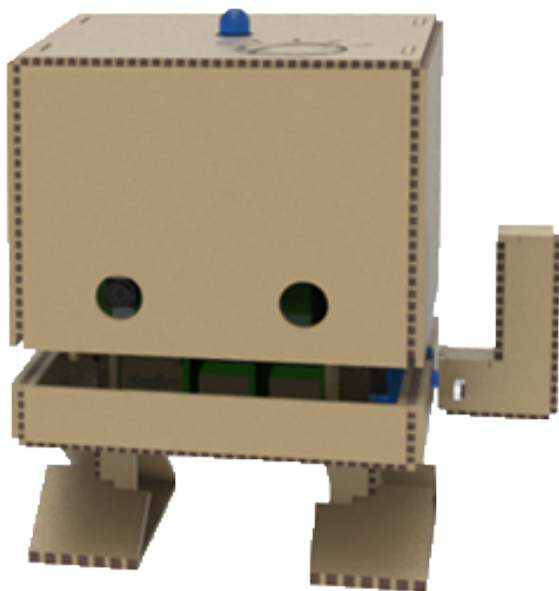


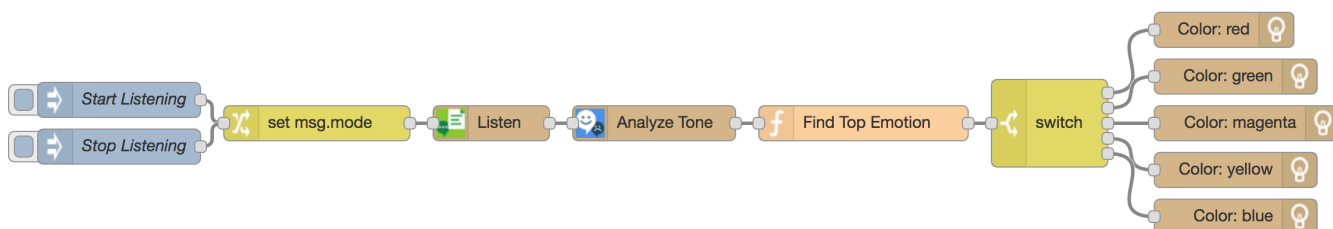
# Emotional LED Light

## TJBot Nodes in Node-RED

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*Use the function node to find top scoring emotion from Watson Tone Analyzer service.*



*Train TJBot to listen using the microphone and the Watson Speech to Text service, analyze emotions in the utterance with the Watson Tone Analyzer service, and control a LED light to represent most prevalent emotion.*




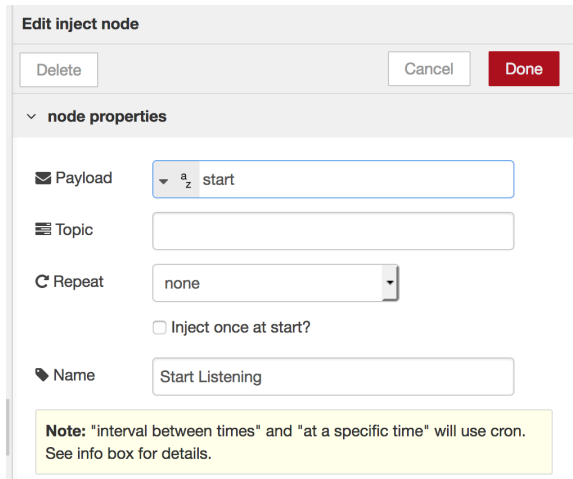
A digital copy of this lab and completed flow can be found at:  
<http://ibm.biz/node-red-tjbot-emotional-light>



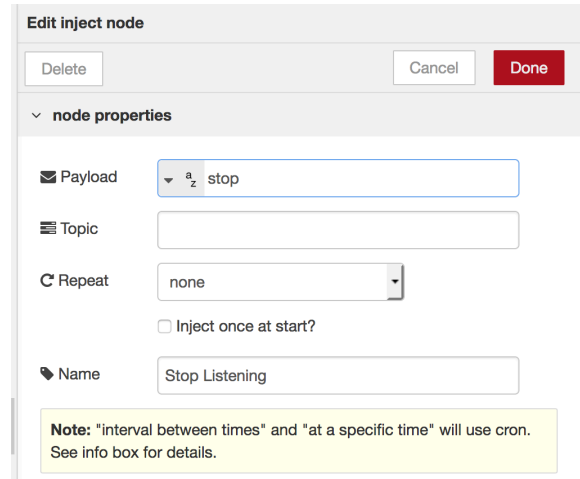
# Train TJBot to Listen and React to Emotions

In this lab, we'll use the listen and analyze tone nodes to train TJBot to listen to utterances and analyze the emotion, lighting up an LED light based on which emotion is most prevalent. You will need a microphone and LED connected to the TJBot for this lab.

