



**Cognitive Computing and
Cyber Physical Systems**

Hands-On: Watson on Bluemix

Build Cognitive API and Application using IBM Watson Text to Speech and Personality Insights services in IBM Bluemix.

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Agenda

Overview

This section will provide an overview of IBM Watson services available in Bluemix. It will briefly discuss Text to Speech and Personality Insights services.

Labs

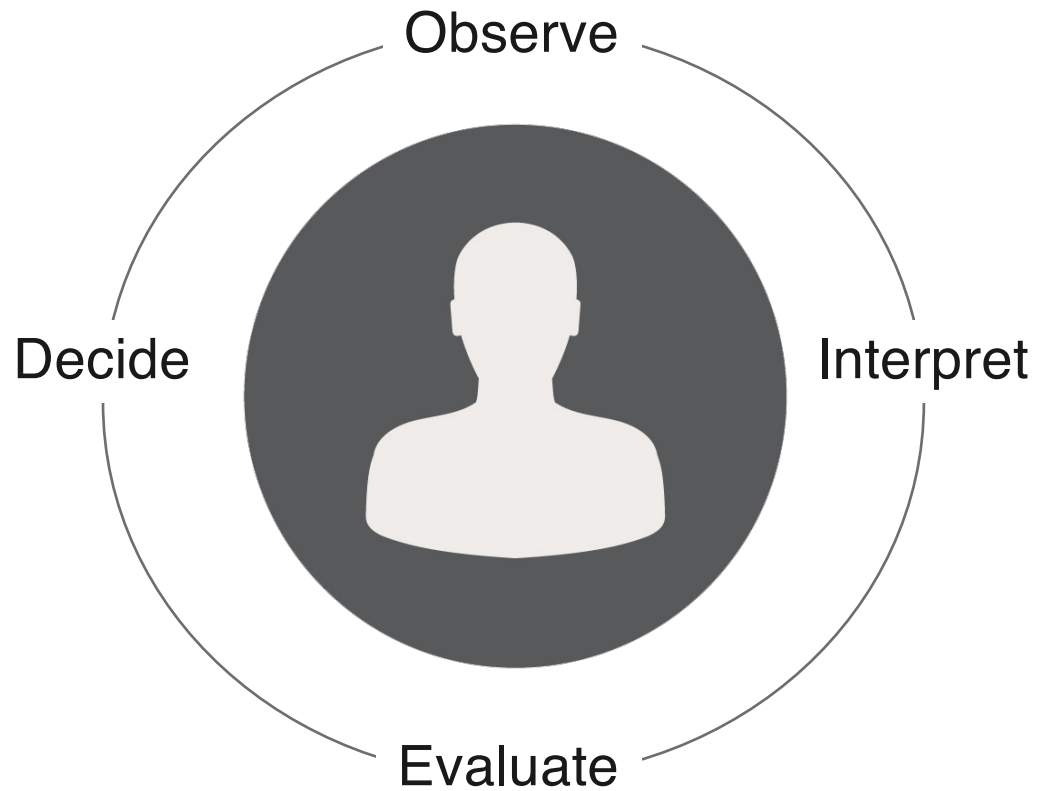
The hands-on portion of the session will focus on a 4-part lab. First 3 parts focus on building reusable APIs that expose IBM Watson's Text to Speech and Personality Insights services. The last part will use a prebuild web application to consume these services.

