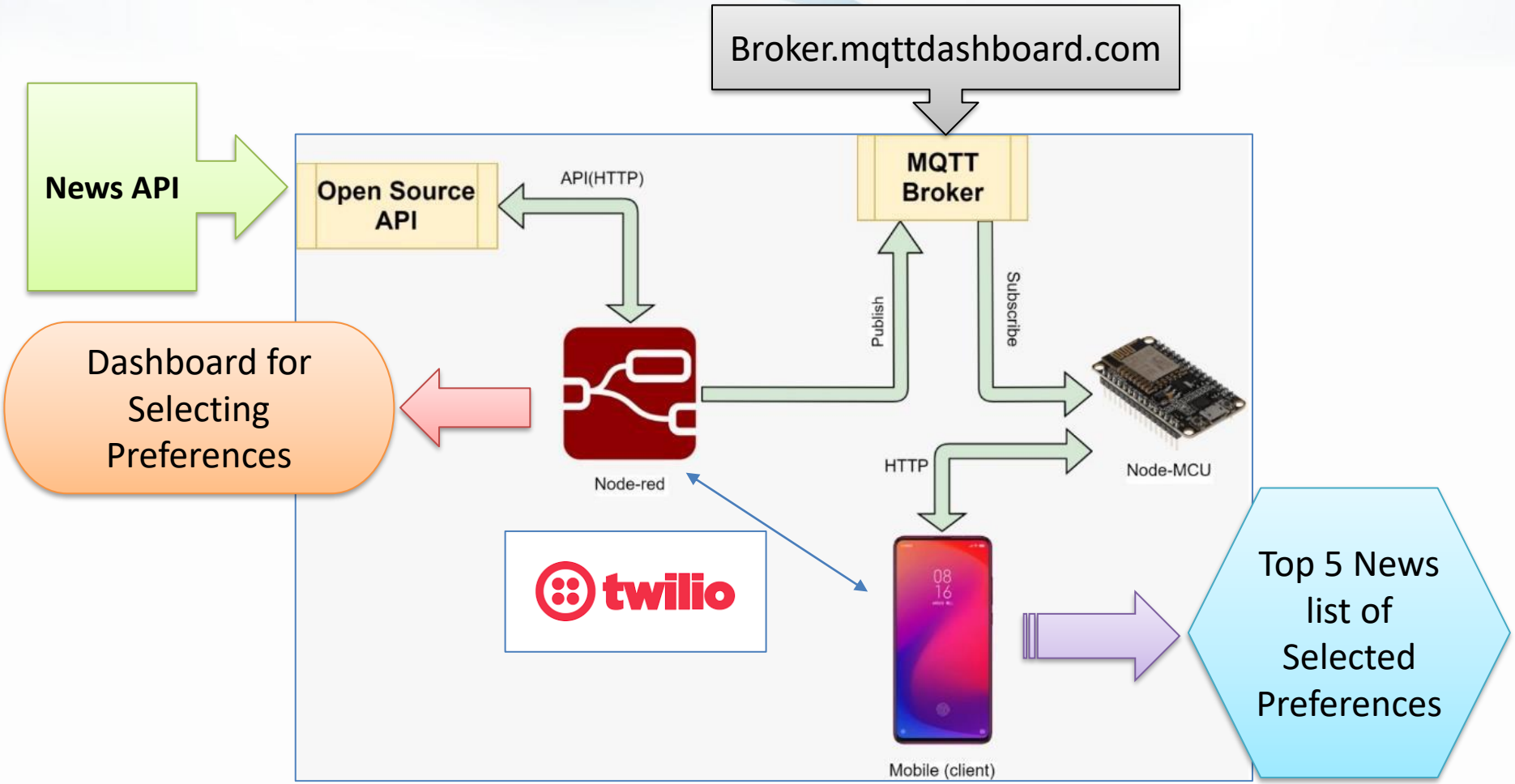
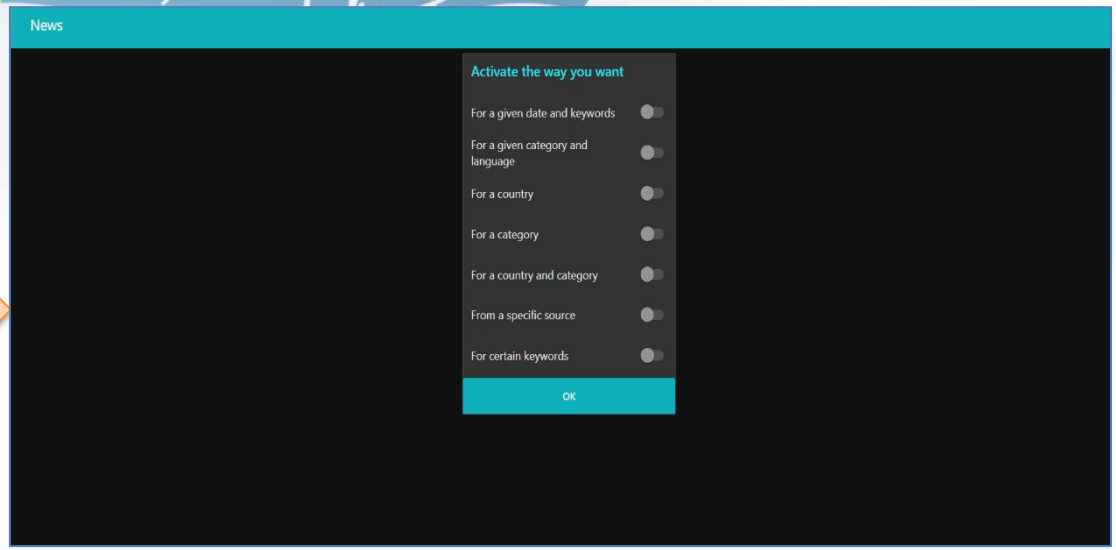
News Classification System

