

# PSI3541-SISTEMAS EMBARCADOS DISTRIBUIDOS MIDDLEWARE DE COMUNICAÇÃO

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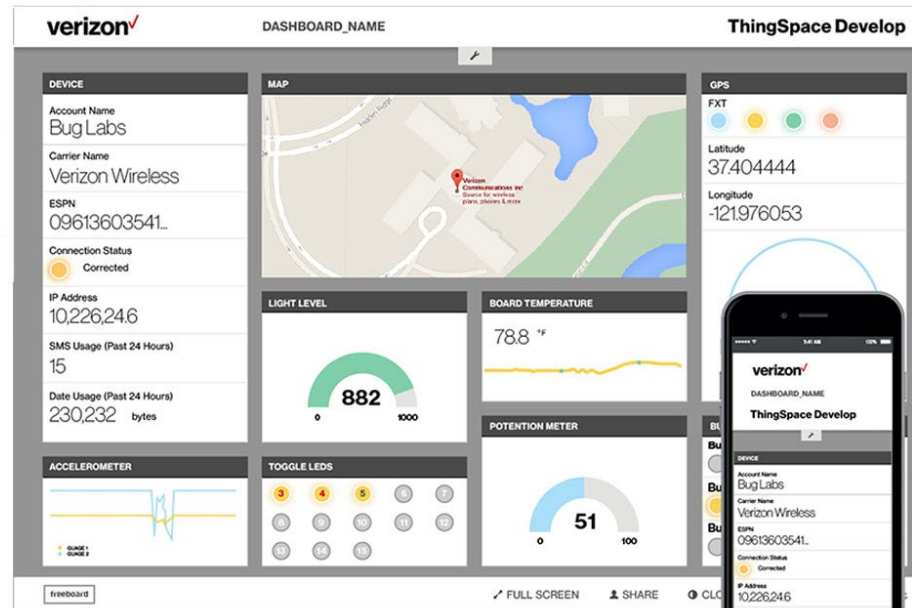
27 DE MARÇO DE 2019

DASHBOARD

# FREEBOARD <https://freeboard.io/>

Set up your logo.

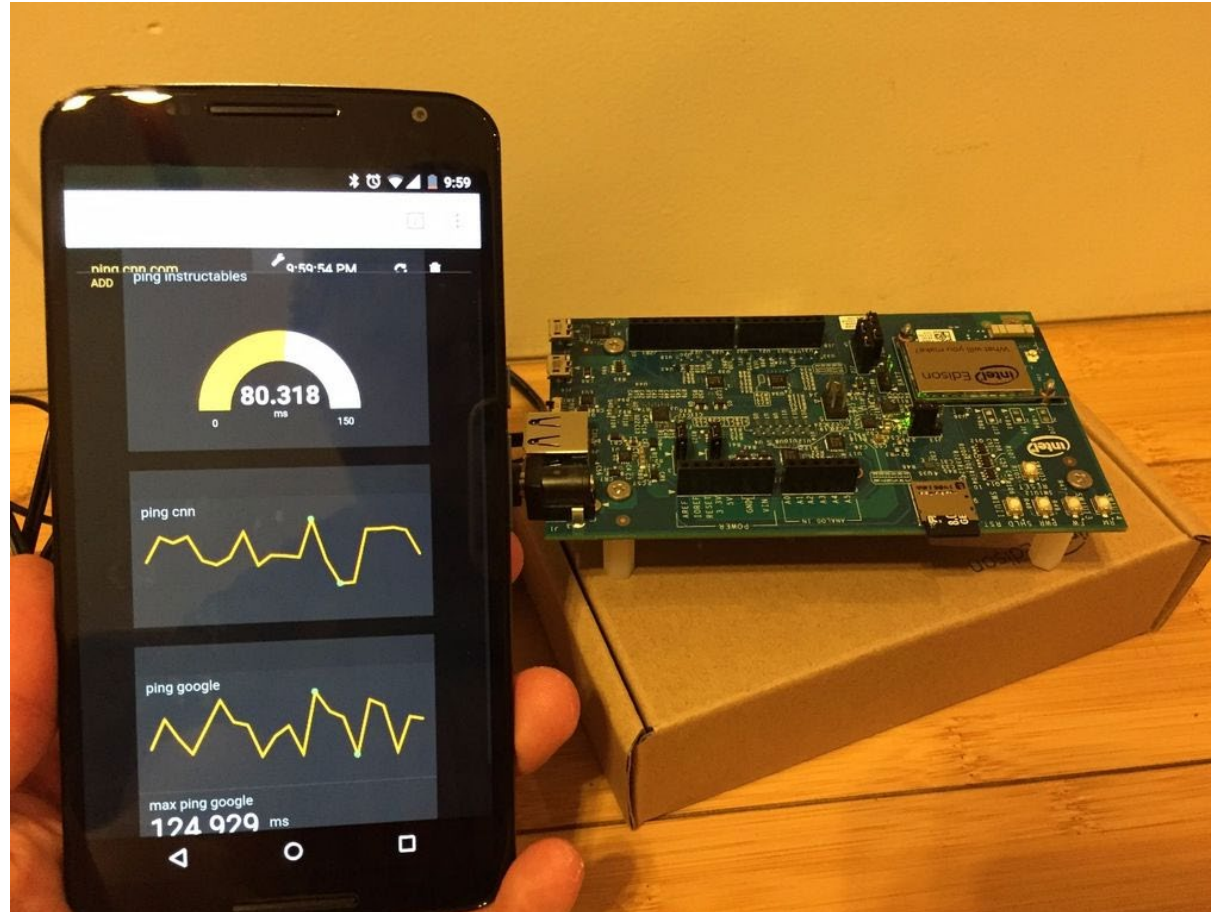
Match your  
branding.  
Define your  
look & feel.



