

TOPOLOGIA MONITORAMENTO



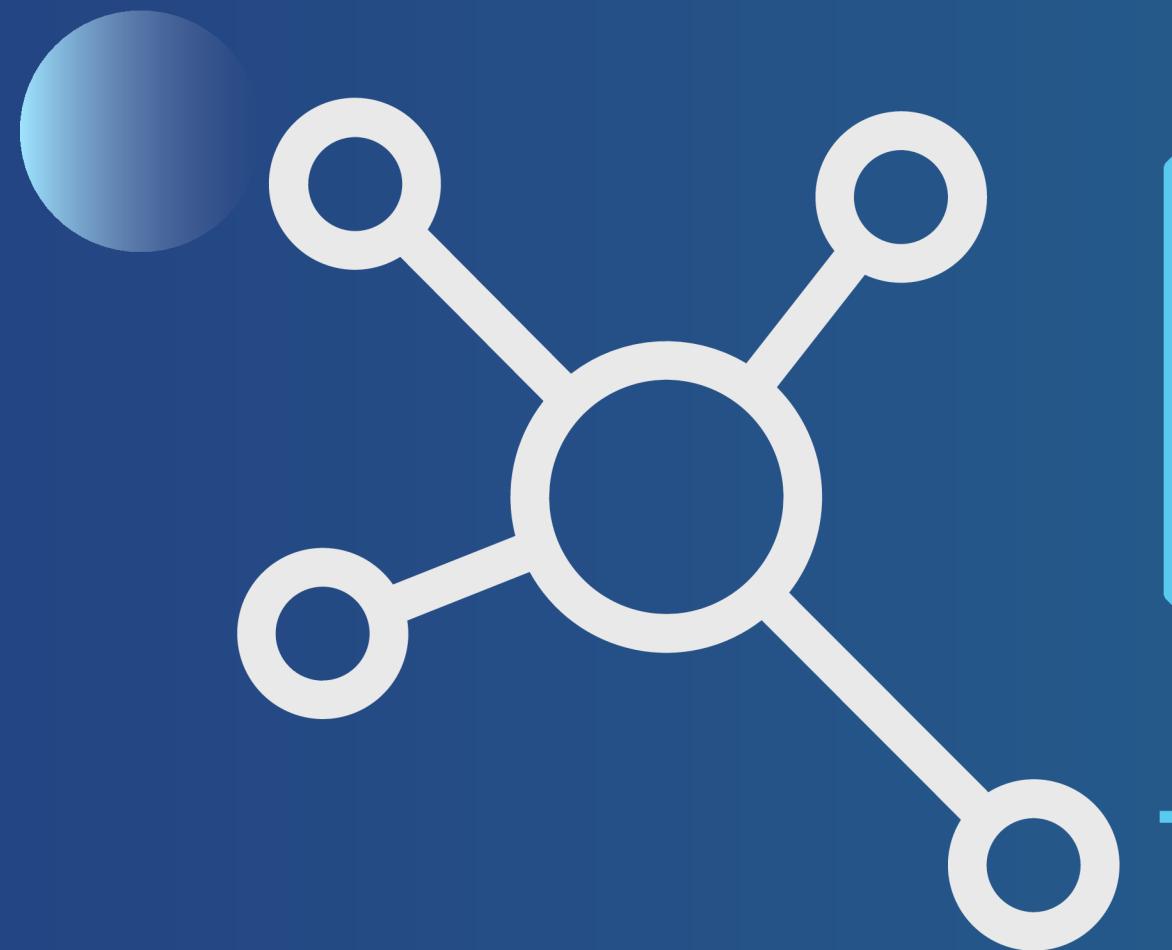
PROBLEMA

A UFBA precisa que o Instituto de Química seja equipado com um sistema de monitoramento de Umidade e Temperatura no laboratório, e que o supervisor possa receber dados do publicados pelos sensores lá no Restaurante Universitário.



