21bce9202
Bandla Hyndavi
CN Assignment-8,9

Introduction to IoT: Smoke and Fire Monitor System using Cisco Packet Tracer:

The Internet of Things (IoT) is a revolutionary concept that refers to the interconnection of everyday physical devices and objects to the internet, enabling them to collect, exchange, and act on data. IoT has brought about innovative applications across various industries, including home automation, healthcare, agriculture, and industrial monitoring. One such application is an IoT-based Smoke and Fire Monitor System, which utilizes sensors, microcontrollers, and networking to enhance fire safety and early detection.

In this project, we will design an IoT-based Smoke and Fire Monitor System using Cisco Packet Tracer. Cisco Packet Tracer is a simulation tool that allows us to create network topologies and emulate real-world IoT devices and their interactions.

Procedure:

Step 1: Design the Physical Setup
- In Cisco Packet Tracer, create a network topology that includes the IoT devices for the Smoke and Fire Monitor System.
- Place a smoke sensor and a fire sensor in the simulated environment. These sensors will detect the presence of smoke and fire, respectively.

Step 2: Connect IoT Devices to Microcontroller
- Place a microcontroller, such as an Arduino or Raspberry Pi, in the network topology.
- Connect the smoke and fire sensors to the analog or digital input pins of the microcontroller.

Step 3: Programming the Microcontroller
- Write the code to program the microcontroller to read data from the connected sensors.
- Implement logic to process sensor data and identify the presence of smoke or fire.

Step 4: Establish Communication with IoT Gateway
- Add an IoT gateway (can be a router or a switch) to the network topology.
- Configure the gateway to facilitate communication between the microcontroller and the cloud platform.

Step 5: Implement Cloud Integration
- Integrate a cloud platform, such as Cisco IoT Cloud, AWS IoT Core, or Google Cloud IoT, to collect data from the microcontroller.
- Set up an IoT cloud service account and obtain authentication credentials (e.g., API keys) for secure communication.

Step 6: Send Data to the Cloud
- Modify the microcontroller code to establish a connection with the cloud platform using the provided credentials.
- Implement a data transmission protocol (e.g., MQTT or HTTP) to send sensor data to the cloud.

Step 7: Cloud-based Data Processing and Alerts
- Configure the cloud platform to process incoming data and analyze it for potential smoke or fire occurrences.