Maintenance and  
support included.

Automatic mobile  
support - iOS & Android.

# FREEBOARD + INTEL EDISON



FREEBOARD

“DASHBOARD FOR  
INTERNET OF  
THINGS”

E SISTEMAS  
EMBARCADOS?

## SISTEMAS EMBARCADOS

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NORMALMENTE POSSUEM  
UMA INTERFACE DE USUÁRIO  
LOCAL, INTEGRADO AO  
PRODUTO

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NOS ÚLTIMOS ANOS O ACESSO  
REMOTO (CONTROLE E ESTADO)  
AO SISTEMA EMBARCADO TEM  
AUMENTADO



# FREEBOARD

- ALTERNATIVA OPENSOURCE
  - <https://github.com/Freeboard>

# ACESSO AO FREEBOARD

## ATRAVÉS DE REST APIS

(<https://docs.buddy.com/docs/integrating-with-freeboard> )

- REGISTER DEVICE
- START SENDING METADATA
- CREATE FREEBOARD DATASOURCE
- ADD FREEBOARD WIDGET
- VIEW FREEBOARD

## ATRAVÉS DE MQTT

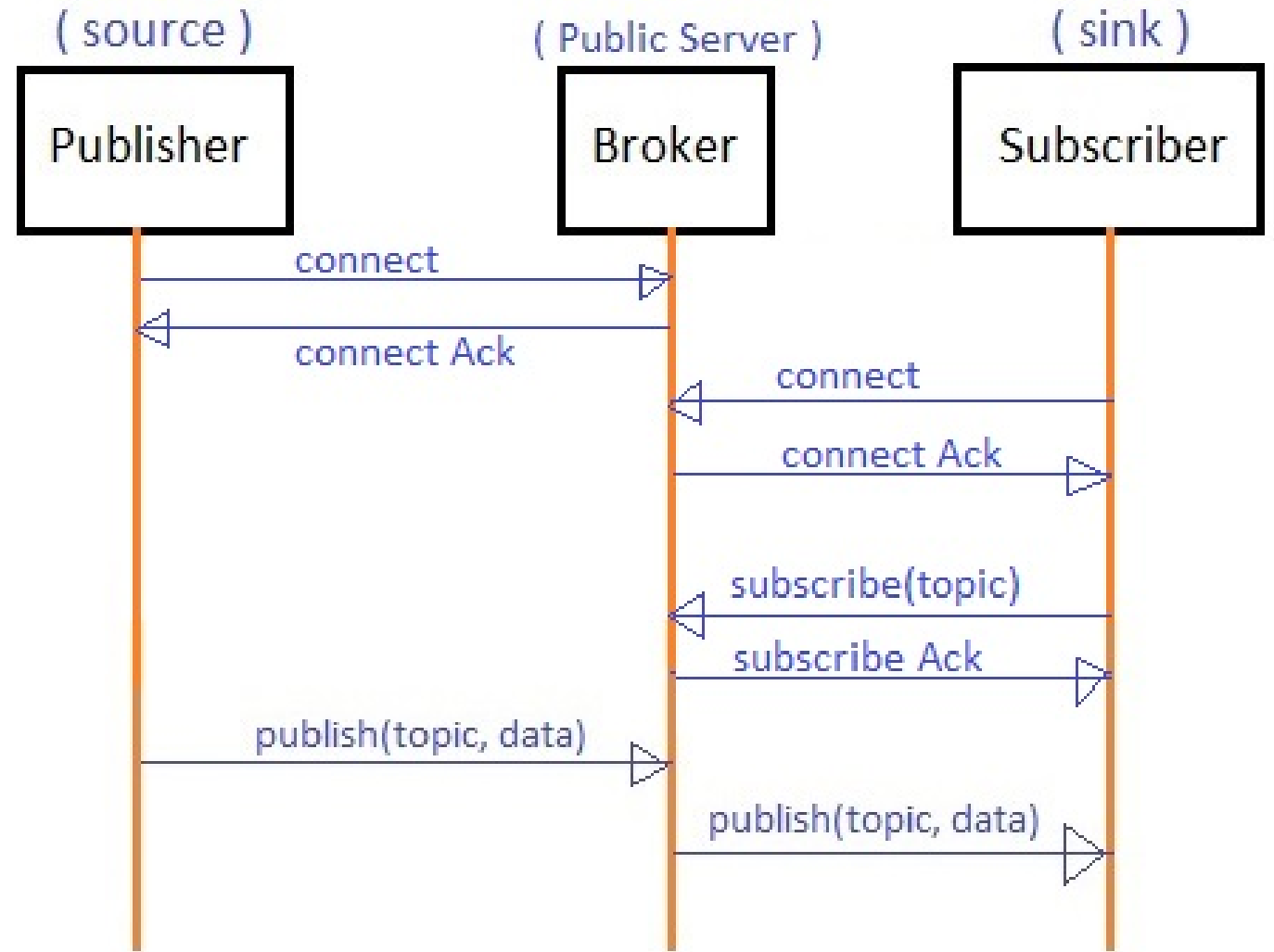
- <https://www.element14.com/community/community/design-challenges/pi-iot/blog/2016/07/17/piiot04-freeboarding-with-mqtt>