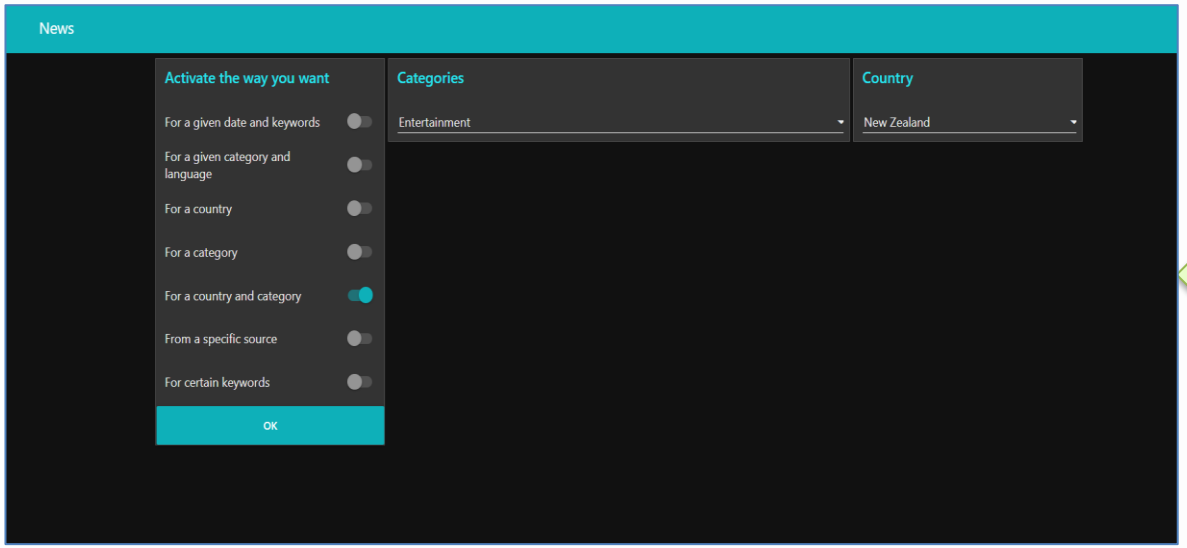
Introduction & System Overview



Node-RED Dashboard

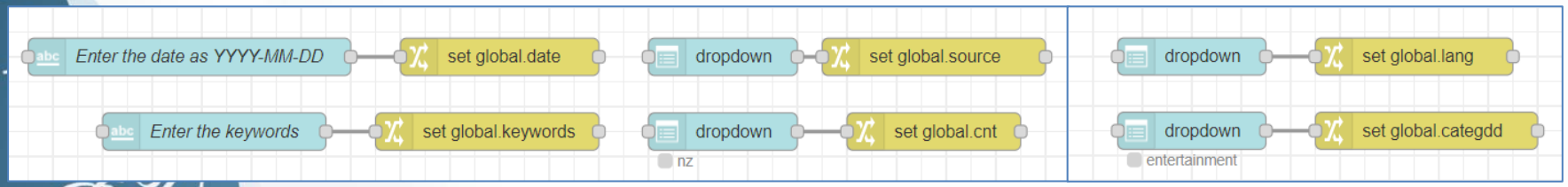
- There are seven ways to get news.
- The user has ability to activate any one of the seven ways shown here at a time.