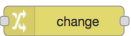
1. In the Node-RED editor running on the Raspberry Pi, drag two  nodes onto the canvas. Double click on each node and configure as shown below.

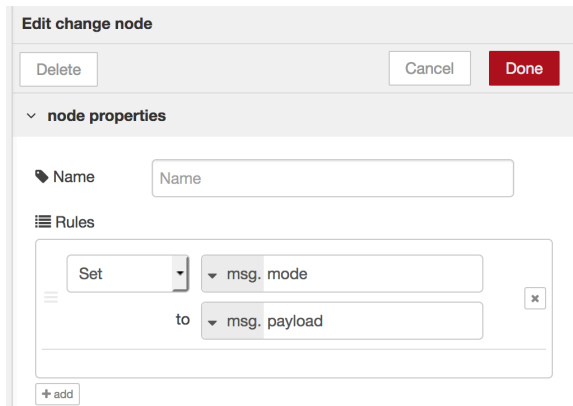


The screenshot shows the 'Edit inject node' dialog for a node named 'Start Listening'. The 'Payload' field is set to 'start', the 'Topic' field is empty, and the 'Repeat' dropdown is set to 'none'. There is an unchecked checkbox for 'Inject once at start?'. A yellow note at the bottom states: 'Note: "interval between times" and "at a specific time" will use cron. See info box for details.'

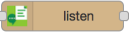


The screenshot shows the 'Edit inject node' dialog for a node named 'Stop Listening'. The 'Payload' field is set to 'stop', the 'Topic' field is empty, and the 'Repeat' dropdown is set to 'none'. There is an unchecked checkbox for 'Inject once at start?'. A yellow note at the bottom states: 'Note: "interval between times" and "at a specific time" will use cron. See info box for details.'

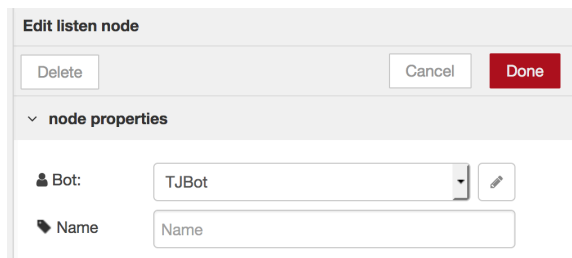
2. Add a  node as shown below. This node will take the payload from the inject nodes and set the **msg.mode** property, which the listen node in the next step will use.



The screenshot shows the 'Edit change node' dialog. The 'Name' field is empty. Under the 'Rules' section, there is a rule configured to 'Set' the 'msg.mode' property 'to' the 'msg.payload' property. There is an '+ add' button at the bottom left.

3. Add a  node as shown below. The listen node has several modes, start and stop, that can be configured programmatically using the **msg.mode** property to start and stop listening. When listening is enabled, the listen node produces messages as TJBot hears and transcribes words, with the text being passed in the **msg.payload** property.

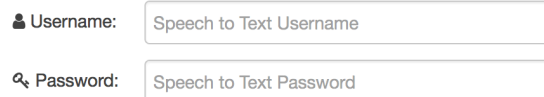
The listen node uses the Watson Speech to Text service, which requires service credentials from IBM Bluemix. Click on the pencil icon to the right of the **Bot** dropdown menu.



Dialog titled "Edit listen node" with buttons "Delete", "Cancel", and "Done". Under "node properties", there is a "Bot:" dropdown menu with "TJBot" selected and a pencil icon to its right, and a "Name:" text input field with "Name" as the placeholder.