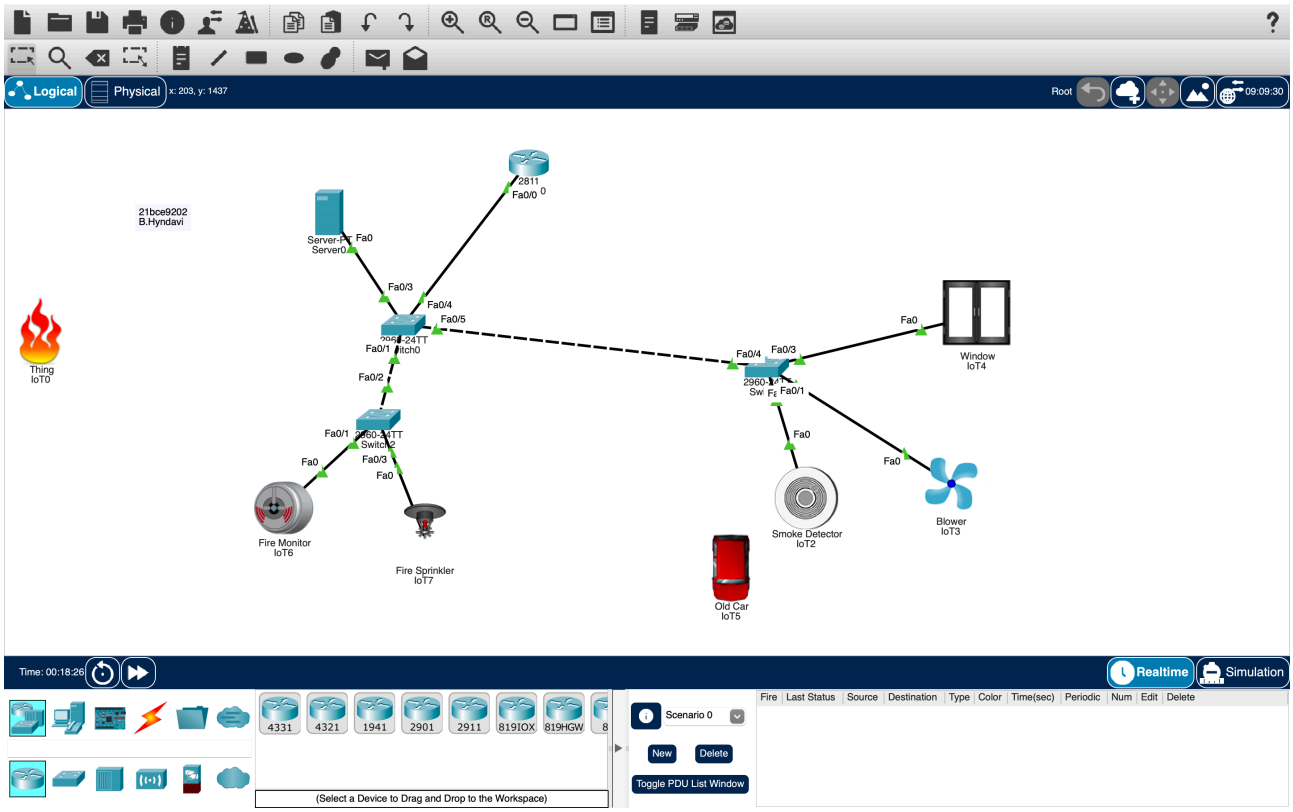
- Set up alerts and notifications to be sent to authorized personnel, emergency services, or other designated recipients in case of fire detection.

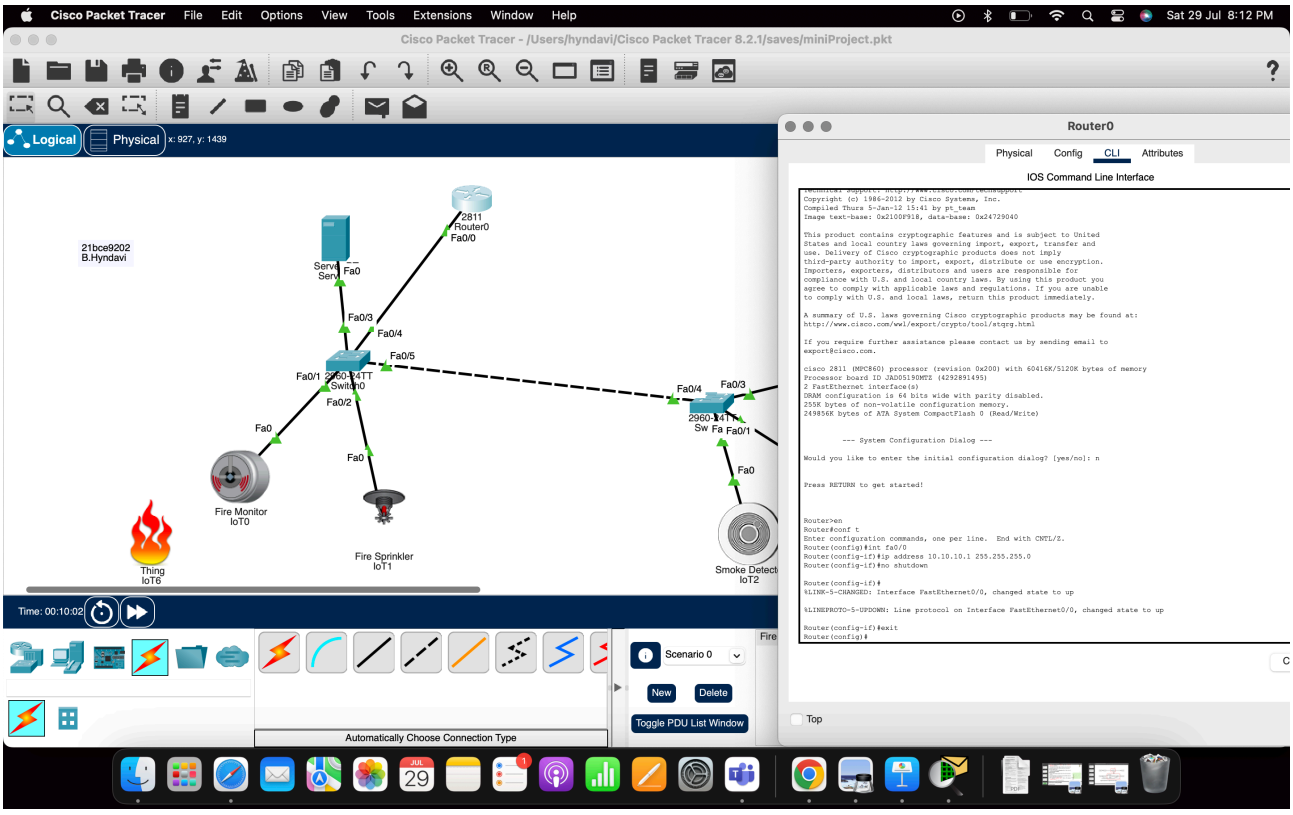
Step 8: Visualization and Monitoring
- Use the cloud platform's dashboard or a custom-built web application to visualize real-time sensor data and fire/smoke alerts.
- Monitor the status of the IoT Smoke and Fire Monitor System remotely.