CAPACITAÇÃO

03/11

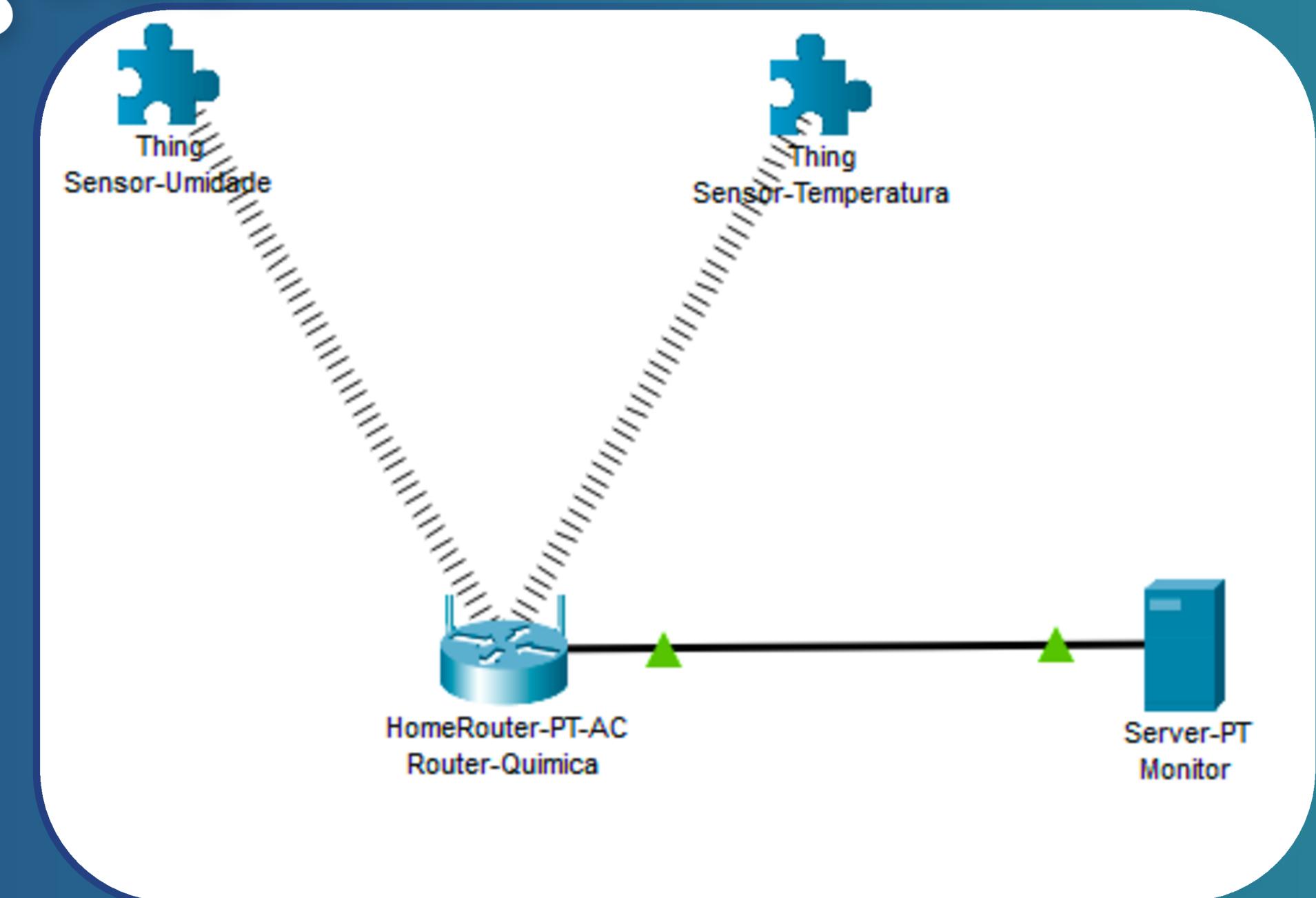


- Concepção da ideia;
- Entender a ferramenta;
- Divergência;
- Convergência;
- Modelagem parcial;
- Modelagem final ;
- Ajustes;



ETAPA 1 - APLICAÇÕES

- Definições das faixas a serem utilizadas.
- Implementação MQTT



Protocolo MQTT

05/11

Admin



Admin

Physical Config Desktop Programming Attributes

com.cisco.mqttclient (Python) - main.py

Open New Delete Rename Import Uninstall from Desktop Run Clear Outputs Help

```
.. [gui]bootstrap.min.cs
[gui]bootstrap.min.js
[gui]icon.png
[gui]index.html
[gui]jquery.min.js
[gui]script.js
[gui]style.css
app_manifest.xml
main.py
mqttclient.py
```

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```
.. [gui]bootstrap.min.cs
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[gui]icon.png
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[gui]script.js
[gui]style.css
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```