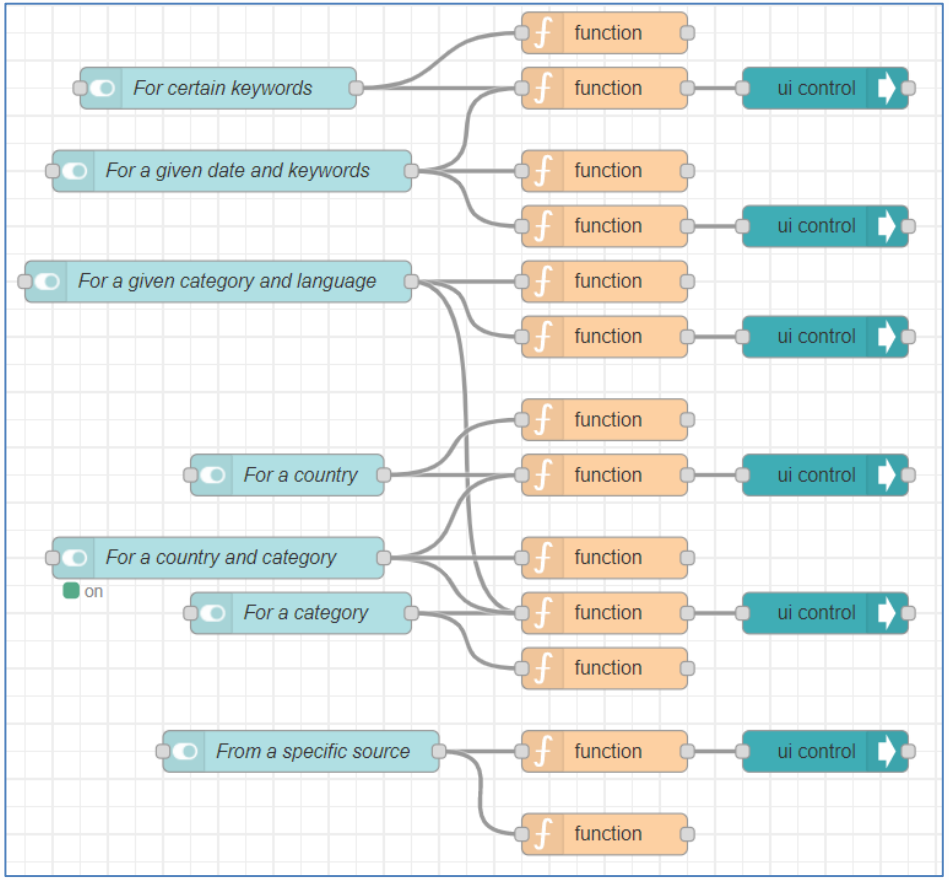


- Once the user has activated the desired mode, the user has ability to enter the required inputs.

