

# Internet Of Things

## Lab - 4

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### **Aim :**

To create and use UI Dashboards in Node-RED using concepts of IoT. To create a speedometer and a OTP generator and analysis of its values.

### **Software :**

Node-Red Software.

### **Methodology :**

This video instructions are followed : <https://www.youtube.com/watch?v=O1gFWbAggJ4>

### **Simulation And Output :**

#### **1) Speedometer Module —**

## (1.1) Inject Node

**Edit Inject node**

Delete Cancel Done

**Properties**

Name Bike Accelerator

msg. payload = 80

msg. topic = a<sub>z</sub>

+ add

☐ Inject once after 0.1 seconds, then

Repeat none

☐ Enabled

## (1.2) Gauge Node

**Edit gauge node**

Delete Cancel Done

**Properties**

Group [IoT Devices] IoT Pane 1

Size auto

Type Gauge

Label Speedometer

Value format {{value}}

Units units

Range min 0 max 100

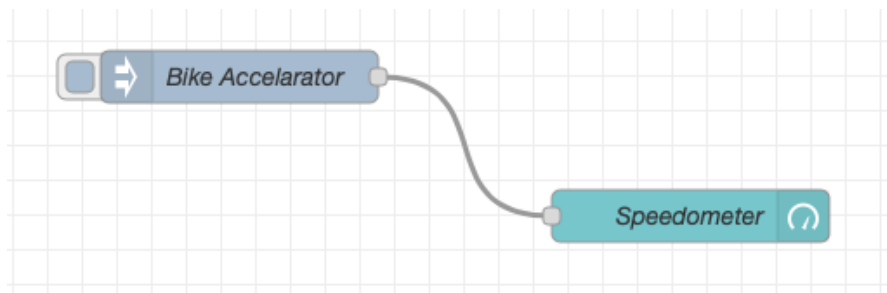
Colour gradient

Sectors 0 ... optional ... optional ... 100

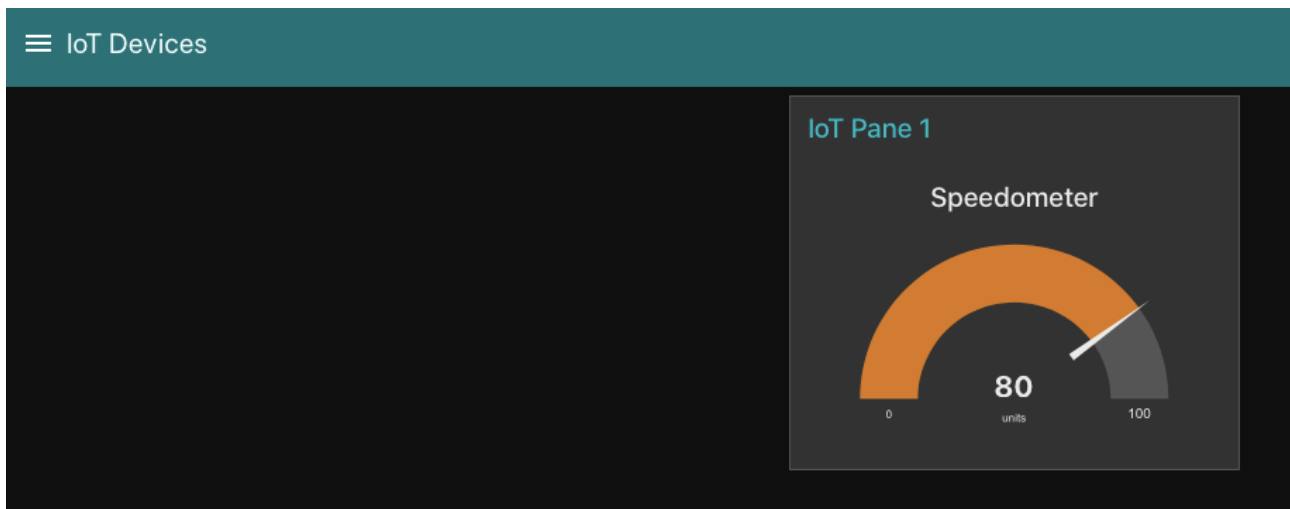
Name Speedometer

☐ Enabled

### (1.3) Complete Flow Diagram



### (1.4) Output



### (1.5) Code

```
[{"id":"afb4bef9.26d5d","type":"tab","label":"UI Guage Lab 4","disabled":false,"info":""},
{"id":"1bb0523d.f9f91e","type":"inject","z":"afb4bef9.26d5d","name":"Bike Accelerator","props":[{"p":"payload"}, {"p":"topic","vt":"str"}],"repeat":"","crontab":"","once":false,"onceDelay":0.1,"topic":"","payload":"80","payloadType":"num","x":190,"y":120,"wires":[["42e743e4.f2071c"]]},
{"id":"42e743e4.f2071c","type":"ui_gauge","z":"afb4bef9.26d5d","name":"Speedometer","group":"f71cc72.2dac038","order":0,"width":0,"height":0,"gtype":"gage","title":"Speedometer","label":"units","format":"{{value}}","min":0,"max":10,"colors":["#00b500","#e6e600","#ca3838"],"seg1":"","seg2":"","x":450,"y":200,"wires":[]},{
"id":"f71cc72.2dac038","type":"ui_group","z":"","name":"IoT Pane 1","tab":"8bf87b26.f8c828","order":1,"disp":true,"width":"6","collapse":false},
{"id":"8bf87b26.f8c828","type":"ui_tab","z":"","name":"IoT Devices","icon":"dashboard","disabled":false,"hidden":false}]
