

PSI3542 – 2023

SISTEMAS EMBARCADOS PARA IOT

ATIVIDADE 17 - TAMOSTA MQTT NODE-RED

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ATIVIDADE 17.1

MQTT NODE-RED

ROTEIRO

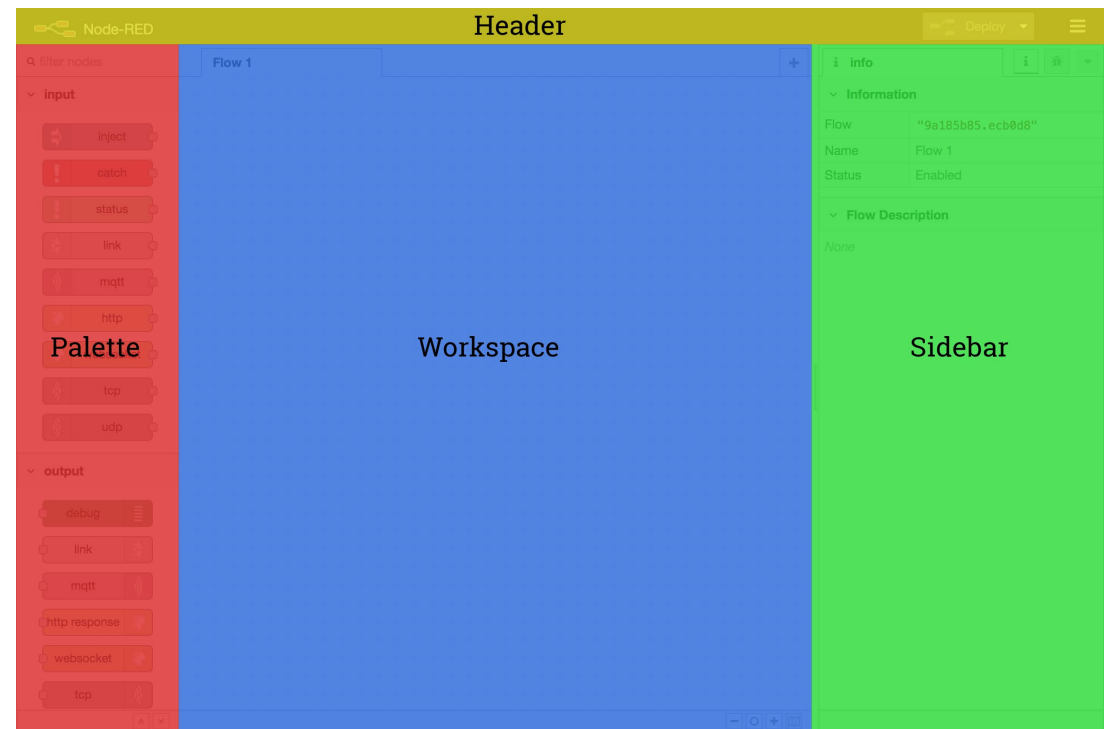
- INSTALAÇÃO DO NODE-RED
 - NO COMPUTADOR WINDOWS OU LINUX
 - COMO ADDON DO HOME-ASSISTANT

INSTALAÇÃO DO NODE-RED NO WINDOWS

- <https://nodered.org/docs/getting-started/windows>
- Instalar o **node.js**
 - <https://nodejs.org/en>
 - Seguir os passos da instalação e verificar:
 - Powershell: `node --version; npm --version`
 - Cmd: `node --version && npm --version`
- Instalar o NODE-RED
 - `npm install -g --unsafe-perm node-red`
- Executar no terminal de comandos do Windows (não use o powershell)
 - Node-red

O NODE-RED

- <https://nodered.org/docs/user-guide/editor/>
- <https://nodered.org/docs/tutorials/first-flow>
- Entrar na interface gráfica do node-red
 - <http://localhost:1880>
 - Ou <http://<ip-address>:1880>