Node-RED Flows

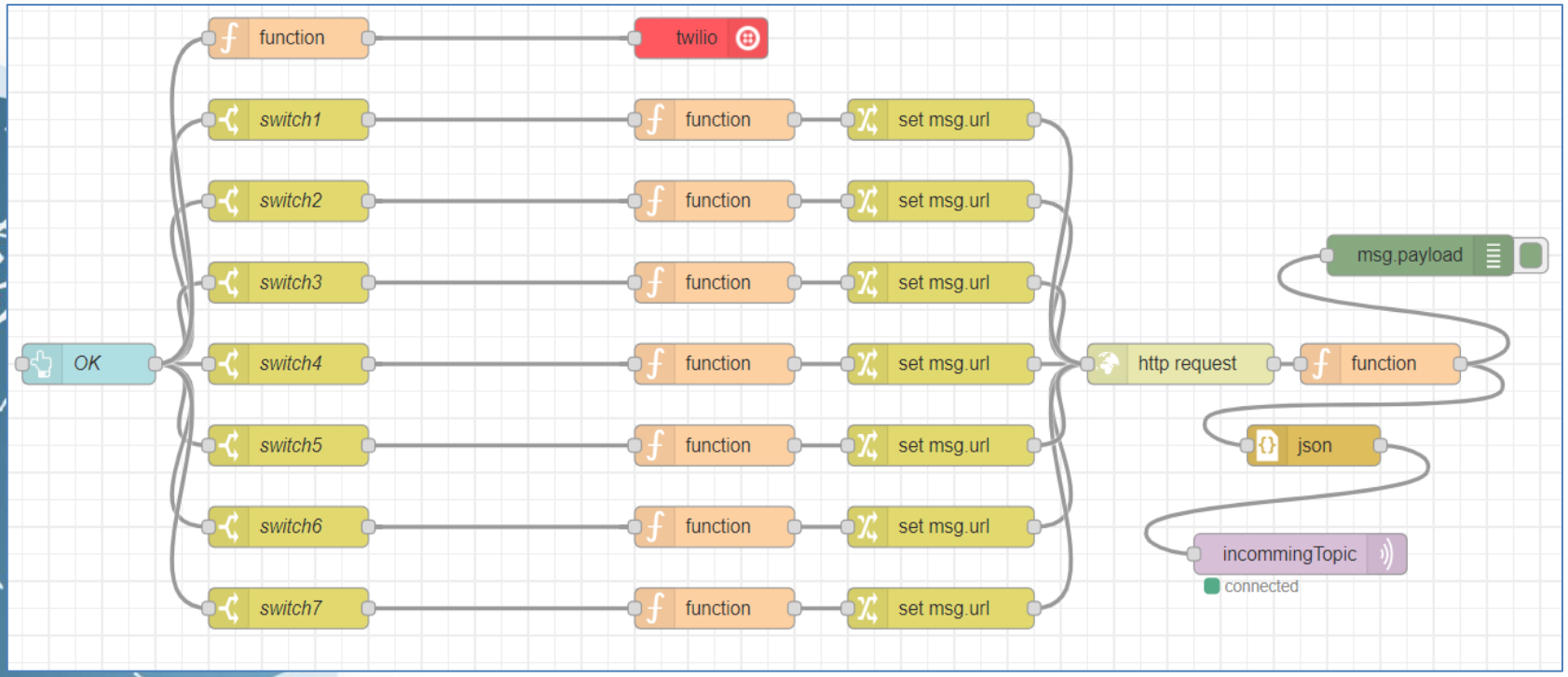


- The section for getting inputs entered by the user



- The flow section that allows the user to activate the way they require news

Node-RED Flows



- ✓ URL is created as a string according to the requirements using the function nodes.
- ✓ URL string is converted to the URL of the http request node using change nodes.
- ✓ The news are taken using http request node.
- ✓ Switches were used to activate only the user-selected path out of the total seven available ways.
- ✓ MQTT out node is used to send the output to Node MCU using MQTT Broker.
- ✓ Twilio node is used to send the link of the html page to user through a SMS.

Message Queuing Telemetry Transport - Publish Subscribe Broker

```
32  void setup_wifi() {
33    delay(10);
34    // We start by connecting to a WiFi network
35    Serial.println();
36    Serial.print("Connecting to ");
37    Serial.println(ssid);
38    WiFi.mode(WIFI_STA);
39    WiFi.begin(ssid, password);
40    while (WiFi.status() != WL_CONNECTED) {
41      delay(500);
42      Serial.print(".");
43    }
44    randomSeed(micros());
45    Serial.println("");
46    Serial.println("WiFi connected");
47    Serial.println("IP address: ");
48    Serial.println(WiFi.localIP());
49  }
```

Setting up the WiFi connection

- For this Client have to provide the SSID and the Password of his/her WiFi Network.
- This connects the Node MCU to the WiFi Access Point.

```
98  void reconnect() {
99    // Loop until we're reconnected
100   while (!client.connected()) {
101     Serial.print("Attempting MQTT connection...");
102     // Create a random client ID
103     String clientId = "ESP8266Client-";
104     clientId += String(random(0xffff), HEX);
105     // Attempt to connect
106     if (client.connect(clientId.c_str())) {
107       Serial.println("connected");
108       // ... and resubscribe
109       client.subscribe("incommingTopic");
110     } else {
111       Serial.print("failed, rc=");
112       Serial.print(client.state());
113       Serial.println(" try again in 5 seconds");
114       // Wait 5 seconds before retrying
115       delay(5000);
116     }
117   }
118 }
```

Subscribing to the MQTT Broker

- The message sent from the Node-RED flows through MQTT broker (https://broker.mqttdashboard.com/) under port 1883 are subscribed to the Node MCU by this part.
- “Incomming topic” has been subscribed here.