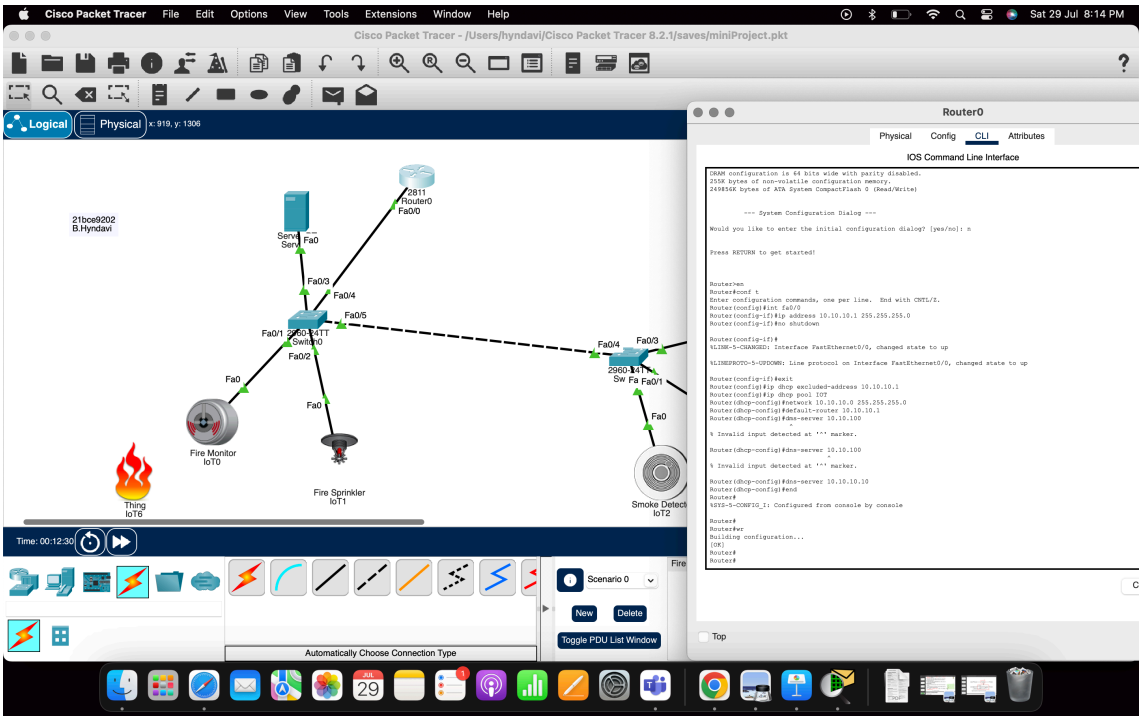
Step 9: Testing and Troubleshooting
- Thoroughly test the IoT system to ensure all components are functioning correctly.
- Debug and troubleshoot any issues that may arise during the testing phase.