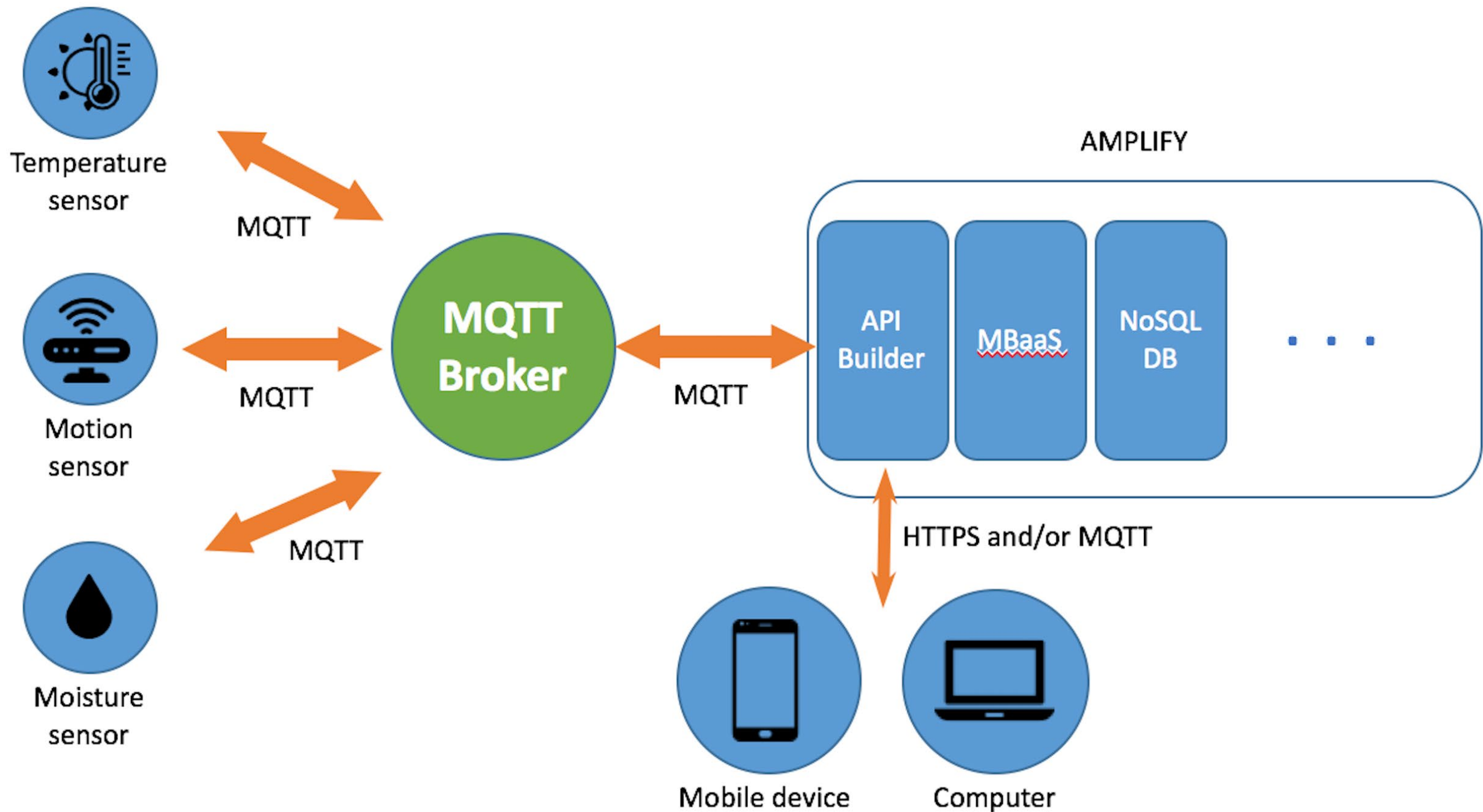
# MQTT

(<http://mqtt.org/>)

- PUBLISH-SUBSCRIBE
- <https://www.ibm.com/developerworks/br/library/iot-mqtt-why-good-for-iot/index.html>



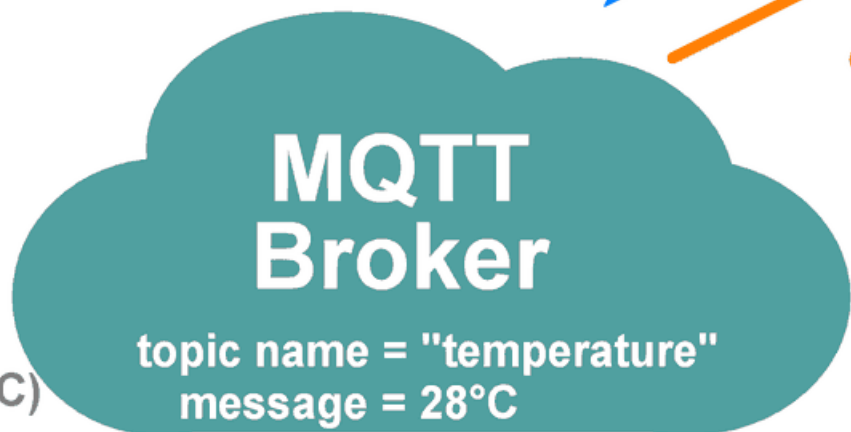
Broker based MQTT Protocol



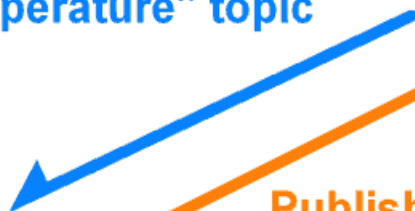
Temperature Sensor



Publish  
temperature data (e.g. 28°C)  
to "temperature" topic



Subscribed to  
"temperature" topic

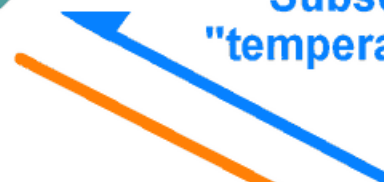


Published data (28°C)  
on "temperature" topic

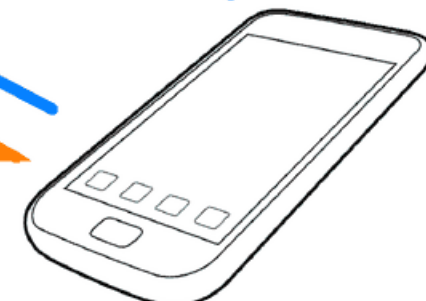
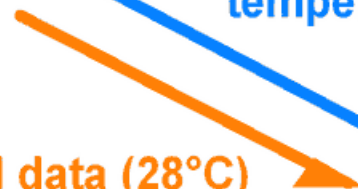