164 mqttclient.onConnect(on_connect)
165 mqttclient.onDisconnect(on_disconnect)
166 mqttclient.onSubscribe(on_subscribe)
167 mqttclient.onUnsubscribe(on_unsubscribe)
168 mqttclient.onPublish(on_publish)
169 mqttclient.onMessageReceived(on_message_received)
170 mqttclient.onGUIUpdate(on_gui_update)

while True:
 delay(600)
 conectar_topico()
 publica()

def conectar_topico():
 brokerAdd = "172.16.0.2"
 user = "admin"
 password = "admin"
 mqttclient.connect(brokerAdd,user,password)

def publica():
 topico1 = "umidade"
 topico2 = "temperatura"
 mqttclient.subscribe(topico1)
 mqttclient.subscribe(topico2)

if __name__ == "__main__":
 main()

Error: Not connected to broker.
Error: Not connected to broker.
Connection change type: 0
Success: Connected to broker at 172.16.0.2.
Success: Subscribed to umidade.
Success: Subscribed to temperatura.

Top

Servidor



Monitor

Physical Config Services Desktop Programming Attributes

broker (Python) - main.py

Open New Delete Rename Import Uninstall from Desktop Stop Clear Outputs Help

```
.. [gui]bootstrap-toggle
[gui]bootstrap-toggle
[gui]bootstrap.min.cs
[gui]bootstrap.min.js
[gui]icon.png
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[gui]script.js
[gui]style.css
app_manifest.xml
main.py
mqttbroker.py
```