Improvements to received String……

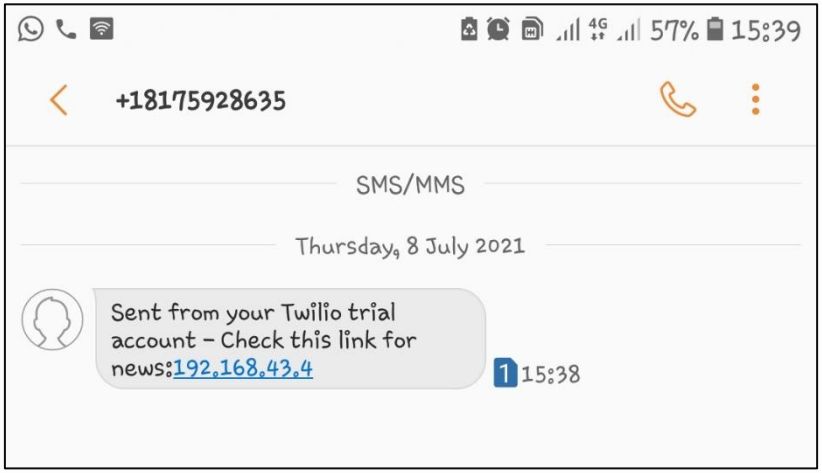
```
50
51  void callback(char* topic, byte* payload, unsigned int length) {
52    char str[length+1];
53    int i = 0;
54    for (int i = 0; i < length; i++) {
55      str[i] = (char)payload[i];
56      Serial.print(str[i]);
57      }
58    str[i] = 0;
59    Serial.println();
60    StaticJsonDocument <32768> doc;
61    deserializeJson(doc,payload);
62    JsonArray arr = doc.as<JsonArray>();
63    int j = 0;
64    for (JsonObject repo : arr) {
65      id[j] = (const char*)repo["source"]["id"];
66      name[j] = (const char*)repo["source"]["name"];
67      author[j] = (const char*)repo["author"];
68      title[j] = (const char*)repo["title"];
69      description[j] = (const char*)repo["description"];
70      url[j] = (const char*)repo["url"];
71      publishedAt[j] = (const char*)repo["publishedAt"];
72      urlToImage[j] = (const char*)repo["urlToImage"];
73      j++;
74      }
75    for (int k = 0; k < 5; k++) {
76      if (name[k] == NULL)
77              name[k] = "Source is not given";
78      if (author[k] == NULL)
79              author[k] = "Anonymous";
80      if (title[k] == NULL)
81              title[k] = "No Title";
82      if (description[k] == NULL)
83              description[k] = " ";
84      if (url[k] == NULL)
85              url[k] = " ";
86      if (urlToImage[k] == NULL)
87              urlToImage[k] = " ";
88      Serial.println("");
89      Serial.println(name[k]);
90      Serial.println(author[k]);
91      Serial.println(title[k]);
92      Serial.println(description[k]);
93      Serial.println(url[k]);
94      Serial.println(urlToImage[k]);
95      }
96  }
```