Demo

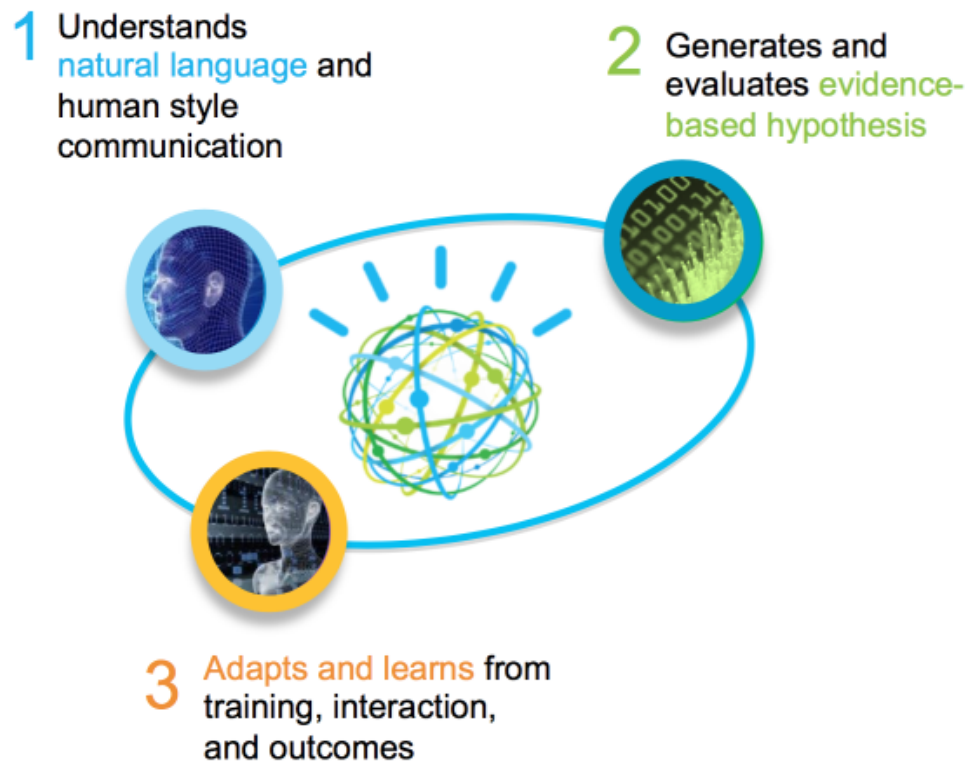
Video demonstration on how to "Train" IBM Watson services. In specific, the demo will cover visual recognition service that can be used to identify images.



How cognition works...



IBM Watson mimics human thinking...



Watson

Understands

- text, voice, video, images
- Context

Reasons

- Generates and evaluates hypotheses
- Weigh option and evidence

Learns

- Adapts and learns and improves
- Continuous feedback loop

Cognitive is the next generation of computing

IBM Watson's expanding set of cognitive services



IBM Watson Personality Insights



Enables deeper Understanding of people's personality,

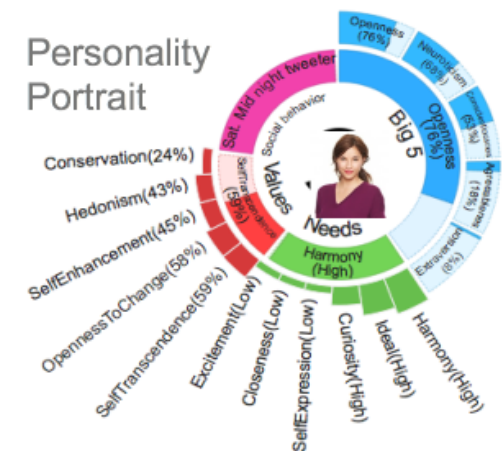
characteristics, needs, and values to help engage users on their own term



Linguistic Analytics



Personality Portrait



IBM Watson Text to Speech

Science Behind the Scene....