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```
.. [gui]bootstrap-toggle
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[gui]bootstrap.min.cs
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[gui]index.html
[gui]jquery.min.js
[gui]script.js
[gui]style.css
app_manifest.xml
main.py
mqttbroker.py
```

100 print "mqttbroker disable-service"
101 print "mqttbroker add-user <username> <password>"
102 print "mqttbroker remove-user <username>"
103 print "mqttbroker display-last-event"
104 print "mqttbroker display-all-events"
105 print ""

106 def on_gui_update(msg, data):
107 GUI.update(msg, data)

108 def main():
109 GUI.setup()
110 CLI.setup()
111 mqttbroker.init()

112 mqttbroker.add_user("admin", "admin")
113 mqttbroker.add_user("umidade", "umidade")
114 mqttbroker.add_user("temperatura", "temperatura")

115 mqttbroker.onGUIUpdate(on_gui_update)
116 print "Started with users"

117 while True:
118 delay(60000)

119 if __name__ == "__main__":
120 main()

Starting broker (Python)...
Started with users

Top



ETAPA 2 - COMUNICAÇÃO

Roteadores

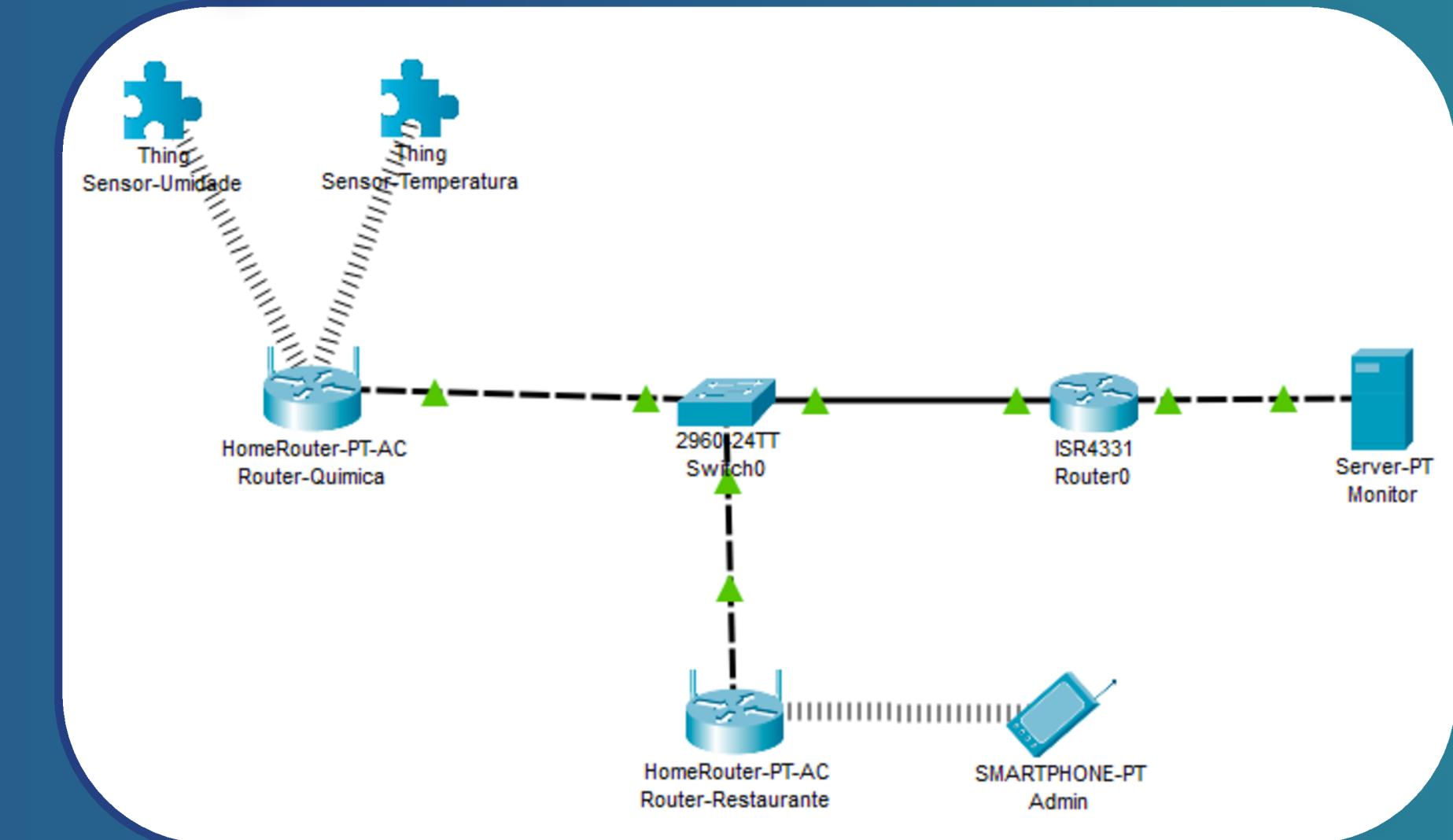
Criação das subredes com máscaras apropriadas.

Switch

Estabelecimento da conexão entre os três roteadores da rede.

Admin

Recebimento das publicações pelo administrador.



Endereçamento

07/11



Roteador-Quimica:

IP: 192.168.0.2

Submask: 255.255.255.248

Default
Gateway: 192.168.0.1

LAN: 10.0.0.1

Submask-
LAN: 255.255.255.128



Roteador-RU:

IP: 192.168.0.3

Submask: 255.255.255.248

Default
Gateway: 192.168.0.1

LAN: 10.0.0.129

Submask-
LAN: 255.255.255.128



Roteador-STI:

IP - Gig0/0/0 : 172.168.0.1

Submask-
Gig0/0/0: 255.255.255.252

IP - Gig0/0/1 : 192.168.0.1

Submask-
Gig0/0/1: 255.255.255.248



Sensores:

IP Umid.: 10.0.0.2

IP Temp.: 10.0.0.3

Gateway: 10.0.0.1

Submask: 255.255.255.128



Servidor:

IP - FastE : 172.16.0.2

Gateway: 172.16.0.1

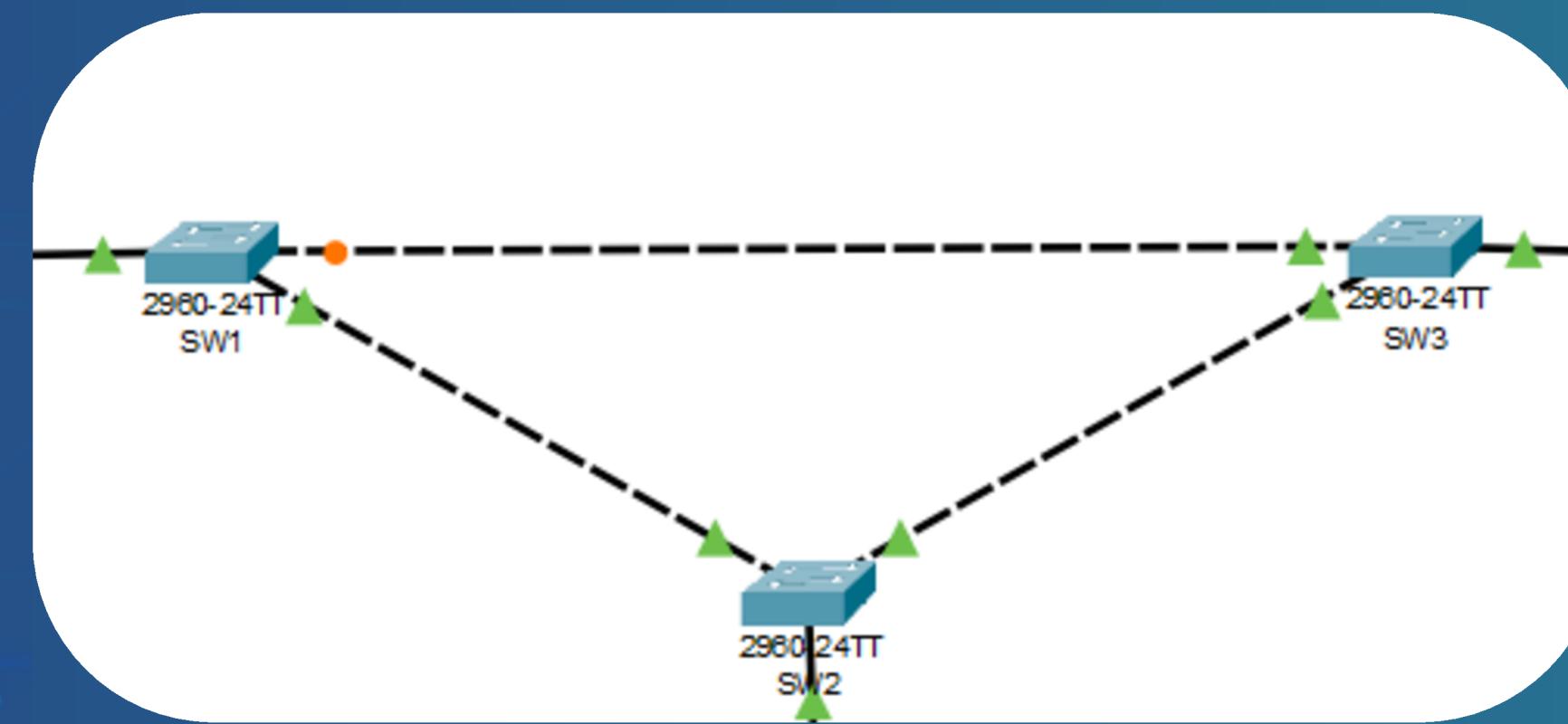
Submask: 255.255.255.252



ETAPA 3 - PREVENÇÃO DE LOOPS

Spanning Tree Protocol

Protocolo usado para prevenção de loops na rede.



Testes

TESTES MQTT

09/11