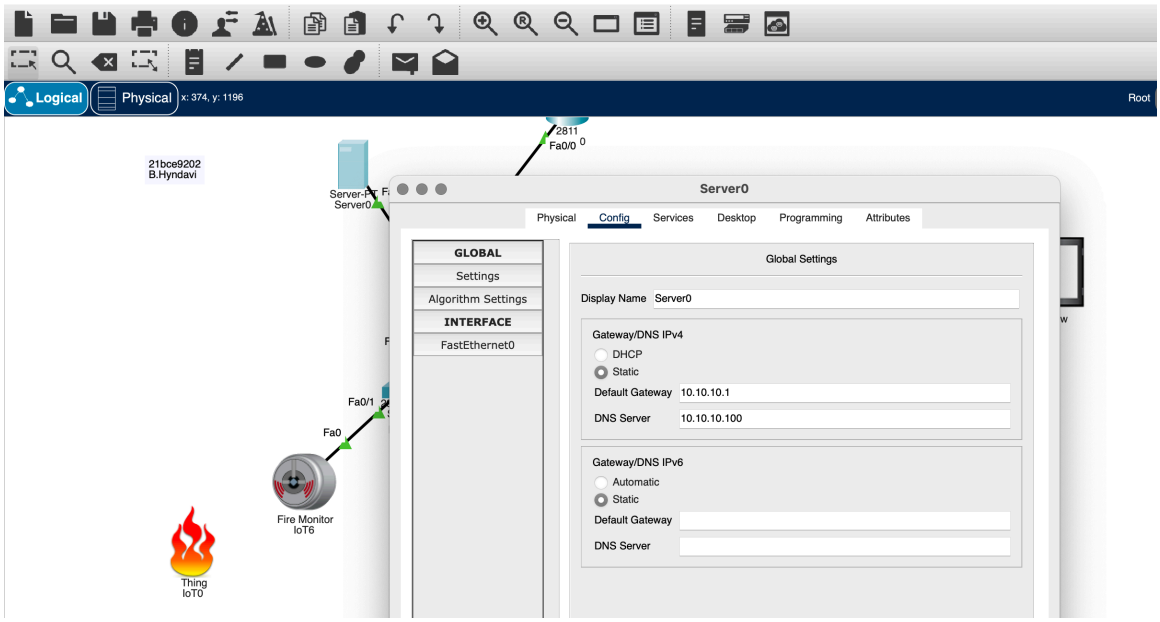
Step 10: Deploy the System
- Once testing is successful, deploy the IoT-based Smoke and Fire Monitor System in the desired real-world environment.