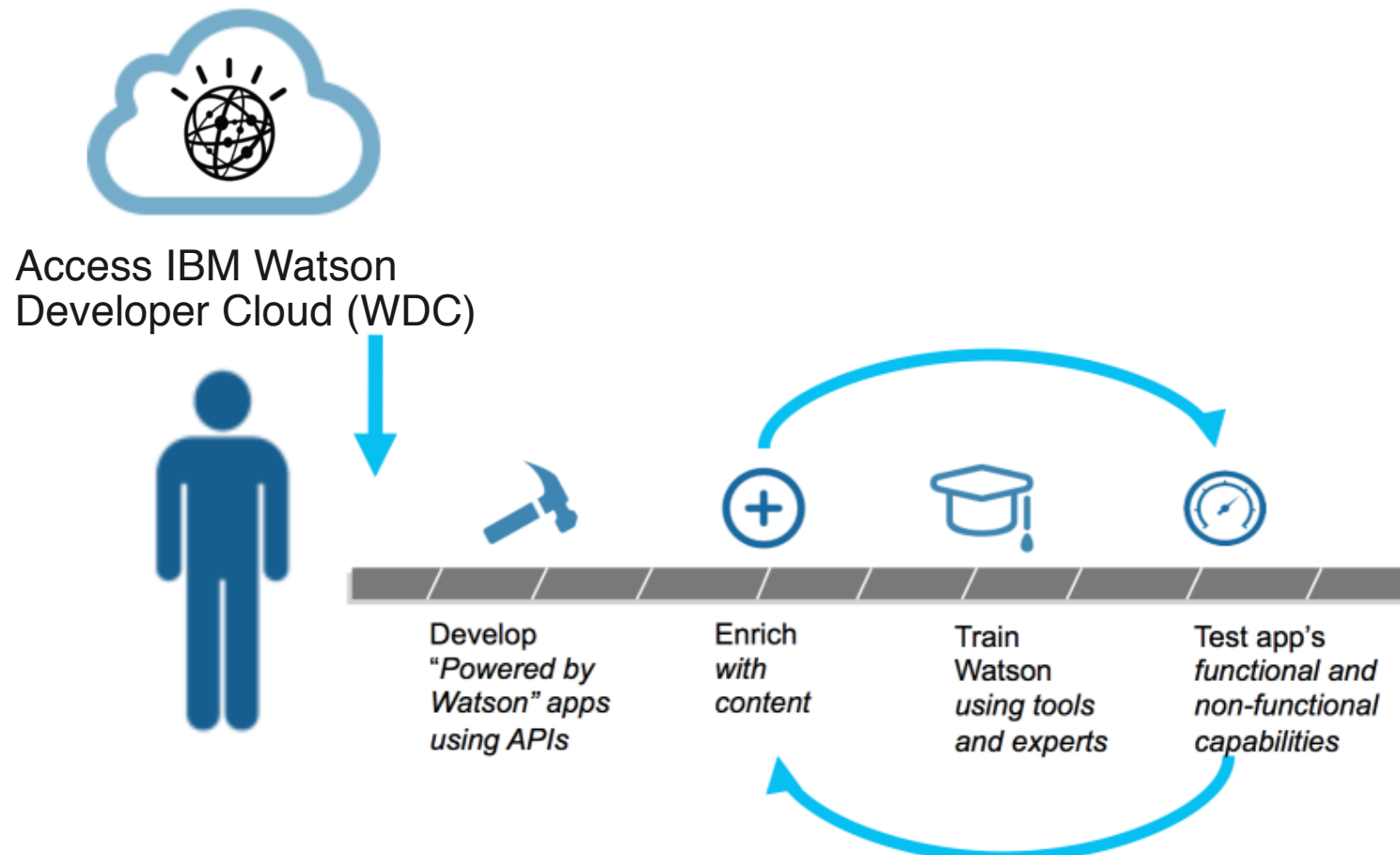
- Watson T2S system relies on acoustic models based on decision trees
- The models generate acoustic candidates to perform searches based on contextual features of the text.
- Watson T2S system uses **PSOLA** (Pitch Synchronous Overlap and Add) DSP technique
- The system can modify the pitch and duration of a speech signal. The service uses a text-processing front- end to parse the text before synthesizing it into audio for
- Based on research papers:
 - Database Mining for Flexible Concatenative Text-to-Speech
 - Automatic Exploration of Corpus-Specific Properties
 - Evaluation of the IBM Expressive Text-to-Speech Synthesis System
 - The IBM Submission to the 2008 Text-to-Speech Blizzard Challenge
 - The IBM expressive text-to-speech synthesis system for American English
 - Frequency warping based on mapping formant parameters.

