Chapter 4: Getting Watson to talk back

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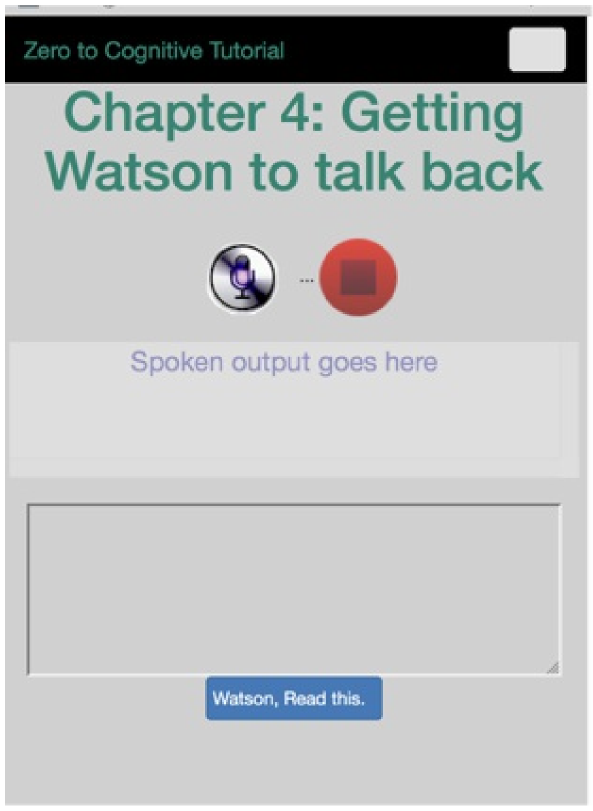
Process

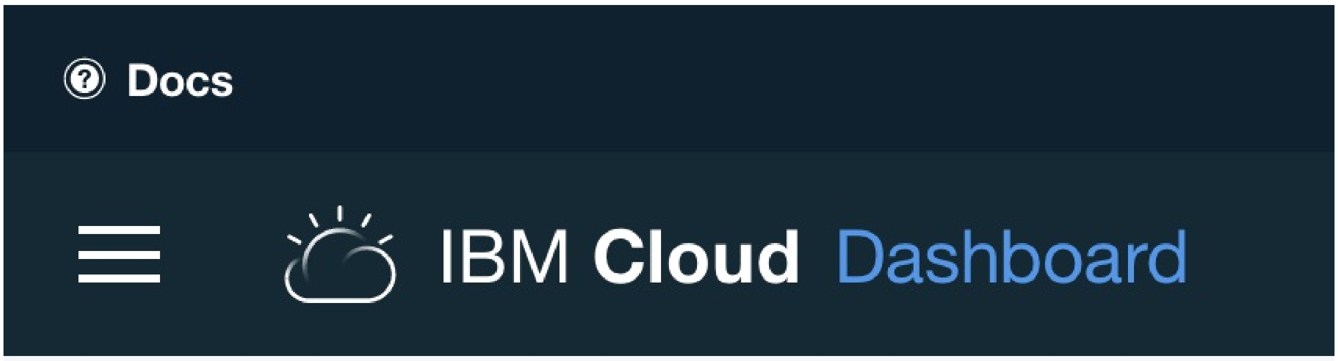
In this chapter, we will

- create our second service in IBM Cloud, Watson Text to Speech
- copy the credentials from IBM Cloud to our env.json file
- update our server code so that we can synthesize the written word into sound
- update our html file so that we have a place to put the words we want Watson to say
- update our browser javascript file to read that text and tell watson to talk to us.
- Our app will look like this when we're done:

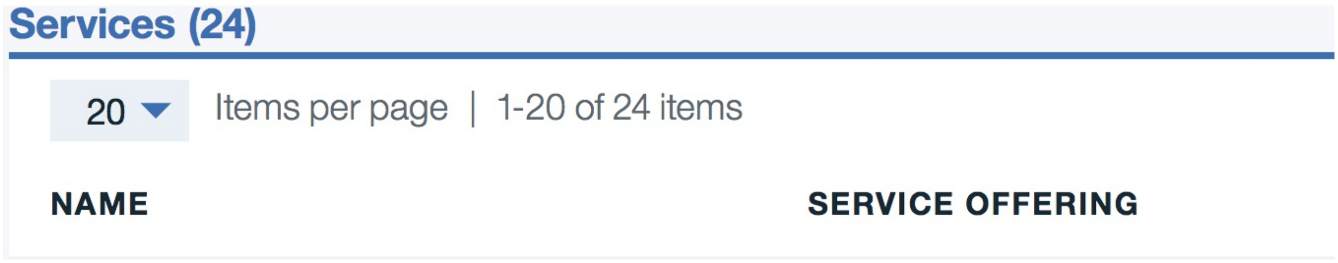

Zero to Cognitive Tutorial
Chapter 4: Getting Watson to talk back
Spoken output goes here
Watson, Read this.