```
root@Thing:/>ping 172.16.0.2

Pinging 172.16.0.2 with 32 bytes of data:

Reply from 172.16.0.2: bytes=32 time=41ms TTL=126
Reply from 172.16.0.2: bytes=32 time=45ms TTL=126
Reply from 172.16.0.2: bytes=32 time=36ms TTL=126
Reply from 172.16.0.2: bytes=32 time=26ms TTL=126

Ping statistics for 172.16.0.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 26ms, Maximum = 45ms, Average = 37ms
```

RUN



```
C:\>ping 172.16.0.2

Pinging 172.16.0.2 with 32 bytes of data:

Reply from 172.16.0.2: bytes=32 time=17ms TTL=126
Reply from 172.16.0.2: bytes=32 time=24ms TTL=126
Reply from 172.16.0.2: bytes=32 time=18ms TTL=126
Reply from 172.16.0.2: bytes=32 time=36ms TTL=126

Ping statistics for 172.16.0.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 17ms, Maximum = 36ms, Average = 23ms
```

Admin

Physical Config Desktop Programming Attributes

com.cisco.mqttclient (Python) - main.py

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mqttclient.py
```

167 mqttclient.onUnsubscribe(on_unsubscribe)
168 mqttclient.onPublish(on_publish)
169 mqttclient.onMessageReceived(on_message_received)
170 mqttclient.onGUIUpdate(on_gui_update)
171 conectar_topico()
172 publica()
173
174 while True:
175 delay(600)
176 #conectar_topico()
177 publica()
178
179 def conectar_topico():
180 brokerAdd = "172.16.0.2"
181 user = "admin"
182 password = "admin123"
183 mqttclient.connect(brokerAdd,user,password)
184
185 def publica():
186 topico1 = "umidade"
187 topico2 = "temperatura"
188 mqttclient.subscribe(topico1)
189 mqttclient.subscribe(topico2)
190
191 if __name__ == "__main__":
192 main()
193
194

Error: Not connected to broker.
Connection change type: 0
Success: Disconnected from MQTT broker.
Error: Unauthorized
com.cisco.mqttclient (Python) stopped.