- ✓ The array of Json send from the Node-RED flows to the Node MCU is in string format.
- ✓ To get these data on to a HLML webpage we had to deserialize the Json array.
- ✓ **ArduinoJson Library** helped in deserialization of the array of Json. (https://arduinojson.org/)
- ✓ All the variables needed to represent the content of a news item were assigned to variables.
- ✓ Then send to the established HTML server at local IP Address.

```
126   // Start LLMNR responder
127   LLMNR.begin("esp8266");
128   Serial.println("LLMNR responder started");
129   // Start HTTP server
130   server.on("/", [] (){
131     String page = "";
132     page += "<!DOCTYPE html>\n";
133     page += "<html>\n";
134     page += "<body>\n";
135     page += "<h1 style=\"font-size:300%;text-align:center;\">" + (String)title[0] + "</h1>\n";
136     page += "<h2>" + (String)name[0] + " - " + (String)author[0] + "</h2>\n";
137     page += "<p style=\"font-size:100%;\">" + (String)description[0] + "</p>\n";
138     page += "<p><a href=\"" + (String)url[0] + "\">Click here for more details!</a></p>\n";
139     page += "<img src=\"" + (String)urlToImage[0] + "\" width=\"500\" height=\"400\">\n";
140     page += "<h1 style=\"font-size:300%;text-align:center;\">" + (String)title[1] + "</h1>\n";
141     page += "<h2>" + (String)name[1] + " - " + (String)author[1] + "</h2>\n";
142     page += "<p style=\"font-size:100%;\">" + (String)description[1] + "</p>\n";
143     page += "<p><a href=\"" + (String)url[1] + "\">Click here for more details!</a></p>\n";
144     page += "<img src=\"" + (String)urlToImage[1] + "\" width=\"500\" height=\"400\">\n";
145     page += "<h1 style=\"font-size:300%;text-align:center;\">" + (String)title[2] + "</h1>\n";
146     page += "<h2>" + (String)name[2] + " - " + (String)author[2] + "</h2>\n";
147     page += "<p style=\"font-size:100%;\">" + (String)description[2] + "</p>\n";
148     page += "<p><a href=\"" + (String)url[2] + "\">Click here for more details!</a></p>\n";
149     page += "<img src=\"" + (String)urlToImage[2] + "\" width=\"500\" height=\"400\">\n";
150     page += "<h1 style=\"font-size:300%;text-align:center;\">" + (String)title[3] + "</h1>\n";
151     page += "<h2>" + (String)name[3] + " - " + (String)author[3] + "</h2>\n";
152     page += "<p style=\"font-size:100%;\">" + (String)description[3] + "</p>\n";
153     page += "<p><a href=\"" + (String)url[3] + "\">Click here for more details!</a></p>\n";
154     page += "<img src=\"" + (String)urlToImage[3] + "\" width=\"500\" height=\"400\">\n";
155     page += "<h1 style=\"font-size:300%;text-align:center;\">" + (String)title[4] + "</h1>\n";
156     page += "<h2>" + (String)name[4] + " - " + (String)author[4] + "</h2>\n";
157     page += "<p style=\"font-size:100%;\">" + (String)description[4] + "</p>\n";
158     page += "<p><a href=\"" + (String)url[4] + "\">Click here for more details!</a></p>\n";
159     page += "<img src=\"" + (String)urlToImage[4] + "\" width=\"500\" height=\"400\">\n";
160     page += "</body>\n";
161     page += "</html>\n";
162     page += "";
163     server.send(200, "text/html", page);
164   });
165   server.begin();
166   Serial.println("HTTP server started");
```