Create a new service in IBM Cloud (formerly IBM Bluemix)

After you , click on the 'hamburger' menu on the top left part of your web page. It's the icon that looks like 3 horizontal lines.



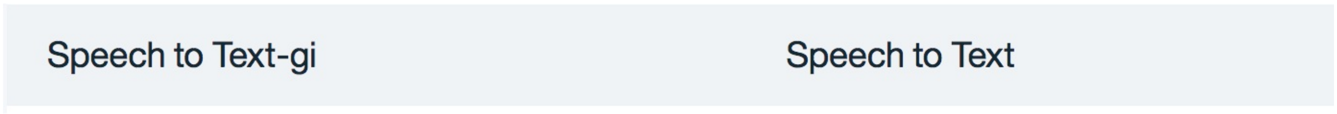
Start by navigating to your Dashboard, which is one of the first options to show up when you click on the hamburger menu. When your dashboard loads, please go to the services section:


Services (24)

20 Items per page | 1-20 of 24 items

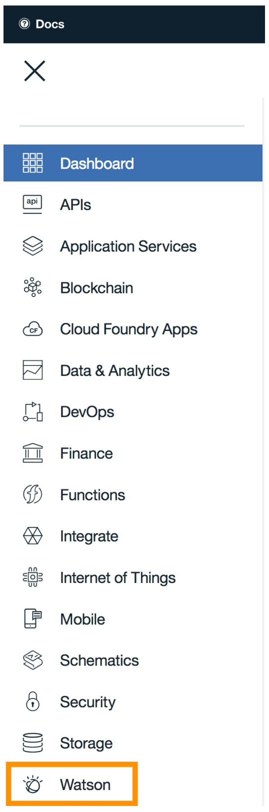
NAME	SERVICE OFFERING

You're looking to see if you already have a text to speech service, which will look something like this:

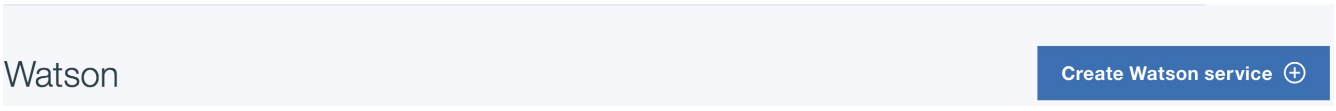


Speech to Text-gi	Speech to Text

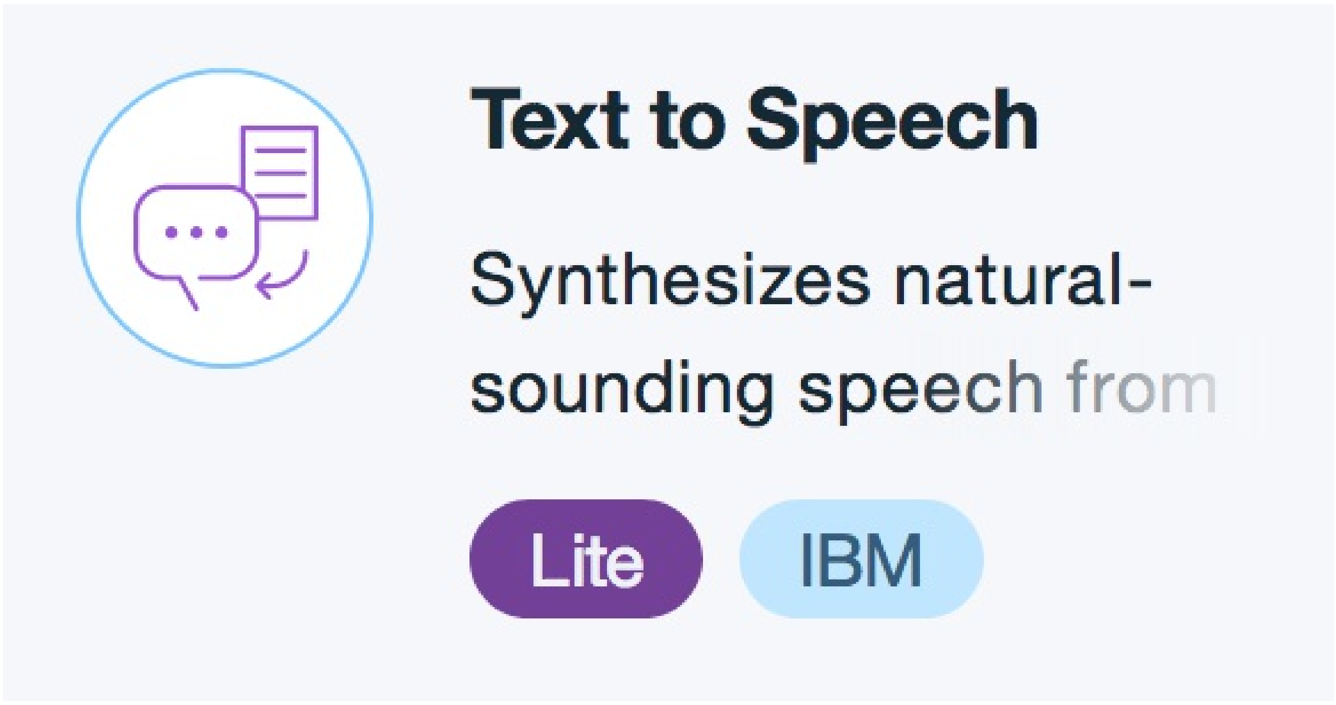
If you already have this service, great! you're ready for the next step, if not, then you need to create one, which you will do by first clicking on the hamburger menu and then selecting Watson. The list is aphabetically