Inserção de nodes do NODE-RED

- <https://nodered.org/docs/user-guide/editor/palette/manager>
- Inserir os seguintes nodes através do palette manager
 - Dashboard
 - Mqtt

filter nodes

Flow 1

common

inject

debug

complete

catch

status

link in

link call

link out

comment

function

function

- Info
- Flows
 - Import ctrl-i
 - Export ctrl-e
 - Search flows ctrl-f
 - Configuration nodes ctrl-g c
 - Flows
 - Subflows
 - Groups
 - Manage palette alt-⬆p
 - Settings ctrl-,
 - Keyboard shortcuts ⬆?
 - Node-RED website
 - v3.0.2



filter nodes

User Settings

Close

View Nodes Install

Palette

sort: a-z recent

Keyboard

dashboard 87 / 4709 x

dashboard-evi
A set of dashboard nodes for Node-RED
1.0.2 2 years, 3 months ago install

cn-dashboard-nodes
Install
0.0.2 5 years, 6 months ago install

node-red-dashboard
A set of dashboard nodes for Node-RED
3.6.1 1 week ago install

feezal
Web Components based Dashboard UI with WYSIWYG Editor
0.8.1 3 years ago install



info

Search flows

- Flows
 - Flow 1
 - Subflows
 - Global Configuration Nodes

Flow 1

Flow "2a57371a79c3dc3f"

Show the Info tab with `ctrl-g i` or
the Debug tab with `ctrl-g d`

filter nodes

Flow 1

read file

watch

dropdown

switch

slider

button

numeric

text input

date picker

colour picker

form

text abc

gauge

chart

audio out

notification

ui control

template

info

Search flows

Flows

- Flow 1
- Subflows
- Global Configuration Nodes

Flow 1

Flow "2a57371a79c3dc3f"

You can confirm your changes in the node edit tray with `ctrl-enter` or cancel them with `ctrl-escape`



filter nodes

common

- inject
- debug
- complete
- catch
- status
- link in
- link call
- link out
- comment

function

- function

User Settings

Close

View

Nodes

Install

Palette

Keyboard

sort: a-z recent

broker 59 / 4709

node-red-contrib-mqtt-connection-check

A Node Red node that checks the connectivity with an MQTT broker. The check result is returned in msg.mqttCheck object.

0.1.2 3 years, 10 months ago install

node-red-contrib-aedes

Node Red MQTT broker node based on aedes.js

0.11.1 8 months ago install

node-red-contrib-z2m

Node-RED nodes for zigbee2mqtt

1.0.1 2 years, 9 months ago install

node-red-contrib-kafka-manager



info

Search flows

- Flows
 - Flow 1
 - Subflows
 - Global Configuration Nodes

Flow 1

Flow "2a57371a79c3dc3f"

click and drag on a node port to move all of the attached wires or just the selected one

filter nodes

Flow 1

- network
 - mqtt in
 - mqtt out
 - http in
 - http response
 - http request
 - websocket in
 - websocket out
 - tcp in
 - tcp out
 - tcp request
 - udp in
 - udp out
 - aedes broker
- sequence



info

Search flows

- Flows
 - Flow 1
 - Subflows
 - Global Configuration Nodes

Flow 1

Flow "2a57371a79c3dc3f"



Dragging a node onto a wire will splice it into the link

Configuração dos nodes de MQTT

The screenshot displays the Node-RED web interface. On the left, the 'network' category is expanded, showing various nodes including 'mqtt in', 'mqtt out', 'http in', 'http response', 'http request', 'websocket in', 'websocket out', 'tcp in', 'tcp out', 'tcp request', and 'udp in'. The main workspace, titled 'Flow 1', contains three nodes: two 'mqtt' nodes and one 'Aedes MQTT broker' node. The right-hand panel is open to the 'info' tab for 'Flow 1', showing the flow's ID as '2a57371a79c3dc3f'. Below the ID, there is a section for moving nodes, which includes instructions: 'Move the selected nodes using the ← ↑ ↓ and → keys. Hold ⇧ to nudge them further'.

CONFIGURAR OS CLIENTES MQTT

The screenshot displays the Node-RED web interface. On the left, a sidebar shows a list of nodes under the 'network' category, including 'mqtt in', 'mqtt out', 'http in', 'http response', 'http request', 'websocket in', 'websocket out', 'tcp in', 'tcp out', 'tcp request', and 'udp in'. The main workspace shows a flow named 'Flow 1' with an 'mqtt in' node. The right-hand panel is open to the configuration for an 'mqtt-broker' node. The configuration is divided into several sections: 'Properties' (with a 'Name' field), 'Connection' (with 'Server' set to 'e.g. localhost' and 'Port' set to '1883'), 'Security' (with 'Connect automatically' checked and 'Use TLS' unchecked), 'Messages' (with 'Protocol' set to 'MQTT V3.1.1'), 'Client ID' (set to 'Leave blank for auto generated'), 'Keep Alive' (set to '60'), and 'Session' (with 'Use clean session' checked). At the bottom of the configuration panel, there are buttons for 'Delete', 'Cancel', and 'Update', along with a status indicator 'Enabled' and a note '0 nodes use this config'. The right sidebar shows a search bar and a list of flows, with the current node configuration displayed as 'undefined:1883' with a node ID of 'e3c5a0646cdf73fd' and type 'mqtt-broker'. A message at the bottom of the right sidebar states: 'You can confirm your changes in the node edit tray with `ctrl-enter` or cancel them with `ctrl-escape`'.