PC/Laptop

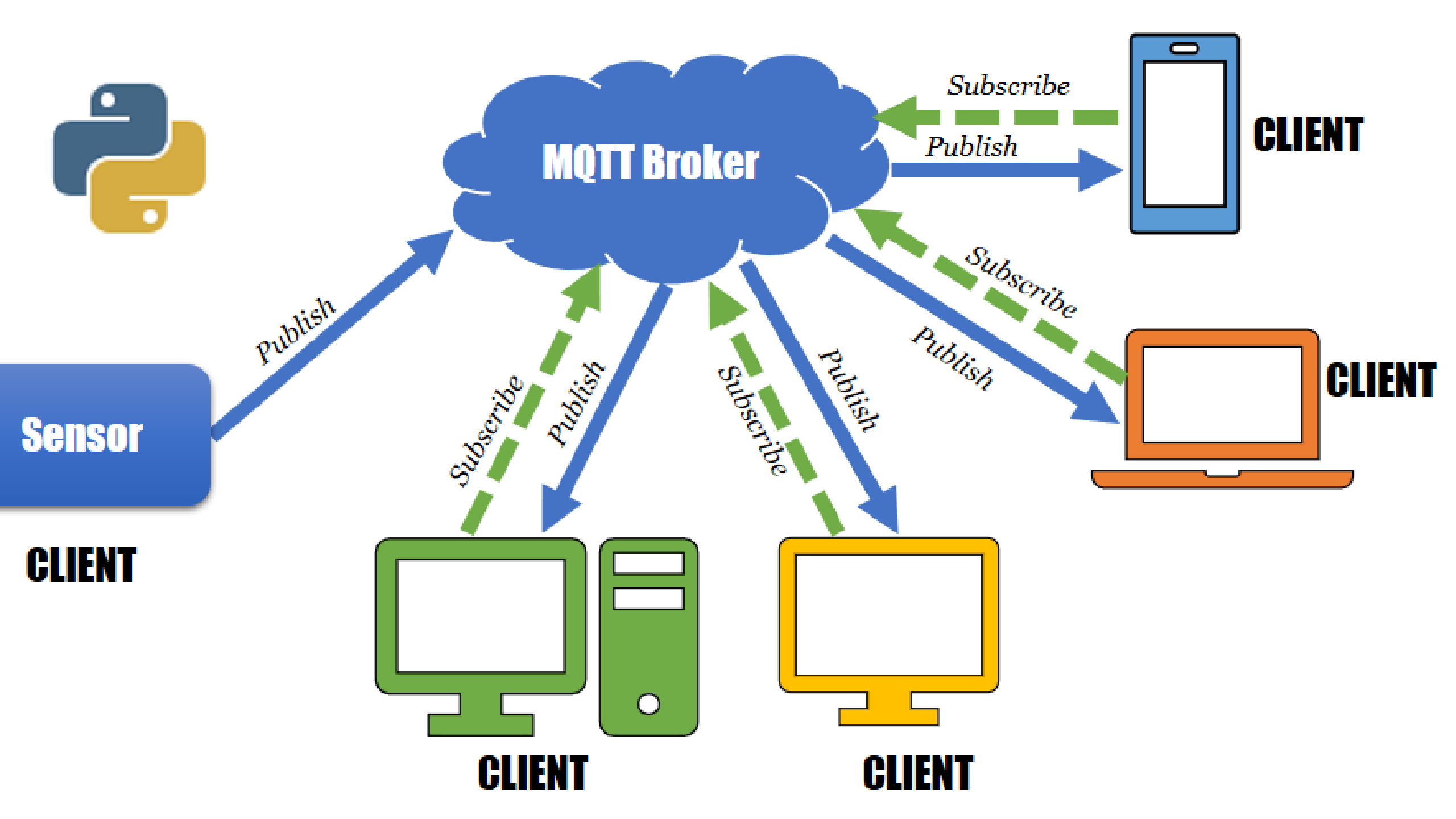
Subscribed to  
"temperature" topic



Published data (28°C)  
on "temperature" topic



Mobile



# LAB01

- IMPLEMENTE UMA APLICAÇÃO DE MONITORAÇÃO USANDO O SMARTPHONE E O FREEBOARD
- SOLUÇÃO
  - APP NO ANDROID
  - SERVIÇO DWEET.IO PARA INTERMEDIAR O SMARTPHONE COM O FREEBOARD