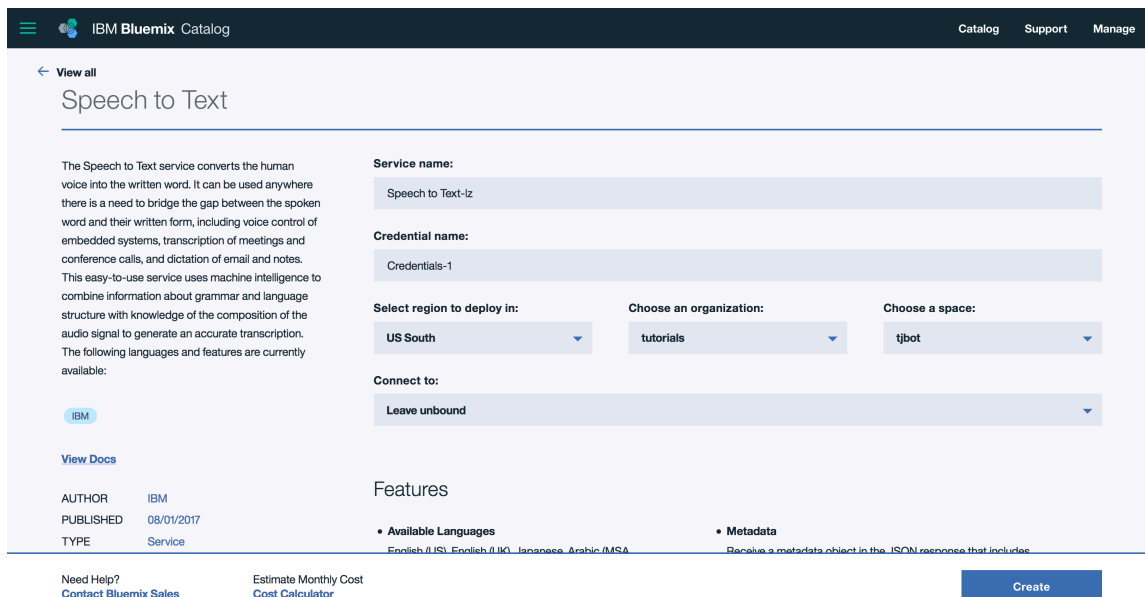
4. Click on the link icon next to the **Speech to Text** heading to launch into the IBM Bluemix console and create a Watson Speech to Text service instance.

#### Speech to Text



Form with two input fields: "Username:" with placeholder "Speech to Text Username" and "Password:" with placeholder "Speech to Text Password".

5. If you don't have an IBM Bluemix account, sign up at [bluemix.net](https://bluemix.net). Sign into your account if prompted. Leave the service name as is and click **Create**.



IBM Bluemix Catalog page for "Speech to Text". It includes a description of the service, a "View Docs" link, and a "Create" button. The "Create" button is highlighted in blue.

Service name: Speech to Text-lz

Credential name: Credentials-1

Select region to deploy in: US South

Choose an organization: tutorials

Choose a space: tjb0t

Connect to: Leave unbound

Features

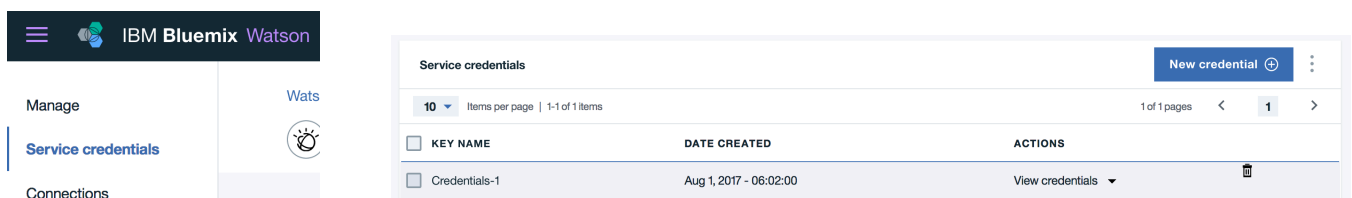
- Available Languages: English (US), English (UK), Japanese, Arabic (MSA)
- Metadata: Because a metadata object in the JSON response that includes

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Estimate Monthly Cost [Cost Calculator](#)

[Create](#)

6. Click on **Service Credentials** in the menu on the left. Click on **View Credentials** to display the service credentials.