Configurar o mqtt-broker

The screenshot displays the Node-RED web interface. On the left, the 'network' category is expanded, showing various nodes including 'mqtt in', 'mqtt out', 'http in', 'http response', 'http request', 'websocket in', 'websocket out', 'tcp in', 'tcp out', 'tcp request', and 'udp in'. The main workspace shows a grid with a single 'mqtt in' node. The right-hand panel is titled 'Edit mqtt in node' and contains the following configuration options:

- Delete** button
- Cancel** button
- Done** button
- Properties** section with icons for settings, help, and documentation.
- Server**: A dropdown menu currently set to 'Add new mqtt-broker...' with an edit icon.
- Action**: A dropdown menu set to 'Subscribe to single topic'.
- Topic**: A text input field containing the word 'Topic'.
- QoS**: A dropdown menu set to '2'.
- Output**: A dropdown menu set to 'auto-detect (parsed JSON object, string or buff)'. Below this is a 'Name' input field.
- Enabled** checkbox at the bottom left.

The right sidebar shows the 'info' panel with a search bar and a tree view of the workspace. The 'mqtt in' node is selected, and its details are shown below:

Node	"371a3f631978fa76"
Type	mqtt in

Below the table, there are 'show more' and 'refresh' buttons. At the bottom of the sidebar, there is a note: 'Switch flow tabs with `ctrl-]` and `ctrl-]`'.

CONFIGURAR O BROKER

The screenshot displays the Node-RED web interface. On the left, the 'network' category is expanded, showing various nodes like 'mqtt in', 'mqtt out', 'http in', etc. The central workspace shows a flow with a single 'Aedes MQTT broker' node. The right sidebar is open to the 'info' tab, displaying the node's configuration details.

Edit aedes broker node

Buttons: Delete, Cancel, Done

Properties

Name: Name

Connection | Security

MQTT port: 1883

WS bind: port

WS port: Enter Websocket port. Leave blank to disable Websocket support

Enable secure (SSL/TLS) connection

Persistence: Memory

Enabled

info

Search flows

- Flows
 - Flow 1
- Subflows
- Global Configuration Nodes

Aedes MQTT broker

Node	"acd66d9c9820e1c1"
Type	aedes broker

show more

Switch flow tabs with `ctrl-[` and `ctrl-]`

VERIFICAR O FUNCIONAMENTO DO MQTT

The screenshot displays the Node-RED web interface. On the left, the 'common' node palette includes 'inject', 'debug', 'complete', 'catch', 'status', 'link in', 'link call', 'link out', and 'comment'. The 'function' palette contains a 'function' node. The main workspace, titled 'Flow 1', contains a flow starting with a 'timestamp' node, followed by a 'teste' node (connected), and an 'Aedes MQTT broker' node (connected). A second 'teste' node (connected) is connected to a 'debug 1' node (ID: 1698332984261). The right-hand panel shows the 'debug' console with a list of messages:

```
10/26/2023, 12:09:28 PM node: debug 1
teste : msg.payload : number
1698332968241

10/26/2023, 12:09:30 PM node: debug 1
teste : msg.payload : number
1698332970852

10/26/2023, 12:09:32 PM node: debug 1
teste : msg.payload : number
1698332972577

10/26/2023, 12:09:40 PM node: debug 1
teste : msg.payload : number
1698332979964

10/26/2023, 12:09:41 PM node: debug 1
teste : msg.payload : number
1698332981071

10/26/2023, 12:09:42 PM node: debug 1
teste : msg.payload : number
1698332982086

10/26/2023, 12:09:43 PM node: debug 1
teste : msg.payload : number
```


Verificar o mqtt no dashboard

The image shows the Node-RED interface with a flow named "Flow 1" and a dashboard. The flow consists of the following nodes:

- button**: A light blue button node.
- debug 2**: A green debug node with the text "este e um teste".
- teste**: A purple MQTT client node, connected.
- Aedes MQTT broker**: A purple MQTT broker node, connected.
- teste**: A second purple MQTT client node, connected.
- text abc**: A cyan text node.
- debug 1**: A green debug node with the text "este e um teste".

