ECEN 5053-002

DEVELOPING INDUSTRIAL INTERNET OF THINGS

EXTRA CREDIT PROJECT-1

HANDS ON WITH IBM BLUEMIX(CLOUD)

PROJECT REPORT

SUBMITTED BY:

SOWMYA RAMAKRISHNAN

SID: 108684769

The IBM Cloud – Demystified

Cloud Technology is literally taking over traditional computing, by allowing resources to be deployed entirely over the internet, on-demand. This ensures extensive availability and scalability, making both front-end and back-end development a lot simpler and less convoluted. The same data center that normally takes at least a month to be deployed physically can now be available and ready in a few seconds! That's how powerful computing has become.

In this project, over the course of three weeks, one such cloud-based technology was learnt and experimented on. The IBM Cloud, earlier known as Bluemix, is one among various cloud technology competitors, other notables being Amazon Web Services, Microsoft Azure and Salesforce. With a simple interface and umpteen number of resources, there was a lot to be explored.

Total number of hours spent in the actual working with the platform: Approximately 20 (Including tutorial courses).

Applications created/built/deployed:

Creation of Toolchain (Lab 1)

Face Recognition using Watson Services (Lab 2)

Creation of application using Continuous Delivery Toolchain

Deploying and managing an application using IBM BLI (Command Line Interface)

Deploying and managing an application using Eclipse IDE

Creation of Node-RED Boilerplate App

Building a webpage and ReST (Representational State Transfer) API using Node-RED

Creating an Interpreter Application using IBM Watson

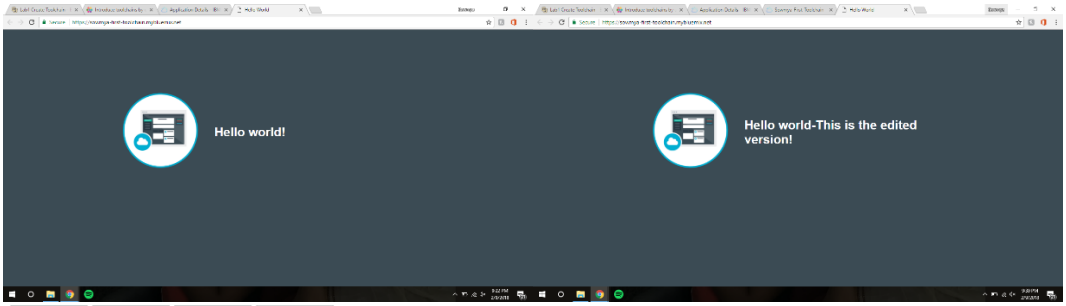
Building a simple Chat-Bot using the Watson Conversation Service

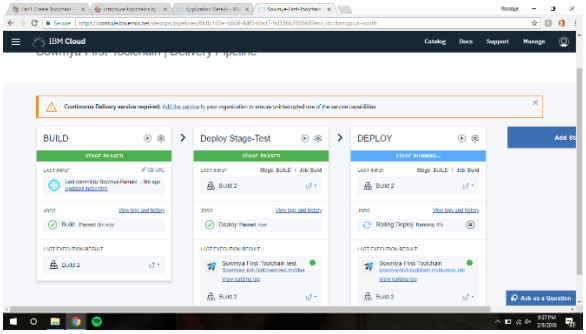
Setting up the Hyperledger Composer Playground and transferring assets in a blockchain network

Creation of Toolchain (Lab 1)

A simple Cloud Foundry app was created which displayed a webpage “Hello World” using default settings. The code was then modified using the Eclipse Orion Web IDE, the change was pushed to the repository and the new webpage was displayed with the updated text. A stage was then added to the pipeline between the Build and Deploy stages. All three stages were run and successfully passed.

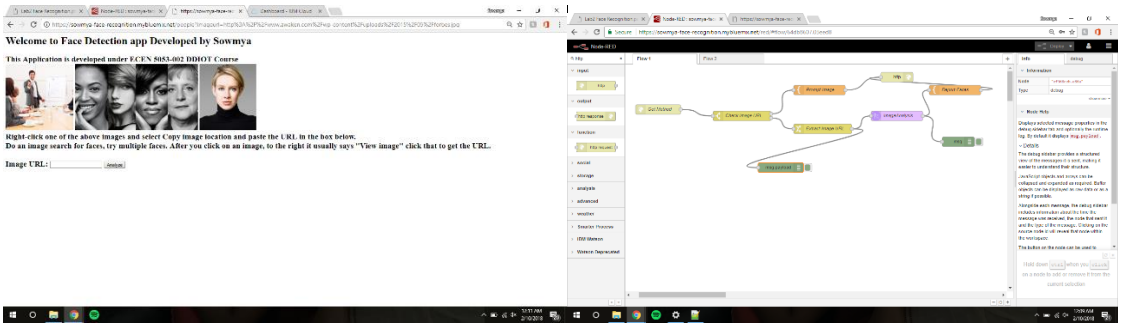
Learning outcome: to continuously integrate and deploy an app to Bluemix by using a toolchain.