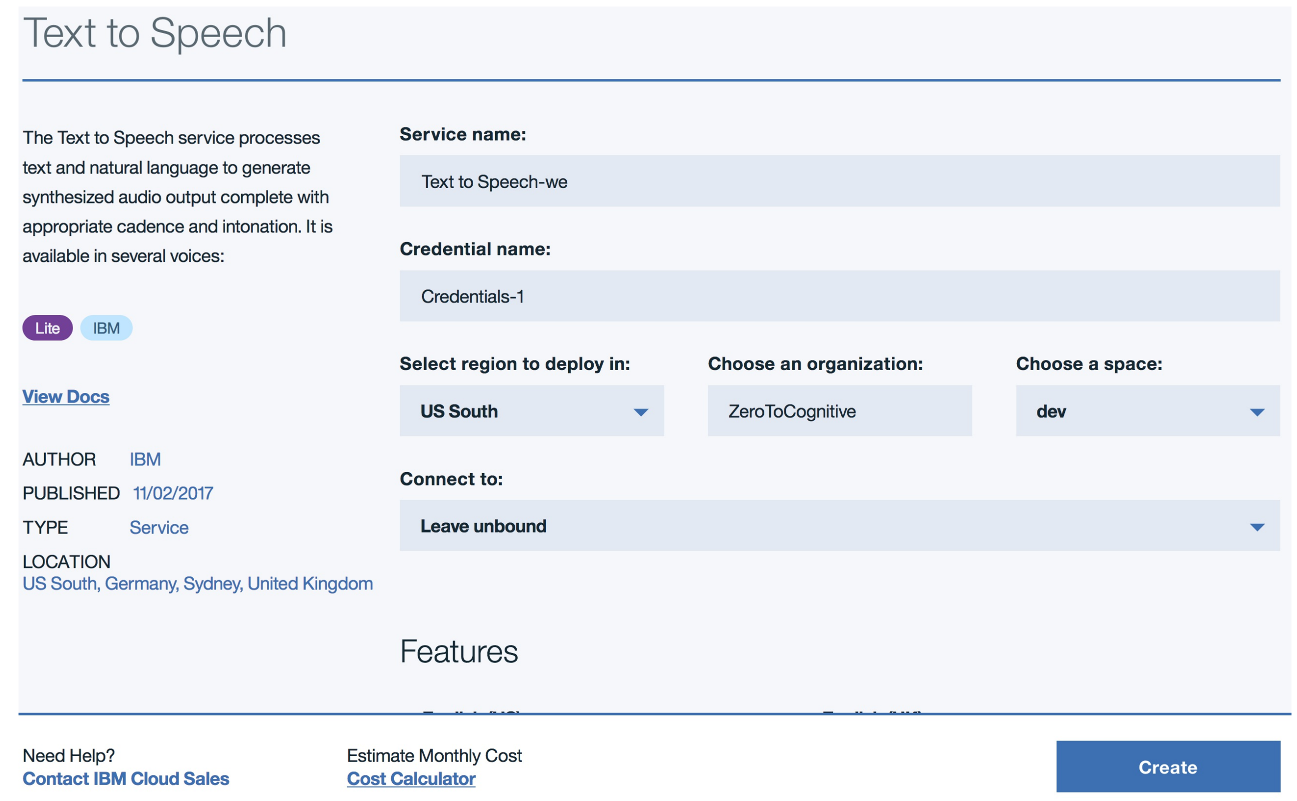
sorted, so Watson will be near the end: When you click on it, you will be shown your current Watson services, since you don't yet have Text to Speech, click on the Create button