The dashboard on the right has the following structure:

- dashboard**: The main dashboard title.
- Layout**: A tab for the dashboard layout.
- Site**: A tab for the dashboard site.
- Theme**: A tab for the dashboard theme.
- Tabs & Links**: A section for managing tabs and links, containing:
 - Home**: A dropdown menu with a sub-item **Default**.

Atividade 7.2

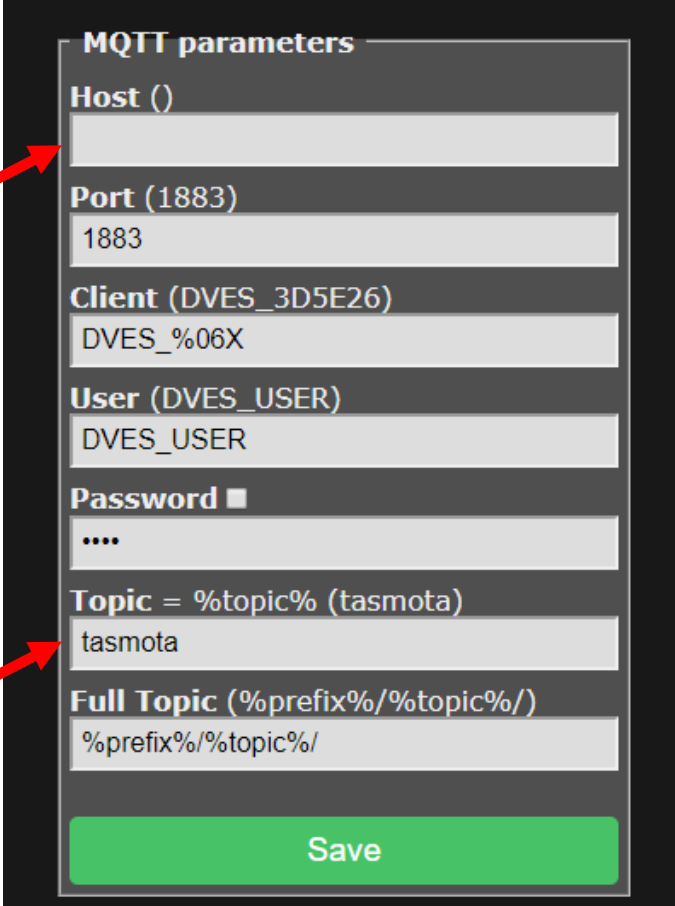
Configurar o MQTT do TASMOTA

Configuração do MQTT no TASMOTA

- <https://tasmota.github.io/docs/MQTT/>

Endereço ip do MQTT broker

Tasmota-81151



MQTT parameters

Host ()
[Empty field]

Port (1883)
1883

Client (DVES_3D5E26)
DVES_%06X

User (DVES_USER)
DVES_USER

Password ■
....

Topic = %topic% (tasmota)
tasmota

Full Topic (%prefix%/tasmota/)
%prefix%/tasmota/

Save

Atividade 7.3

Controle do led TASMOTA por MQTT

Gravar o firmware TASMOTA

- <https://tasmota.github.io/install/>

Envio de comando para ligar o LED

- <https://tasmota.github.io/docs/Commands/#how-to-use-commands>
- O dispositivo TASMOTA deve receber o seguinte comando
 - Cmnd/tasmota_81151/power 1
 - Cmnd/tasmota_81151/power 0
- O dispositivo TASMOTA deve executar o comando e enviar uma mensagem de status de retorno de acordo com a opção setoption
 - Stat/tasmota_81151/result