Face Recognition using Watson Services (Lab 2)

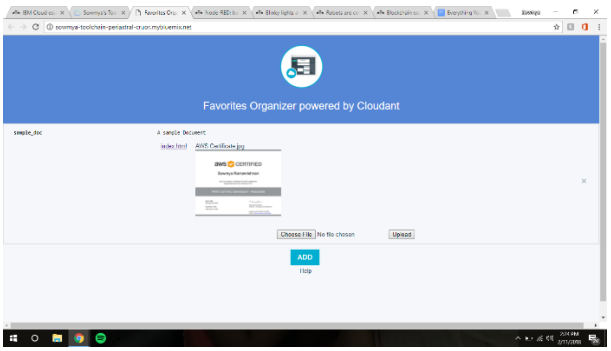
A Node-RED Flow Diagram that deployed a website which took a URL of an image as input and provided analysis about it was created using the instructions provided. Without much knowledge about Node-RED, this task was a little complicated, but it led the way for Node-RED to be learnt.



Creation of application using Continuous Delivery Toolchain

A github repository was used from where an app was directly deployed to Bluemix using a delivery pipeline.

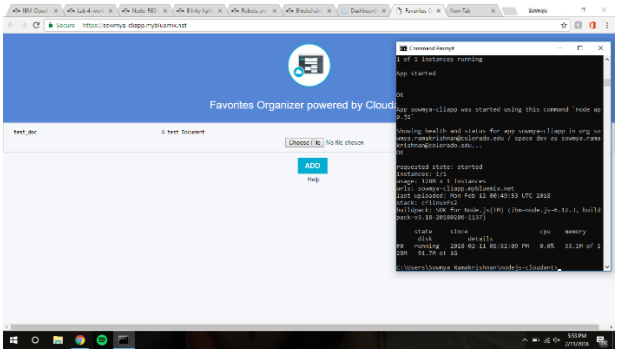
Learning outcome: Integrating git repository with IBM Cloud to deploy webpages. The simplicity factor increases by a great amount!



Deploying and managing an application using IBM BLI (Command Line Interface)

The same webpage was now deployed using Command Line. The github repository was cloned and data extracted, Cloudant database service was created, the app was pushed to Bluemix, updated with the changes made, finally removed-entirely using the command line interface.

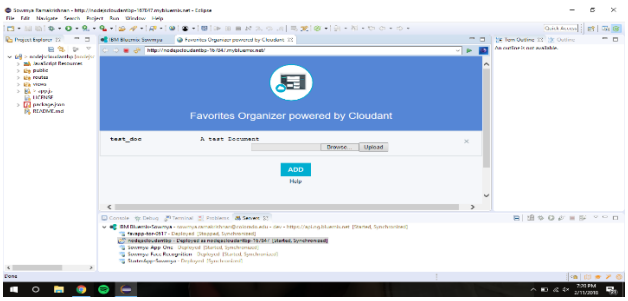
Learning outcome: Using CLI instead of console to deploy applications, importance of CLI and the safety associated with it when compared to console. CLI is safer and more secure, does not guarantee accessibility to any random user.



Deploying and managing an application using Eclipse IDE

The same application was then deployed using the Eclipse IDE by adding a server to the Eclipse workspace and accessing and updating the app through the workspace.

Learning Outcome: Use of IDE and integration with IBM Cloud, ease of deploying and running applications in IDE.

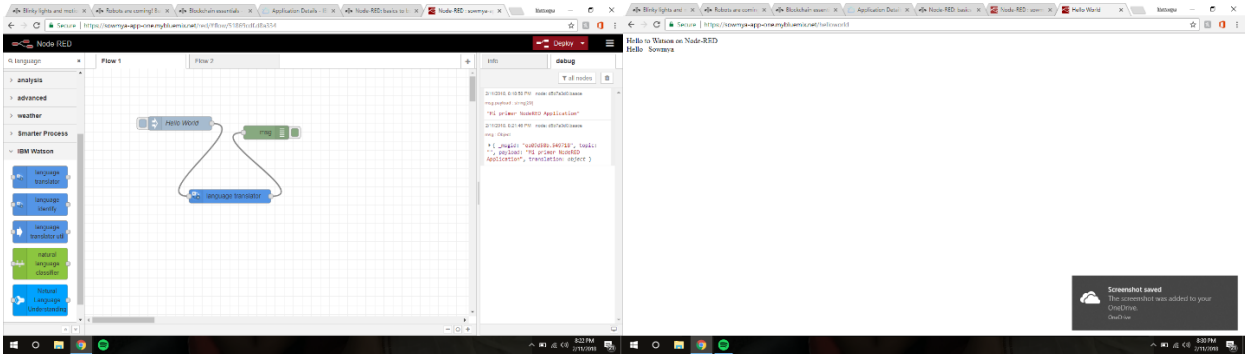


Creation of Node-RED Boilerplate App

Building a webpage and ReST (Representational State Transfer) API using Node-RED

Creation of Cloud Foundry Boilerplate application, using simple Node-RED Configuration, and creating a website and ReST API.