and then select the Text to Speech service from the following list:



Once you have selected the service, you want to create the service:


Text to Speech

The Text to Speech service processes text and natural language to generate synthesized audio output complete with appropriate cadence and intonation. It is available in several voices:

AUTHOR IBM
PUBLISHED 11/02/2017
TYPE Service
LOCATION
US South, Germany, Sydney, United Kingdom

Service name: Text to Speech-we

Credential name: Credentials-1

Select region to deploy in: US South

Choose an organization: ZeroToCognitive

Choose a space: dev

Connect to: Leave unbound

Copy your credentials

After creating the service, you will need to update two files in your local system. You'll update env.json with your credentials, remembering that username and password are unique for each IBM Cloud service which you access

```
{
   "speech_to_text": {
     "version": "v1",
     "url":
"https://stream.watsonplatform.net/speech-to-
text/api",
     "password": "stt password",
     "username": "stt user name"
     },

     "text_to_speech": {
         "version": "v1",
         "url":
```

```
"https://stream.watsonplatform.net/text-to-
speech/api",
         "password": "tts password",
         "username": "tts user name"
     }
}
```

and the manifest.yml file with the name of your new service, replacing the -xx in the example below with the correct names of your services. You'll note, below, that the name is more than just Z2C. Names in IBM Cloud must be globally unique in each geographic instance (North America, UK, Europe, Australia) and over 10,000 people have started this tutorial. So I recommend that you use some portion of your email address (without the '@' symbol) as part of your application name:

```
Applications:
- path: .
  memory: 128M
  instances: 1
  domain: mybluemix.net
  name: Z2C-youremailshortname-Chapter04
  host: Z2C-youremailshortname-Chapter04
  disk_quota: 1024M
  services:
    - Speech to Text-xx
    - Text to Speech-xx
```

Congratulations! You've created your second IBM Cloud and Watson service!

NodeJS Server code

In the previous chapter, we created a token for the Speech to Text service to work. In this chapter, we need to synthesize the text to turn it into the right sounds. Watson understands many languages, so you can write in multiple languages and Watson will correctly read back what you have said.

The server code is enhanced with the following new routine:

```
exports.tts_synthesize = function(req, res) {
  console.log("tts_synthesize entered");
  // use the environment variables to configure text
to speech
    var ttsConfig =
watson.text_to_speech(config.text_to_speech);
    // give the synthesizer the data from the
browser.
    // you may find that you get errors if you send
in an empty text string.
    // this can be avoided by testing req.query to
see if it has any text in it
    // that would be a good exercise to extend this
code
    var transcript = ttsConfig.synthesize(req.query);
    transcript.on('response', function(response) {
      if (req.query.download) {
        response.headers['content-disposition'] =
'attachment; filename=transcript.ogg';
      }
    });
    // if there's an error, log it to the server
console window.
    transcript.on('error', function(error) {
console.log("error encountered: "+error);
next(error); });
    // pipe sends the sound as a stream (vs a
downloaded file) back to the browser
    transcript.pipe(res);
}
```