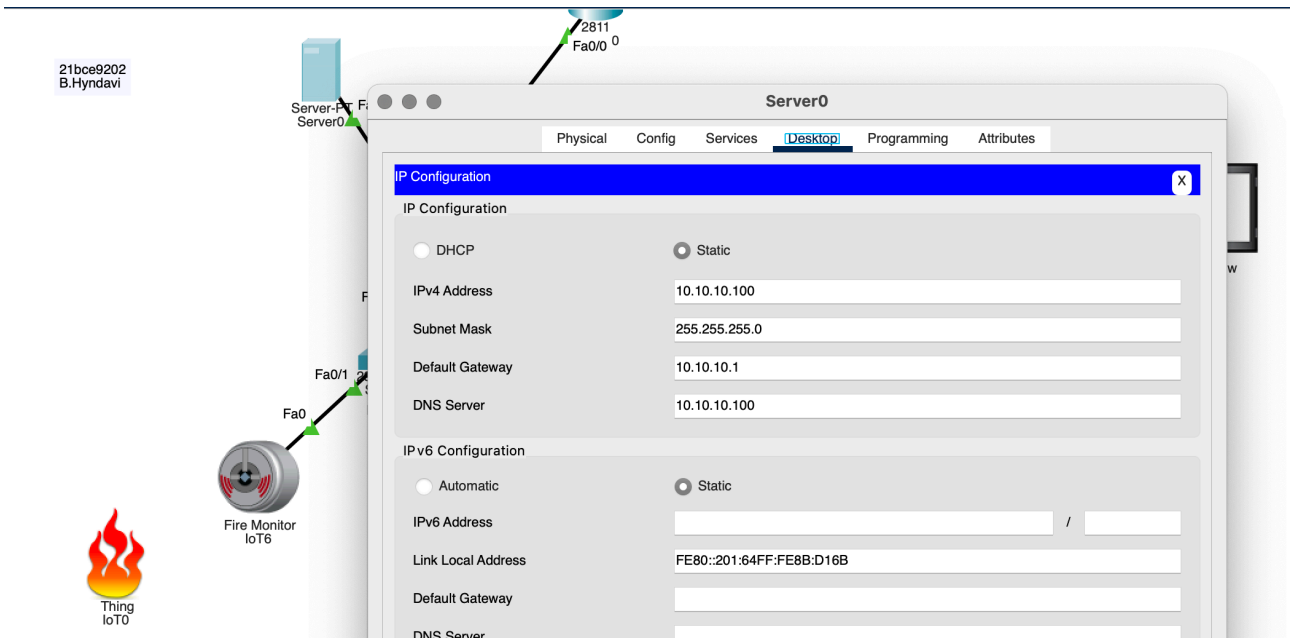
Remember that this is a simulation in Cisco Packet Tracer, and real-world implementation may require additional considerations, such as power supply, physical housing for sensors, and compliance with safety regulations. Nonetheless, this project provides an excellent introduction to designing and implementing IoT applications for monitoring and safety purposes.