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Admin

Physical Config Desktop Programming Attributes

MQTT Client

```
{"topic": "umidade", "cmd": "PUBLISH", "client": "Sensor-Umidade (3d460bd00c6d90L)", "qos": 0, "payload": "2 g/m3", "dup": 0, "retain": 0}
{"topic": "temperatura", "cmd": "PUBLISH", "client": "Sensor-Temperatura (3d460bd0261010L)", "qos": 0, "payload": "2 C", "dup": 0, "retain": 0}
{"topic": "umidade", "cmd": "PUBLISH", "client": "Sensor-Umidade (3d460bd00c6d90L)", "qos": 0, "payload": "100 g/m3", "dup": 0, "retain": 0}
{"topic": "temperatura", "cmd": "PUBLISH", "client": "Sensor-Temperatura (3d460bd0261010L)", "qos": 0, "payload": "100 C", "dup": 0, "retain": 0}
{"topic": "umidade", "cmd": "PUBLISH", "client": "Sensor-Umidade (3d460bd00c6d90L)", "qos": 0, "payload": "29 g/m3", "dup": 0, "retain": 0}
 {"topic": "temperatura", "cmd": "PUBLISH", "client": "Sensor-Temperatura (3d460bd0261010L)", "qos": 0, "payload": "29 C", "dup": 0, "retain": 0}
 {"topic": "umidade", "cmd": "PUBLISH", "client": "Sensor-Umidade (3d460bd00c6d90L)", "qos": 0, "payload": "23 g/m3", "dup": 0, "retain": 0}
 {"topic": "temperatura", "cmd": "PUBLISH", "client": "Sensor-Temperatura (3d460bd0261010L)", "qos": 0, "payload": "23 C", "dup": 0, "retain": 0}
 {"topic": "umidade", "cmd": "PUBLISH", "client": "Sensor-Umidade (3d460bd00c6d90L)", "qos": 0, "payload": "18 g/m3", "dup": 0, "retain": 0}
 {"topic": "temperatura", "cmd": "PUBLISH", "client": "Sensor-Temperatura (3d460bd0261010L)", "qos": 0, "payload": "18 C", "dup": 0, "retain": 0}
```

Top

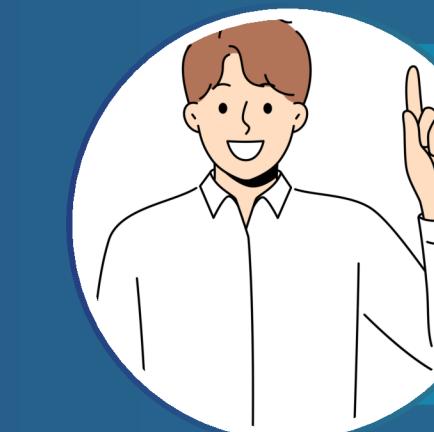


CONSIDERAÇÕES



Problemática

Implementar uma solução que possui recursos escassos ou que pode tornar a ideia não otimizada se mal implementada.



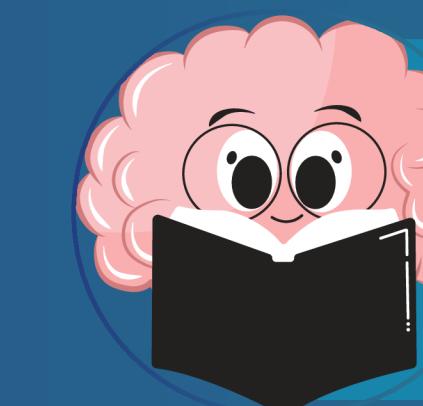
Solução

Pensar 2 vezes antes de conectar qualquer cabo, antes de configurar qualquer roteador.



Realidade

Um dos principais impeditivos que margeia as regras do que pode e o que não pode ser feito na vida real



Conhecimento

No mundo de redes de computadores todo IP importa tanto quanto uma pessoa, logo, todo o estudo ao se criar algo é essencial.



OBRIGADO!
ATÉ MATC99 :)