```

## 2) OTP Generation Module —

### (2.1) Inject Node

Edit inject node

Delete Cancel Done

Properties

Name OTP Generator

msg.payload = a\_z OTP Generator

msg.topic = timestamp

+ add

☐ Inject once after 0.1 seconds, then

Repeat interval

every 3 seconds

☐ Enabled

### (2.2) Function Node

Edit function node

Delete Cancel Done

Properties

Name OTP Generator

Setup Function Close

```
1 msg.payload = Math.round(Math.random()*10000)
2 return msg;
```

Outputs 1

## (2.3) Debug Node

Edit debug node

Delete Cancel Done

⚙ Properties

Output

To ☒ debug window  
☐ system console  
☐ node status (32 characters)

Name

☐ Enabled

## (2.4) Chart Node

Edit chart node

Delete Cancel Done

⚙ Properties

Group

Size

Label

Type

Legend  Cutout  %

Series Colours


Blank label

Name

☐ Enabled

## (2.5) Slider Node

Delete

Cancel

Done

⚙️ Properties

🔧 📄 🖨️

📁 Group

[IoT Banking] Bank

✎

📏 Size

auto

🏷️ Label

Slider Node

💡 Tooltip

optional tooltip

↔️ Range

min 0

max 10

step 1

🔗 Output

continuously while sliding

➔ If **msg** arrives on input, set slider to new payload value:

☒

☑️ When changed, send:

Payload

Current value

Topic

🏷️ Name

☐ Enabled

## (2.6) Text Node

Delete

Cancel

Done

⚙️ Properties

🔧 📄 🖨️

📁 Group

[IoT Banking] Bank

✎

📏 Size

auto

🏷️ Label

Text Node

💡 Tooltip

optional tooltip

⌨️ Mode

text input

⌚ Delay (ms) 300

➔ If **msg** arrives on input, pass through to output:

☒

☑️ When changed, send:

Payload

Current value

Topic

🏷️ Name

Text Node

Setting **Delay** to 0 waits for Enter or Tab key, to send input.

☐ Enabled

## (2.7) Artless Gauge Node

Edit artless-gauge node

Delete

Cancel

Done

Properties

Group

[IoT Banking] Bank

Size

auto

Input

msg.payload

Label

Artless Gauge Node

Icon

fa-fire

Layout

Linear

Mode

☐ differential

Range

Value	Color	Dot
Min 0	<div></div>	0 px
Max 10	<div></div>	0 px

+ add

Line width

3px

Track color

☒ Use theme color

Tickmarks

☐ Show for min and max (and center)