Features

- Given a text, this service synthesizes audio with proper cadence and annotation
- Support Customizations
 - Allows user to “Train” the service
- Supports 9 different languages at the moment
 - Both female and male voices
- Watson Developer Cloud (WDC)
 - Node JS
- Native SDK for mobile devices
 - Android SDK
 - iOS SDK

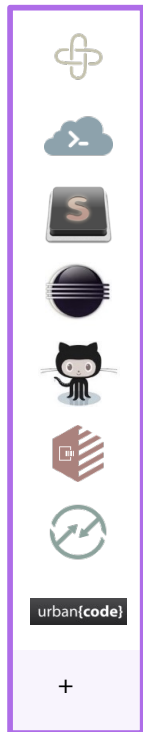


The process of building cognitive apps..



IBM Bluemix Architecture

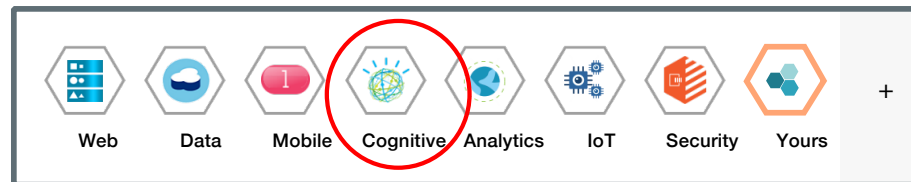
DevOps Tooling



Your Own Hosted Apps / Services



Catalog of Services that Extend Apps' Functionality



Flexible Compute Options to Run Apps



Platform Deployment Options to meet Workload Requirements

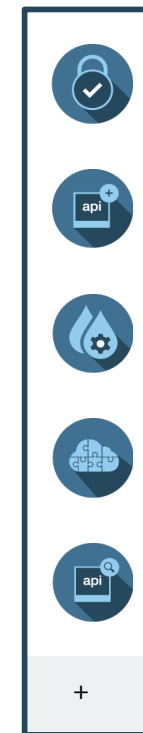


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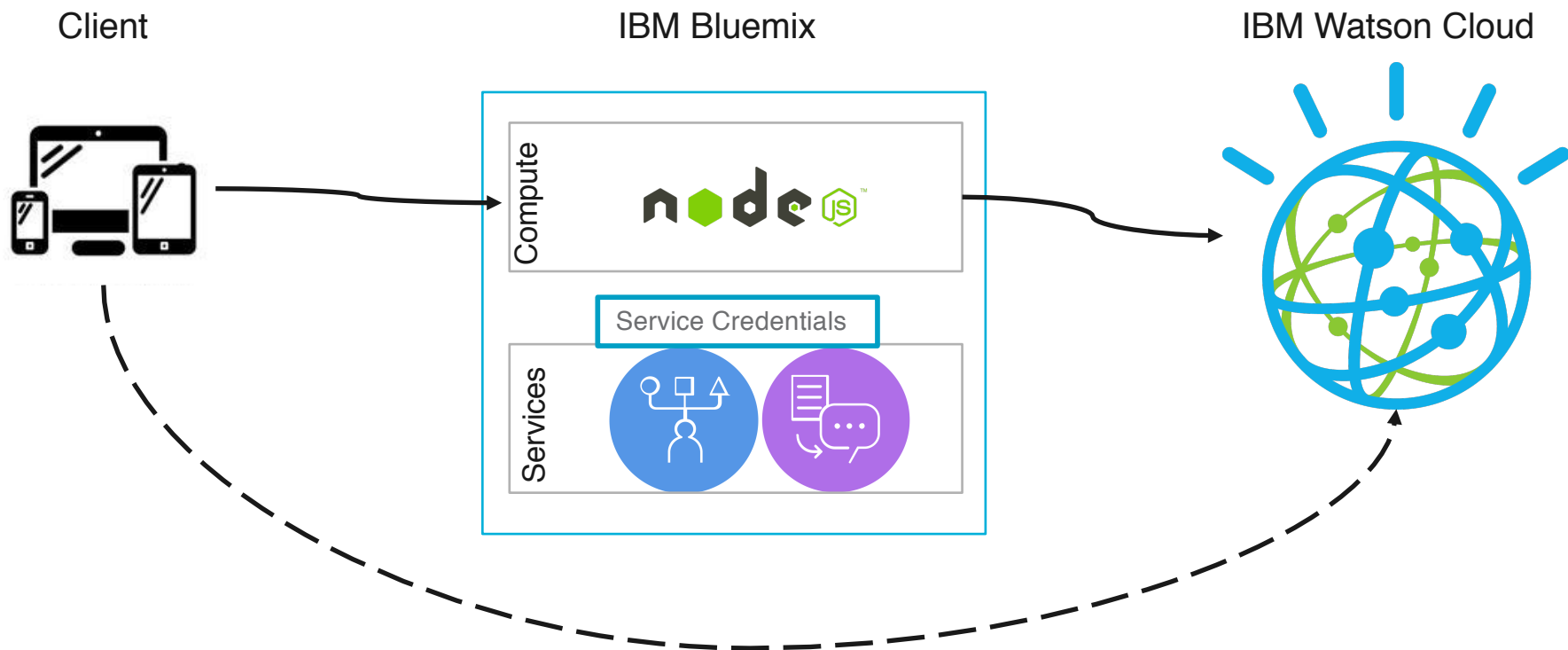
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In Your Data Center