Learning outcome: Ease of use of Node-RED in deploying applications

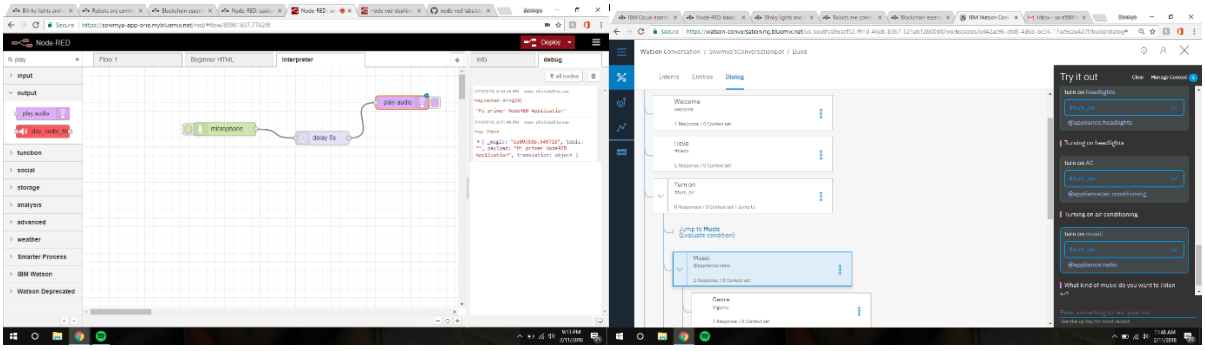


Creating an Interpreter Application using IBM Watson

Building a simple Chat-Bot using the Watson Conversation Service

IBM's Watson Services and external node palettes were used to create an application that took voice as input, converted into text, translated into another language and voiced it out. It was also used to create a chat-bot by loading customized intents and responses.

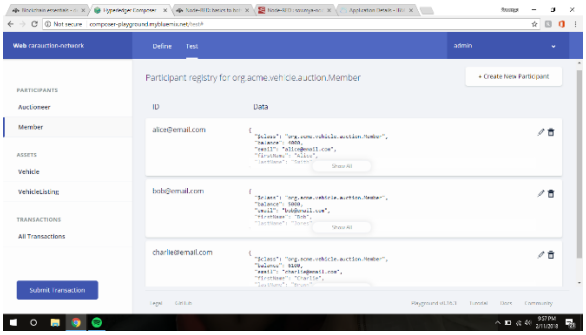
Learning outcome: Watson-IBM's Machine Learning algorithm, its vast range of uses.



Setting up the Hyperledger Composer Playground and transferring assets in a blockchain network

A blockchain application was built using the online Hyperledger Composer API. A business network with assets, members was created, and an auction for a vehicle among the members and the ensuing transfer of assets and transactions were recorded and encrypted for safety.

Learning Outcome: Creation of blockchain and using with Bluemix, cryptography and security.



Value of IBM Cloud (Industrial Advantages):

- Provides IaaS (Infrastructure as a Service) that allows applications to be deployed without having to worry about servers and data centers. This allows organizations to save a lot of time and money.
- Scalability and Availability make sure that there are no glitches to the running of the application. Helps avoid downtime in organizations.
- Accessibility using CLI, IDE and console-allows for multi-way use and ease of access.
- Highly secure, helps organizations encrypt and manage data in a safe manner.
- Ease of use-creation of apps using node libraries-allow for interactive build.
- Watson-Highly technologically advanced resource that can be employed in a variety of industrial services to perform a multitude of tasks with ease to improve overall UI/UX.
- Ability to develop highly IoT-centric applications-IBM has an extensive IoT resource-that can be used by organizations for technological advancement.

Limitations

- The console is slow to load, especially when it is being used at a good capacity.
- The UI malfunctions a bit, by often going into a different region than the one the user is in.
- There do not seem to be additional extensive layers of customizable security.
- Serverless API (OpenWhisk) is not known to be as usable as that provided by AWS.

Projects to Try: (Advanced development on IBM Cloud)

- IoT Robots using Watson, Node-RED and Swift
- Blinking lights and motion detectors-IoT Applications integrated with the Pi.