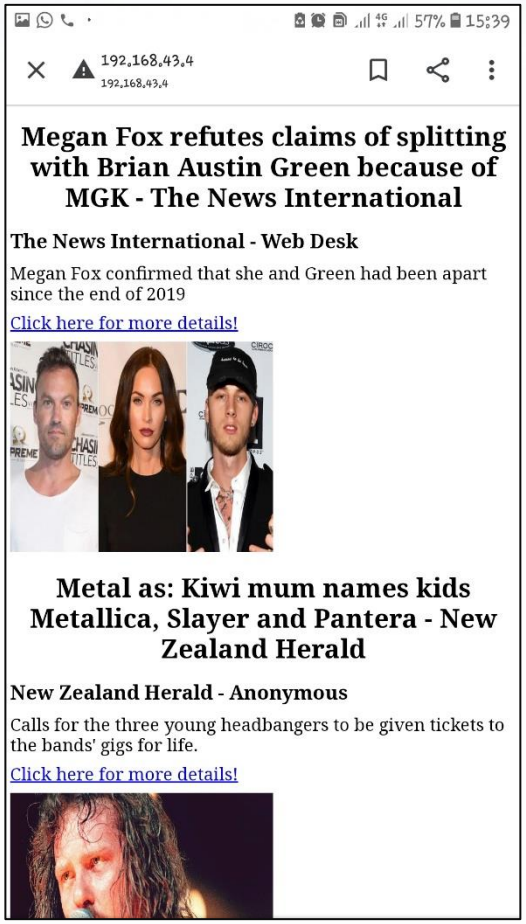
Text Message Notification Preview

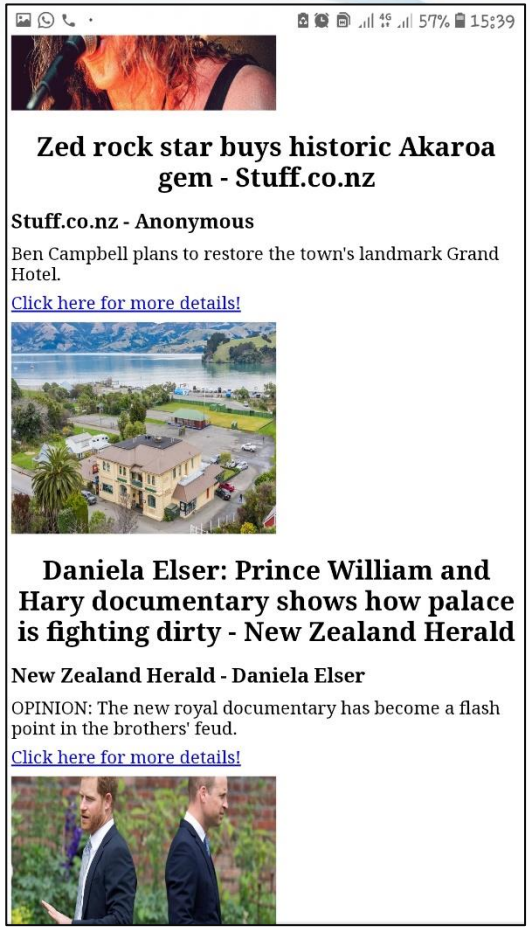
- Text message is received to the client's mobile number through Twilio (a cloud communication platform) indicating the Local IP Address of the Client.
- Twilio is a good platform, where making phone calls, sending and receiving SMS can be done programmatically.
- Clicking the link will redirect the client to the list of Top 5 news items.



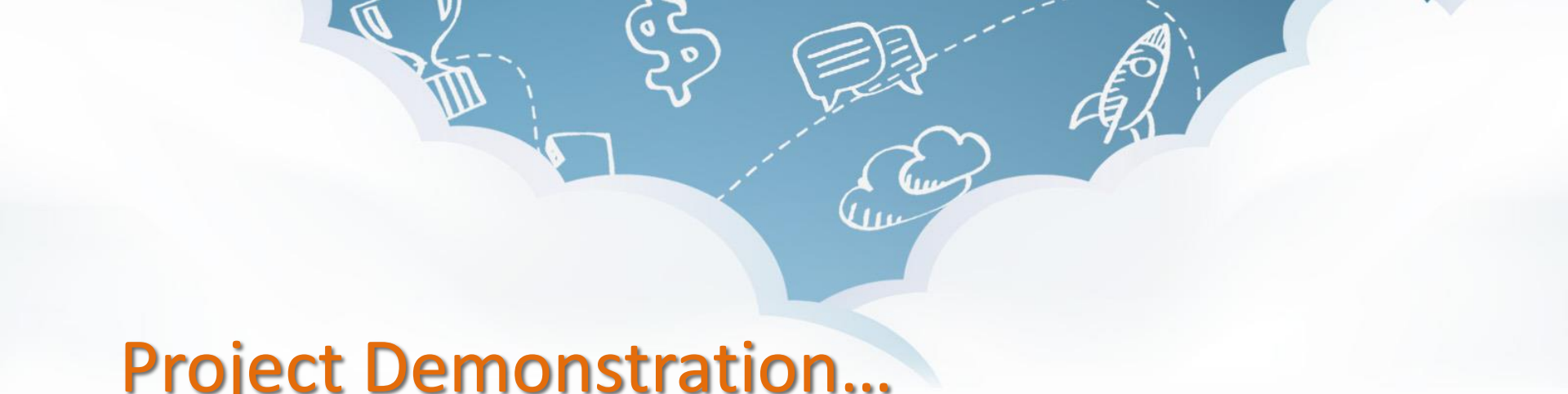
Output Preview – Top 5 News items

- Top 5 news items for the selected preference are displayed in a web page and easily accessible through a smart phone.





Sample outputs taken for Entertainment as Category and New Zealand as Country



Project Demonstration…

Thank You….!

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