Integration & API Mgmt



IBM Bluemix and IBM Watson Cloud



Labs and Demo

Now you will go through building a set of Cognitive APIs that utilize Watson Developer Cloud SDK.

Lab – Overview

- Part 1 – Setup (20 mins)
- Part 2 – Text to Speech (20 mins)
- Part 3 – Personality Insights (20 mins)
- OPTIONAL Part 4 – Web Application Client Integration (20 mins)
- Video Demo (30 mins)



Lab – Part 1 – Setup

- In lab part 1 you will setup your Bluemix account with necessary cognitive services used in later parts of the lab.
- You will also create the Node JS starter application and download it to student VM.
- Lastly, you will modify the downloaded Node application and push it to Bluemix.
- Time: 20 mins



Lab – Part 2 – Text to Speech

- In lab part 2 you will augment the application created in part 1 by
 - Creating IBM Watson helper module that uses Watson Developer Cloud SDK and Text to Speech API. Helper module will transform binary audio into Base64 string that can be consumed by mobile or web clients.
 - Implementing Node JS Express routes to expose your API
- You will publish the modified application Bluemix
- Finally, you will test the application using Advance REST Client and cURL utilities.
- Time: 20 mins



Lab – Part 2 – Personality Insights

- In lab part 3 you will augment the application created in part 1 by
 - Modifying IBM Watson helper module and expose a new helper method for personality insight analysis. Helper module will only return the big 5 attributes of the personality attributes retrieved from Watson Developer Cloud SDK.
 - Implementing Node JS Express routes to expose your API
- You will publish the modified application Bluemix
- Finally, you will test the application using Advance REST Client and cURL utilities.
- Time: 20 mins



Lab – Part 3 (OPTIONAL) – Web Application

- This the optional In lab part of the lab. This part deals with using a prebuild web application, written in AngularJS and Bootstrap web frameworks.
- The application is provided in the solution folder as a zip file.
- You will modify the application to invoke the APIs you created in previous parts.
- You will publish this application to Bluemix.
- Finally, you will use a web browser client to test the application.
- Time: 20 mins



Demo – Visual Recognition Service

- The last part of the workshop will be a video demo. The demo will discuss how to train IBM Watson Visual Recognition Service to identify a set of images.
- Time: 20 minutes