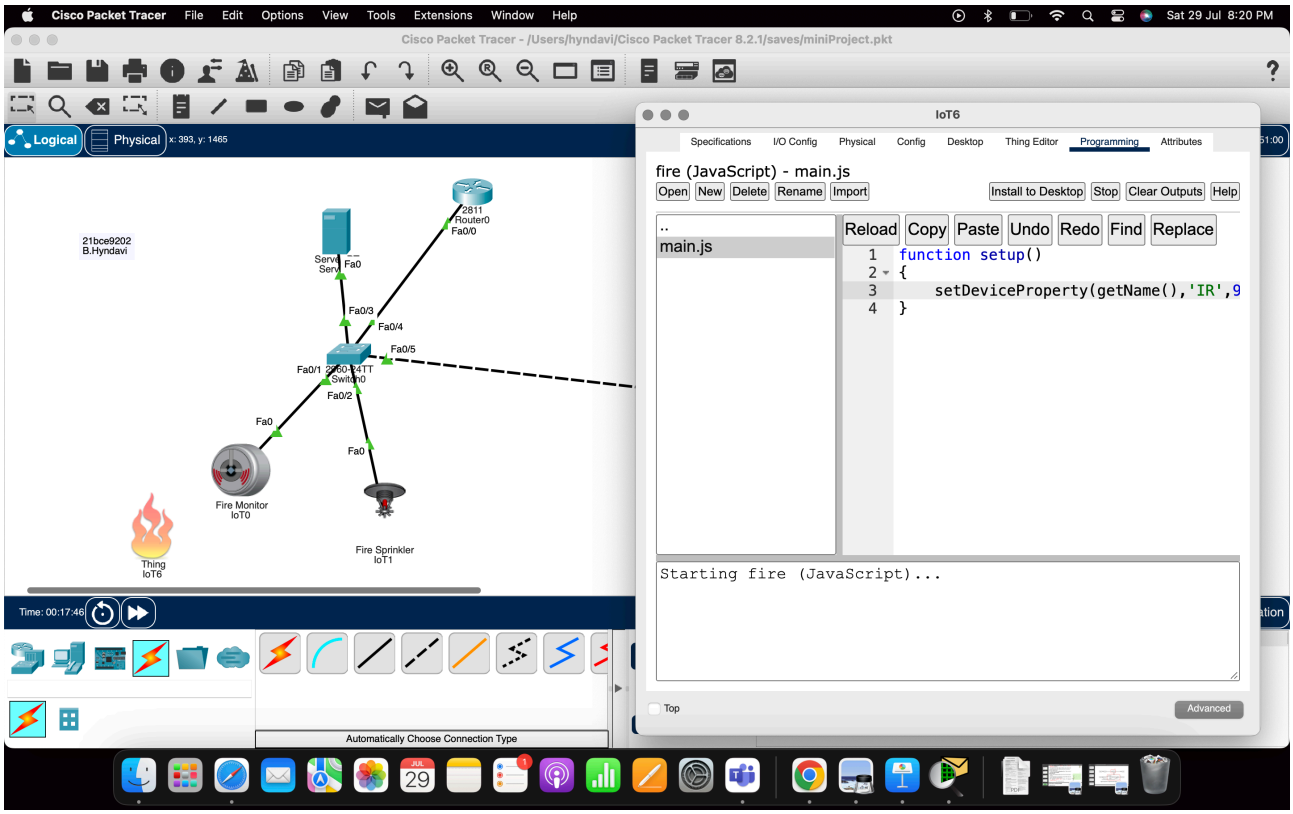

Logical
Physical
x: 203, y: 1437
Root
09:09:30
21bce9202
B.Hyndavi
2811
Fa0/0
Server0
Fa0
Fa0/3
Fa0/4
Fa0/5
Fa0/1
Fa0/2
Switch0
Switch2
Fa0/4
Fa0/3
Fa0/1
Fa0
Window
IoT4
Thing
IoT0
Fire Monitor
IoT6
Fire Sprinkler
IoT7
Smoke Detector
IoT2
Blower
IoT3
Old Car
IoT5
Time: 00:18:26
Realtime
Simulation
4331
4321
1941
2901
2911
819IOX
819HGW
(Select a Device to Drag and Drop to the Workspace)
Scenario 0
New
Delete
Toggle PDU List Window
Fire
Last Status
Source
Destination
Type
Color
Time(sec)
Periodic
Num
Edit
Delete