Browser HTML

Now that the server has been updated, we need to do the same thing for the browser app. We need to add HTML to support an input field and to support a new 'talk' button. The core of our HTML contains the following lines:

```
             <div class="app_container" id="body">
                 <div class="row">
                     <div class="col-md-6 text-
center" style="color: #008571; ">
                         <h1>Chapter 4: Getting
Watson to talk back</h1>
                     </div>
                   </div>
                   <div class="row">
                     <br/>
                     <div class="col-md-6"><center>
<img id="microphone" src="icons/microphone.png"> ...
<img id="stop" src="icons/stop.png"></center></div>
                     <br/>
                 </div>
                 <div class="row">
                     <div class="col-md-6">
                       <center><div cols="50"
class="speech-only" id="speech" readonly wrap="soft"
style="height: 5.0em; ">Spoken output goes here</div>
</center>
                     </div>
                   </div>
                   <div class="row">
                     <br/>
                      <div class="col-md-6"><center>
<textarea class="text-only" id="chat" rows="5"
cols="50" ></textarea></center></div>
                   </div>
                   <div class="row">
```

```
                              <div class="col-md-6"><center>
<a id="readText" class="btn btn-primary"
style="padding-left: 0.3em">Watson, Read this.</a>
</center></div>
                          </div>
                          <div class="row">
                            <div class="col-lg-12 col-md-12
col-sm-12">
                              <div class="audioParent">
                                <audio class="audio"
id="a_player">Your browser does not support the audio
element.</audio>
                              </div>
                            </div>
                          </div>
                        </div>
```

The first half is unchanged, below the line reading: `<div cols="50" class="speech-only" id="speech" readonly wrap="soft" style="height: 5.0em; ">Spoken output goes here</div>` we have added three elements:

- a TEXTAREA called 'chat'
- a button called 'readText'
- an audio element called 'a_player'

Browser javascript

Let's look at how we use and interact with the elements. The basic idea is that we will type into the text area, click the button, and listen (via the audio player) to Watson speaking what we wrote. We update the initPage() function with the following code:

```
  // do something useful when the readText button is
clicked.
```

```
  readText.on("click",  function()
  {
    console.log("initiating text-to-speech
service...");
    // if we're going to have Watson talk, we
probably don't want it listening at
    // the same time, so go through the normal 'turn
off the microphone' process.
    // this is missing an if statement, which would
make the code more robust.
    // can you figure out what's missing?
    //
    if (!((typeof(stream) == "undefined") || (stream
== null))) {stream.stop(); }
    _mic.addClass("mic_enabled");
    _mic.removeClass("mic_disabled");
    _stop.addClass("mic_disabled");
    _stop.removeClass("mic_enabled");

    var sessionPermissions =
JSON.parse(localStorage.getItem('sessionPermissions')
) ? 0 : 1;
    // get the text to be turned into an audio signal
    var textString = $("#chat").val();
    // select the voice to use (this is assuming US
English as the language.)
    // change the en-US_AllisonVoice to a different
language if desired.
    var voice = 'en-US_AllisonVoice';
    // get the audio element from the HTML 5 audio
player
    var audio = $("#a_player").get(0);
    // build the url to call to synthesize the text
    var synthesizeURL = '/api/text-to-
speech/synthesize' +
      '?voice=' + voice +
      '&text=' + encodeURIComponent(textString) +
      '&X-WDC-PL-OPT-OUT=' +  sessionPermissions;
    // attach the synthesize URL to the audio player
    audio.src = synthesizeURL
    // and pause it in case it's currently running
    audio.pause();
    // add an event listener and the function to call
when the voice comes back
    audio.addEventListener('canplaythrough',
onCanplaythrough);
    // mute the audio player
    audio.muted = true;
    // set the audio element to play mode, to prepare
it for the returning signal
    audio.play();
    // change the cursor so that there's a visual cue
that we're now waiting on the server
    // to send an audio signal back
    $('body').css('cursor', 'wait');
    $('.readText').css('cursor', 'wait');
    return true;
  });
```

and then we add the new 'onCanPlayThrough() function

```
/**
 * This function is called each time an audio signal
comes back from the server
 */
function onCanplaythrough() {
  console.log('onCanplaythrough');
  // get the audio player (we could save a step if we
passed that in as a parameter from the preceding
function)
  var audio = $('#a_player').get(0);
  // remove the event listener.
  // Why are we doing this?
  // Each time the readText button is clicked, we add
an event listener. But we only want one,
  // so once the event listener process kicks off, we
remove the current listener.
  // this lightens the load on the browser and makes
the application more robust
  audio.removeEventListener('canplaythrough',
onCanplaythrough);
  // some versions of FireFox have an undetermined
bug which causes the audio player to
  // fail if the following try/catch block is missing
  try { audio.currentTime = 0; }
  catch(ex) { // ignore. Firefox just freaks out here
for no apparent reason.
            }
  // display the audio controls
  audio.controls = true;
  // unmute the player
  audio.muted = false;
  // animate the audio player, so that there is a
visual cue on where we are in the
  // current playback
  $('html, body').animate({scrollTop:
$('#a_player').offset().top}, 500);
  // reset the cursor to whatever the user has
specified as their default browser cursor.
  $('body').css('cursor', 'default');
}
```