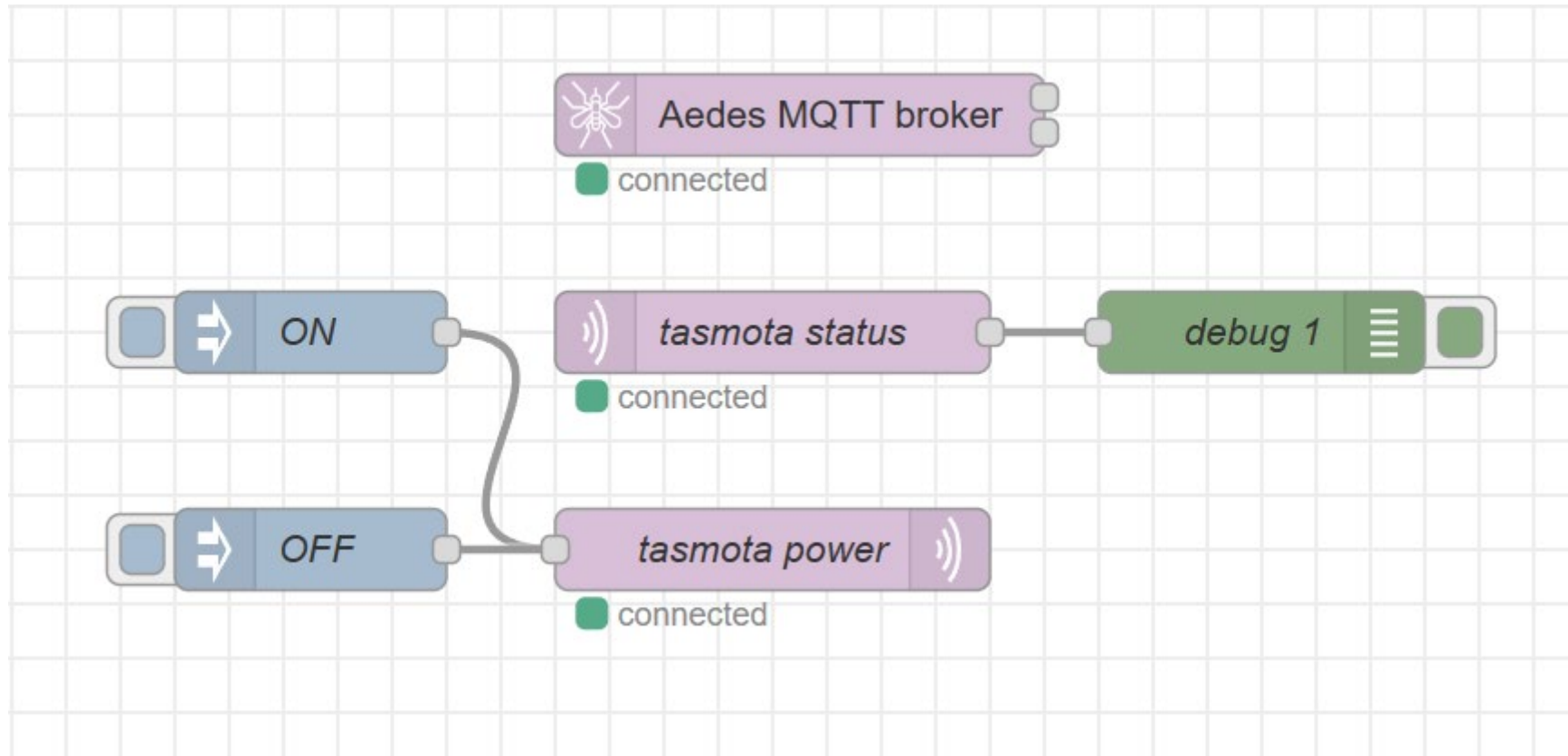
```
SetOption4      Return MQTT response as
                 0 = RESULT topic (default)
                 1 = %COMMAND% topic
```

Comando POWER

```
Power<x>          Control the corresponding power state (also restarts PulseTime)<x>
0 / off / false = turn OFF
1 / on / true = turn ON
2 / toggle = if power state is ON switch to OFF and vice versa
3 / blink = toggle power for BlinkCount times each BlinkTime duration (at the end of
blink , power state is returned to pre-blink state)
4 / blinkoff = stop blink sequence and return power state to pre-blink state
```

```
cmd/tasmota_switch/Power TOGGLE
↳ // Power for relay 1 is toggled
↳ stat/tasmota_switch/RESULT → {"POWER":"ON"}
↳ stat/tasmota_switch/POWER → ON
```

NODE-RED



Atividade 7.4

Sensor DHT11/22

Sensor DHT11/22 TASMOTA

- Configurar o tasmota para enviar telemetria de temperature e humidade
- Implementar um fluxo NODE-RED para graficar no dashboard temperatura e humidade

Atividade 7.5

Termostato com controle pelo NODE-RED

Termostato node-red

- Implemente com controle tipo termostato no node-red
- Tasmota:
 - Sensor de temperatura e humidade DHT11/22
 - Atuador tipo SWITCH no GPIO 02 (LED)

Bom trabalho

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