Format

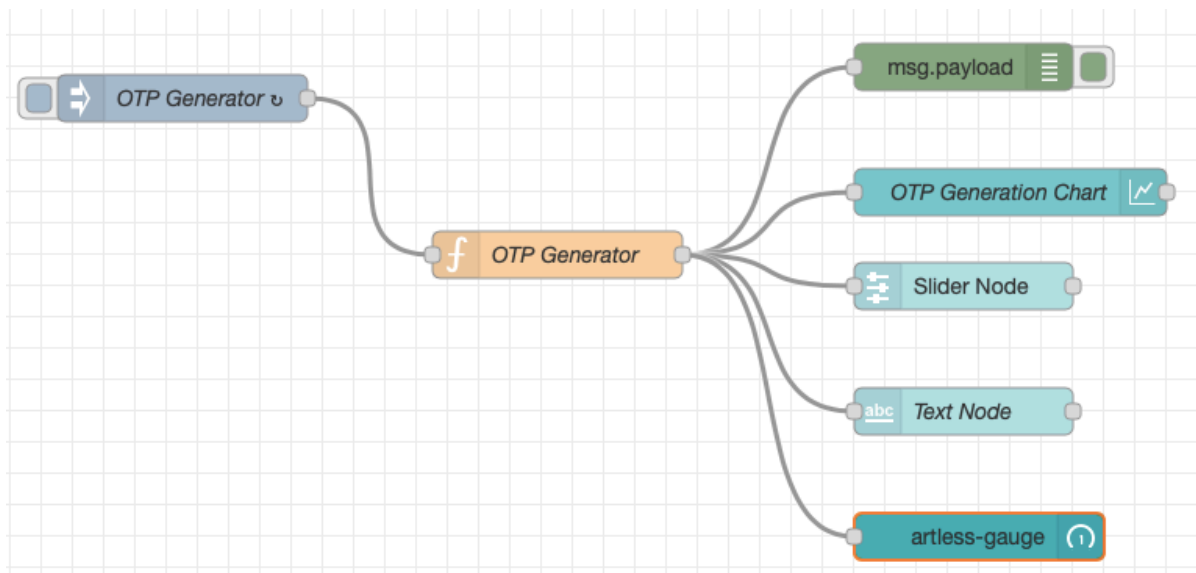
Unit units decimals 0

Name

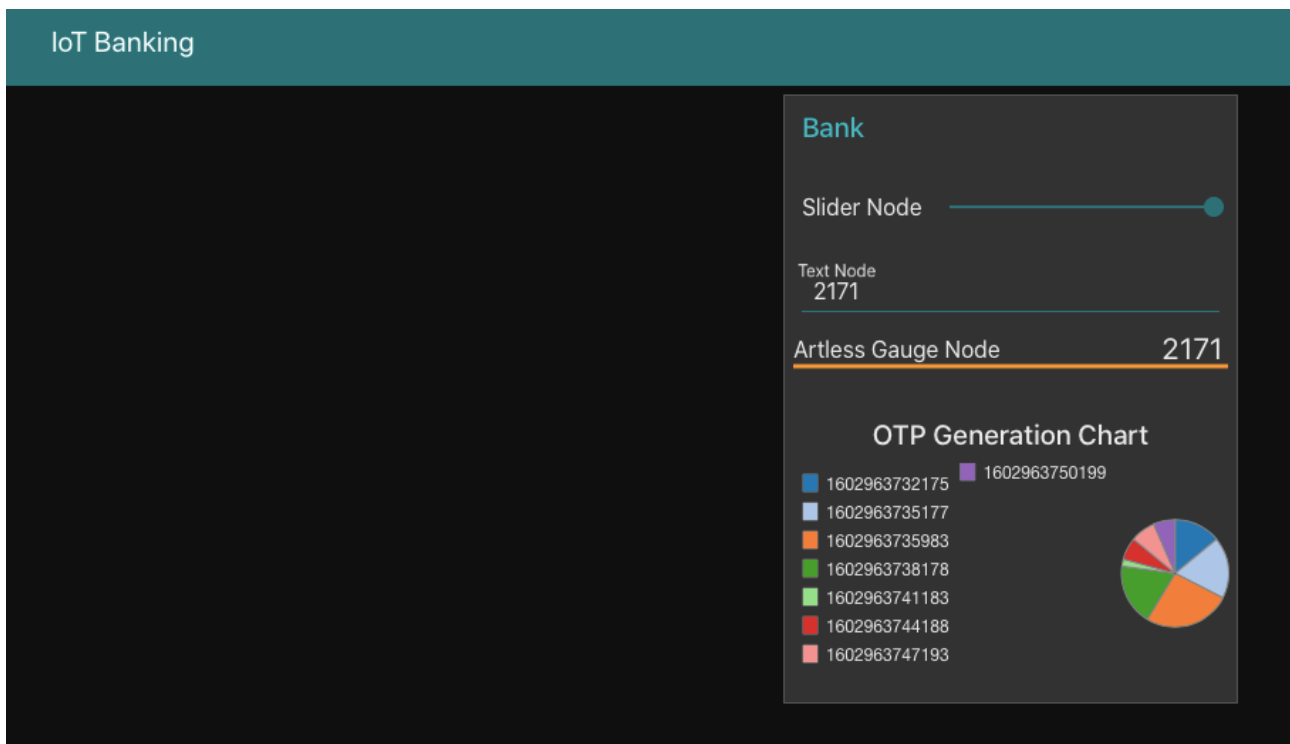
Name

☐ Enabled

## (2.8) Complete Flow Diagram



## (2.9) Output



## (2.10) Code

```
[{"id":"8b8c5e95.4b069","type":"tab","label":"UI based OTP generation Lab 4","disabled":false,"info":""},
{"id":"4c7a850b.d954cc","type":"inject","z":"8b8c5e95.4b069","name":"OTP Generator","props":[{"p":"payload"},
{"p":"topic","v":"","vt":"date"}],"repeat":"3","crontab":"","once":false,"onceDelay":0.1,"topic":"","payload":"OTP Generator","payloadType":"str","x":150,"y":120,"wires":
[["8a3a18ec.897f98"]]},
{"id":"8a3a18ec.897f98","type":"function","z":"8b8c5e95.4b069","name":"OTP Generator","func":"msg.payload =
Math.round(Math.random() * 10000)\nreturn
msg;","outputs":1,"noerr":0,"initialize":"","finalize":"","x":390,"y":220,"wires":
[["52bf8116.813d","1b1a2be.619f7d4","9fc59c4f.ea7b68","3e7a7a9d.484176","a0a281b4.753508"]]},
{"id":"52bf8116.813d","type":"debug","z":"8b8c5e95.4b069","name":"","active":true,"tosidebar":true,"console":false,"tostatus":false,"complete":"payload","targetType":"msg","statusVal":"","statusType":"auto","x":650,"y":100,"wires":[]},
{"id":"1b1a2be.619f7d4","type":"ui_chart","z":"8b8c5e95.4b069","name":"OTP Generation Chart","group":"e0d06160.00286","order":0,"width":0,"height":0,"label":"
```



## OTP Generation

```
Chart,"chartType":"pie","legend":"true","xformat":"HH:mm:ss","interpolate":"linear","nodata":"","dot":false,"ymin":"","ymax":"","removeOlder":1,"removeOlderPoints":"","removeOlderUnit":"3600","cutout":0,"useOneColor":false,"useUTC":false,"colors":["#1f77b4","#aec7e8","#ff7f0e","