IBM Bluemix Watson "Service credentials" page. It shows a table with one credential named "Credentials-1" created on "Aug 1, 2017 - 06:02:00". The "View credentials" link is highlighted.

KEY NAME	DATE CREATED	ACTIONS
Credentials-1	Aug 1, 2017 - 06:02:00	<a href="#">View credentials</a>

7. Copy the username and password into the fields back in the Node-RED editor under the **Speech to Text** section.

```
{
  "url": "https://stream.watsonplatform.net/speech-to-text/api",
  "username": "cf63b1f3-ef18-4628-86c8-6b1871e076b9",
  "password": "MWNwz3qcdIab"
}
```


**Speech to Text**  
Username: cf63b1f3-ef18-4628-86c8-6b1871e076b9  
Password: .....

8. Add a  node as shown below. Select **Emotion** from the **Tones** dropdown menu.

The analyze node uses the Watson Tone Analyzer service, which requires service credentials from IBM Bluemix. Click on the pencil icon to the right of the **Bot** dropdown menu.

**Edit analyze tone node**  
Delete Cancel Done

**node properties**

Bot: TJBOT 

Tones: Emotion

Name: Name

9. Click on the link icon next to the **Tone Analyzer** heading to launch into the IBM Bluemix console and create a Watson Tone Analyzer service instance.

**Tone Analyzer**

Username: Tone Analyzer Username

Password: Tone Analyzer Password

10. Leave the service name as is and click **Create**.

IBM Bluemix Catalog Catalog Support Manage

**Tone Analyzer**

People show various tones, such as joy, sadness, anger, and agreeableness, in daily communications. Such tones can impact the effectiveness of communication in different contexts. Tone Analyzer leverages cognitive linguistic analysis to identify a variety of tones at both the sentence and document level. This insight can then be used to refine and improve communications. It detects three types of tones, including emotion (anger, disgust, fear, joy and sadness), social propensities (openness, conscientiousness, extroversion, agreeableness, and emotional range), and language styles (analytical, confident and tentative) from text.

Service name: Tone Analyzer-5p

Credential name: Credentials-1

Select region to deploy in: US South

Choose an organization: tutorials

Choose a space: tjbot

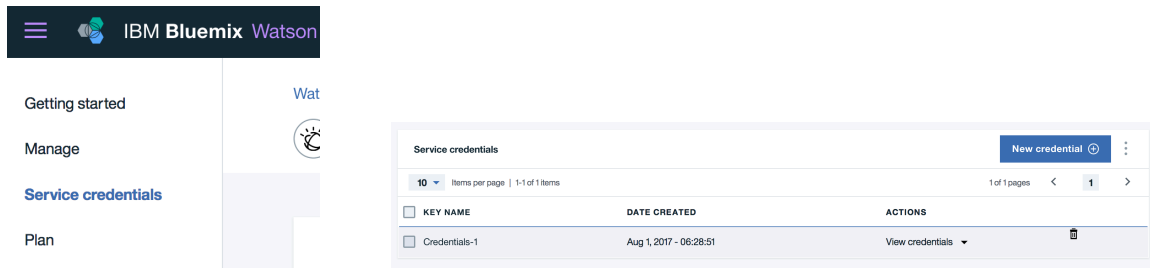
Connect to: Leave unbound

**Pricing Plans** Monthly prices shown are for country or region: United States

PLAN	FEATURES	PRICING
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Need Help? Contact Bluemix Sales Estimate Monthly Cost Cost Calculator **Create**

