis.

3.3 Commerce

Having key solutions like IBM Watson Customer Experience Analytics, IBM Watson Content Hub, IBM

iX Experience Design and Strategy, Watson aims to deliver proper and effective commerce services. Watson helps in making adjustments along the customer journey to improve engagement and satisfaction.

3.4 Financial Services

Watson is being designed as the ultimate financial services assistant, capable of performing deep content analysis and evidence-based reasoning to accelerate and improve decisions, reduce operational costs, and optimise outcomes. The ability to consume vast amounts of information to identify patterns and make informed hypotheses naturally make Watson an excellent solution to help make informed decisions about investment choices, trading patterns and risk management.

3.5 IoT

Internet of Things (IoT) is an ecosystem of connected physical objects that are accessible through the internet. The 'thing' in IoT could be a person with a heart monitor or an automobile with built-in-sensors, i.e. objects that have been assigned an IP address and have the ability to collect and transfer data over a network without manual assistance or intervention. The embedded technology in the objects helps them to interact with internal states or the external environment, which in turn affects the decisions taken.

3.6 Marketing

Establishing personalized customer conversion and build relationship that drive engagement seamlessly across all channels. The cognitive power of Watson helps you understand individual customer behaviors so you can create the ideal combination of interactions that drive conversion and build loyalty.

3.7 Supply Chain

Watson stands apart in providing supply chain solutions like B2B integration, procurement and managed file transfer.

3.8 Talent

Watson Talent solutions learn from data and use cognitive technology to lift proficiency and speed tasks. Watson Talent solutions help in drive productivity optimization, boost business performance, speed tasks.

4. EXPERIMENTATION

Some of the prerequisites before getting started are:

- Git CLI
- CF CLI
- NPM (Version 4.0 >)

We will create a Bluemix account to avail the services. Here listed below are the services offers by Watson on Bluemix

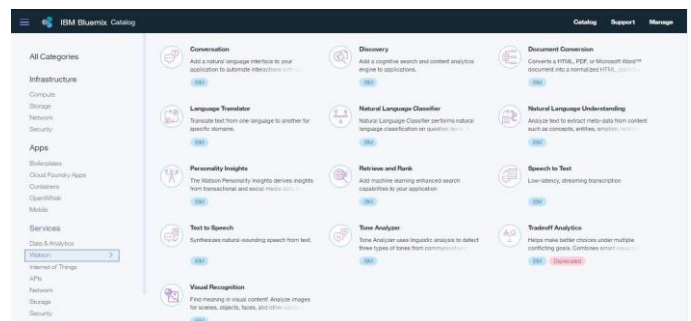


Figure-3: Available Watson Services on Bluemix

Next, we will use the conversation service api to develop our own app on our local system.

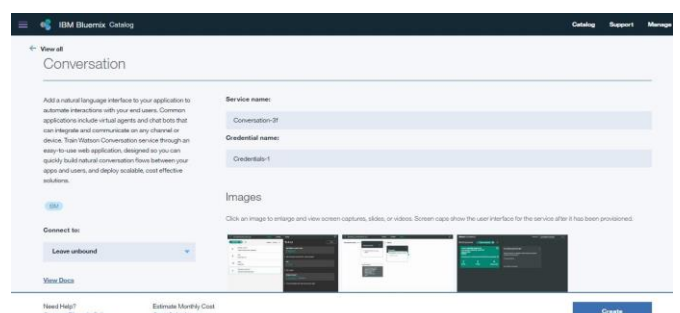


Figure-4: GUI for Conversation Service

On our command line :

We will copy a sample code from github.

\$git clone

<https://github.com/iraj4t/watson-conversation>

Next, we will connect the Bluemix account to the Cloud Foundry command line tool and create an instance of a service .

\$ cf login

\$cf create-service conversation free

<Name-of-Service>

In case of a non-free service we can use the below command line command for that:

\$ cf create-service conversation tiered

<Name-of-Service>

Importing a Json file from our repository on the cloud dashboard

File path: watson-conversation/training/service.json

\$ cp .env.example .env

For authentication purpose:

\$ cf create-service-key <service_instance>

<service_key>

For printing the output,

\$ cf service-key <Name-of-Service> <Key-Name>

Replacing the below parameter details of Key File into .env file.

WORKSPACE_ID=<workspace-id>

CONVERSATION_USERNAME=<conversation-username>

CONVERSATION_PASSWORD=<conversation-password>

The workspace id can be found out by visiting bluemix dashboard and creating the service by importing the service.json file present in our local code.

In order to get started,we install all the dependencies

\$ npm install

Now we can push our application to our bluemix console using the below command:

\$ cf push

You can check the service in your browser at the URL :

<Name-of-Service>.bluemix.net

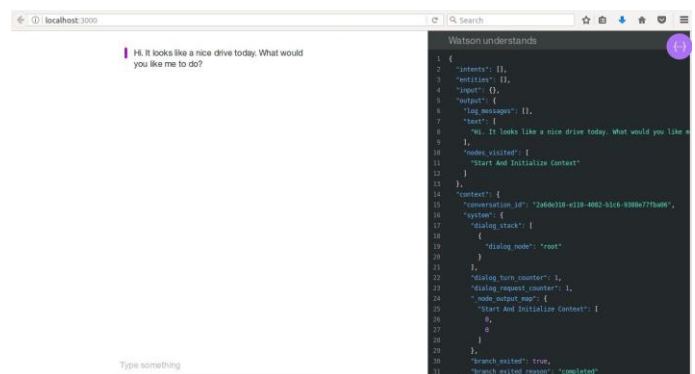


Figure-5: Application Deployment on Bluemix