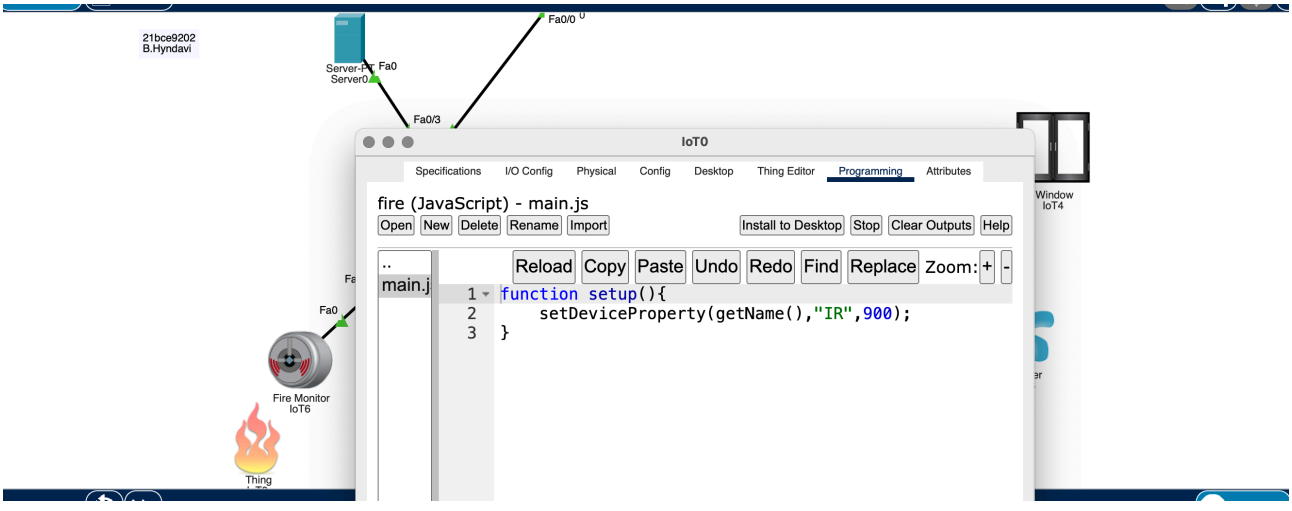

Cisco Packet Tracer
File
Edit
Options
View
Tools
Extensions
Window
Help
Sat 29 Jul 8:12 PM
Cisco Packet Tracer - /Users/hyndavi/Cisco Packet Tracer 8.2.1/saves/miniProject.pkt
Logical
Physical
x: 927, y: 1439
21bce9202
B.Hyndavi
2811
Router0
Fa0/0
Fa0
Fa0/3
Fa0/4
Fa0/5
Fa0/1
Fa0/2
Switch0
Fa0/4
Fa0/3
Fa0/1
Fa0
Fire Monitor
IoT0
Thing
IoT6
Fire Sprinkler
IoT1
Time: 00:10:02
Automatically Choose Connection Type
Scenario 0
New
Delete
Toggle PDU List Window
Router0
Physical
Config
CLI
Attributes
IOS Command Line Interface
Copyright (c) 1986-2012 by Cisco Systems, Inc.
Compiled Thurs 5-Jan-12 15:41 by pt_team
Image text-base: 0x2100F918, data-base: 0x24729040
This product contains cryptographic features and is subject to United
States and local country laws governing import, export, transfer and
use. Delivery of Cisco cryptographic products does not imply
third-party authority to import, export, distribute or use encryption.
Importers, exporters, distributors and users are responsible for
compliance with U.S. and local country laws. By using this product you
agree to comply with applicable laws and regulations. If you are unable
to comply with U.S. and local laws, return this product immediately.
A summary of U.S. laws governing Cisco cryptographic products may be found at:
http://www.cisco.com/wwl/export/crypto/tool/stqrg.html
If you require further assistance please contact us by sending email to
export@cisco.com.
cisco 2811 (MPC860) processor (revision 0x200) with 60416K/5120K bytes of memory
Processor board ID JAD05190MTZ (4292891495)
2 FastEthernet interface(s)
DRAM configuration is 64 bits wide with parity disabled.
255K bytes of non-volatile configuration memory.
249856K bytes of ATA System CompactFlash 0 (Read/Write)
--- System Configuration Dialog ---
Would you like to enter the initial configuration dialog? [yes/no]: n
Press RETURN to get started!
Router>en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int fa0/0
Router(config-if)#ip address 10.10.10.1 255.255.255.0
Router(config-if)#no shutdown
Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
Router(config-if)#exit
Router(config)#
Top