#2ca02c","#98df8a","#d62728","#ff9896","#9467bd","#c5b0d5"],"useOldStyle":false,"outputs":1,"x":680,"y":180,"wires":[[]]},{"id":"9fc59c4f.ea7b68","type":"ui_slider","z":"8b8c5e95.4b069","name":"","label":"Slider"},Node,"tooltip":"","group":"e0d06160.00286","order":1,"width":0,"height":0,"passthru":true,"outs":"all","topic":"","min":0,"max":10,"step":1,"x":650,"y":240,"wires":[[]]},{"id":"a0a281b4.753508","type":"ui_artlessgauge","z":"8b8c5e95.4b069","group":"e0d06160.00286","order":3,"width":0,"height":0,"name":"","icon":"","label":"Artless Gauge"},Node,"unit":"","layout":"linear","decimals":0,"differential":false,"minmax":false,"colorTrack":"#555555","colorFromTheme":true,"property":"payload","sectors":[{"val":0,"col":"#ff9900","t":"min","dot":0},{"val":10,"col":"#ff9900","t":"max","dot":0}],lineWidth":3,"bgcolorFromTheme":true,"diffCenter":"","x":660,"y":400,"wires":[]},{"id":"3e7a7a9d.484176","type":"ui_text_input","z":"8b8c5e95.4b069","name":"Text Node","label":"Text"},Node,"tooltip":"","group":"e0d06160.00286","order":2,"width":0,"height":0,"passthru":true,"mode":"text","delay":300,"topic":"","x":650,"y":320,"wires":[[]]},{"id":"e0d06160.00286","type":"ui_group","z":"","name":"Bank","tab":"5bd54464.e82afc","order":1,"disp":true,"width":"6","collapse":false},{"id":"5bd54464.e82afc","type":"ui_tab","z":"","name":"IoT Banking","icon":"dashboard","disabled":false,"hidden":false}]
```

## Result :

Thus, with the help of Node-RED we have implemented a speedometer in the UI dashboard and also a OTP generation module and analysed it using Node Red and visualised it using the Node-red Dashboard and put it to practical use.