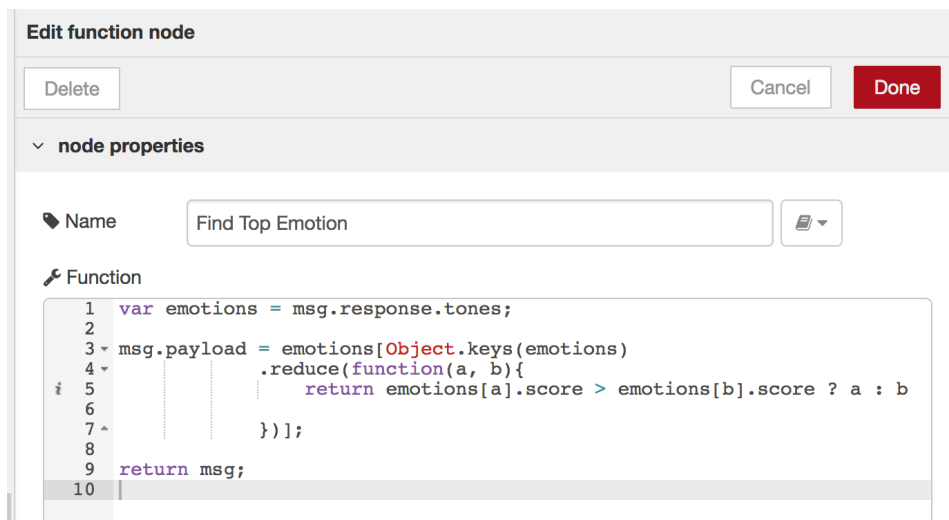
11. Click on **Service Credentials** in the menu on the left. Click on **View Credentials** to display the service credentials.

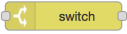


12. Copy the username and password into the fields back in the Node-RED editor under the **Tone Analyzer** section.



13. Watson Tone Analyzer returns scores for five emotions: anger, disgust, fear, joy, and sadness. Use a  **function** node to find the emotion that scores the highest.



14. Add a  switch node to test which emotion scored highest as shown below.

**Edit switch node**

Delete Cancel Done

▼ node properties

📌 Name: Name

Property: msg. payload.tone\_id

==	▼ a_z anger	→ 1	✕
==	▼ a_z disgust	→ 2	✕
==	▼ a_z fear	→ 3	✕
==	▼ a_z joy	→ 4	✕
==	▼ a_z sadness	→ 5	✕

+ add

stopping after first match

15. Add five shine nodes, each with a color representing one of the emotions: red (anger), green (disgust), magenta (fear), yellow (joy), and blue (sadness).

**Edit shine node**

Delete Cancel Done

▼ node properties

👤 Bot: TJBOT

⚙️ Mode: Shine

🎨 Color: red

📌 Name: Name

**Edit shine node**

Delete Cancel Done

▼ node properties

👤 Bot: TJBOT

⚙️ Mode: Shine

🎨 Color: green

📌 Name: Name

**Edit shine node**

Delete Cancel Done

▼ node properties

👤 Bot: TJBOT

⚙️ Mode: Shine

🎨 Color: magenta

📌 Name: Name

**Edit shine node**

Delete Cancel Done

▼ node properties

👤 Bot: TJBOT

⚙️ Mode: Shine

🎨 Color: yellow

📌 Name: Name

Edit shine node

Delete
Cancel
Done

node properties

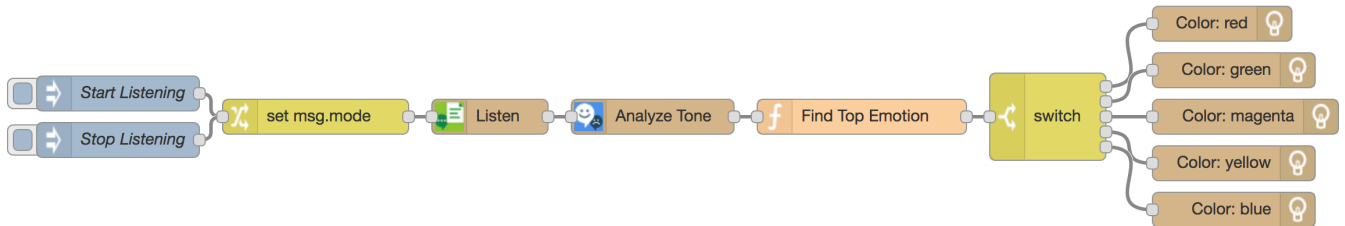
Bot:
TJBot


Mode:
Shine

Color:
blue

Name
Name

16. Connect the nodes together as shown below.



17. Click on the  button in the top-right corner of the Node-RED editor to save and deploy the changes.

18. Click on the tab to the left of the inject node labeled **Start Listening** to activate the microphone. Speak into the microphone and wait for the LED to turn the color that represents the emotion that's most prevalent. Click on the tab to the left of the inject node labeled **Stop Listening** to deactivate the microphone.