# MQTT X DDS

- <http://www.rfwireless-world.com/Terminology/MQTT-vs-DDS.html>

# DDS

<https://www.electronicdesign.com/embedded-revolution/11-myths-about-dds-standard>

Healthcare patient monitoring

Surgical robots

Autonomous cars

Hyperloop

Wind-power generation systems

Air traffic control

Mass-transit systems

Medical imaging

Space launch systems

Power-plant energy generation

Train transportation

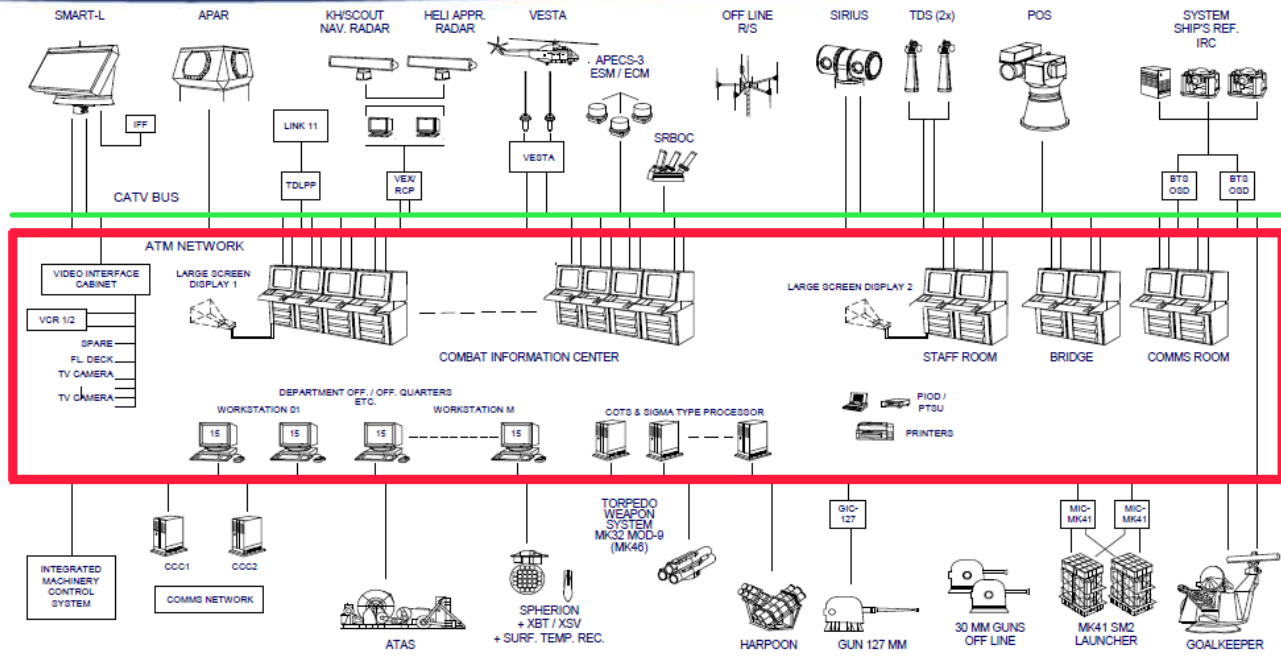
Mining vehicles

Oil & gas drilling

Robotics

Smart-grid power distribution

# An Example: Naval Frigate Combat System



DDS PARA  
CONTROLE  
DE SISTEMAS  
CRITICOS

- Data-traffic: *>4.000 publications per second over the system-data bus*
- Programs: *2.200 programs allocated over 150 processors*
- Data flows: *urgent & non-urgent data (latency), important & less-important data (priority)*



DDS VENDORS

(<https://www.omgwiki.org/dds/where-can-i-get-dds/>)

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ADLINK (Vortex DDS)

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EPROSIMA

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Hamersham

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KONGSBERG

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MilSOFT

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OCI

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PRISMTECH (Opensplice)

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RemedyIT

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RTI (Connex DDS)

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TWINOAKS COMPUTING

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OPENDDS \*\*\*

# LAB02

- <https://www.rti.com/developers/case-code/real-time-lan-over-wan>

# Tutorial OpenDDS

- <https://objectcomputing.com/products/opendds/getting-started-with-opendds>



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