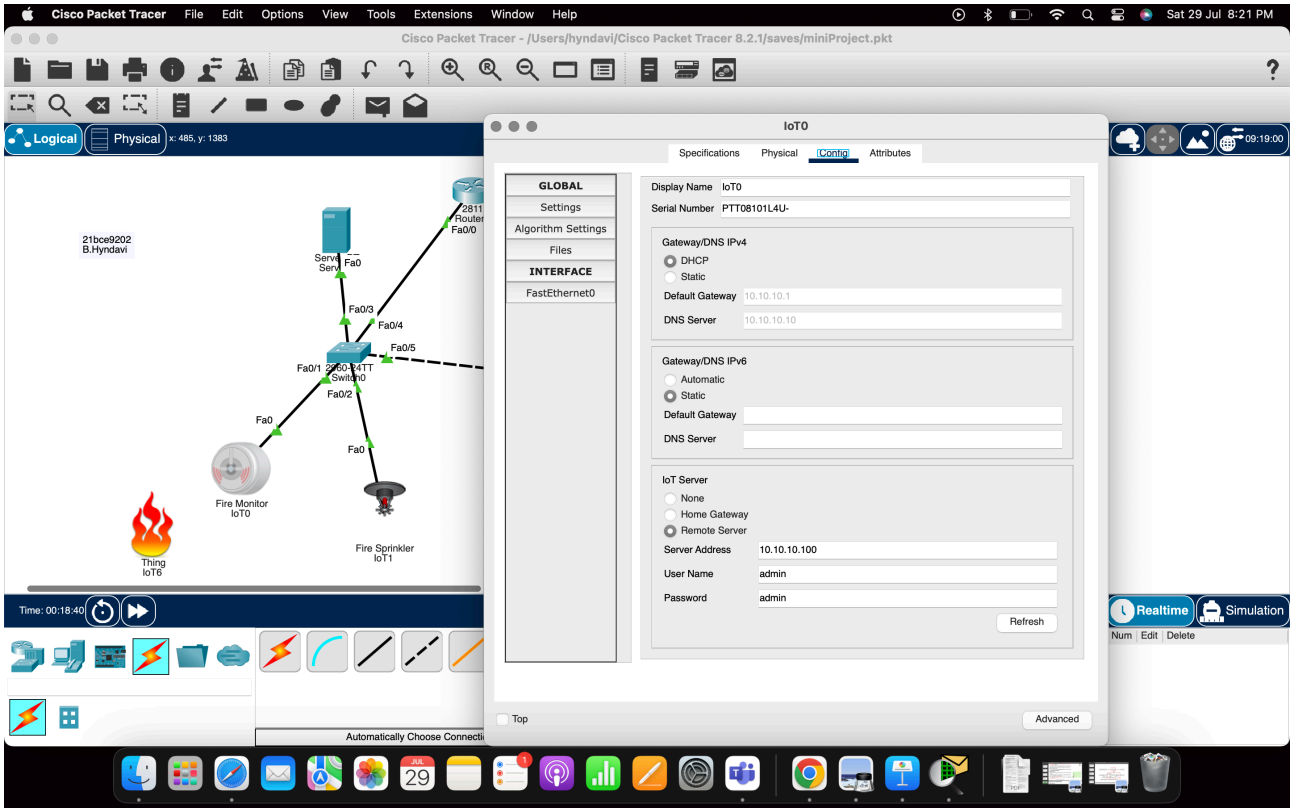

Cisco Packet Tracer File Edit Options View Tools Extensions Window Help
Sat 29 Jul 8:14 PM
Cisco Packet Tracer - /Users/hyndavi/Cisco Packet Tracer 8.2.1/saves/miniProject.pkt
Logical
Physical
x: 919, y: 1306
21bce9202
B.Hyndavi
2811
Router0
Fa0/0
Server0
Fa0
Fa0/3
Fa0/4
Fa0/5
Fa0/1
2960-24TT
Switch0
Fa0/2
Fa0
Fa0/4
Fa0/3
2960-24TT
Sw
Fa0/1
Fa0
Fire Monitor
IoT0
Thing
IoT6
Fire Sprinkler
IoT1
Smoke Detect
IoT2
Time: 00:12:30
Scenario 0
New
Delete
Toggle PDU List Window
Automatically Choose Connection Type
Router0
Physical
Config
CLI
Attributes
IOS Command Line Interface
Top


Logical
Physical
x: 374, y: 1196
Root
21bce9202
B.Hyndavi
2811
Fa0/0
Server-PT
Server0
Server0
Physical
Config
Services
Desktop
Programming
Attributes
GLOBAL
Settings
Algorithm Settings
INTERFACE
FastEthernet0
Global Settings
Display Name Server0
Gateway/DNS IPv4
DHCP
Static
Default Gateway 10.10.10.1
DNS Server 10.10.10.100
Gateway/DNS IPv6
Automatic
Static
Default Gateway
DNS Server
Fa0/1
Fa0
Fire Monitor
IoT6
Thing
IoT0


21bce9202
B.Hyndavi
2811
Fa0/0
Server-PT
Server0
Server0
Physical
Config
Services
Desktop
Programming
Attributes
IP Configuration
IP Configuration
DHCP
Static
IPv4 Address 10.10.10.100
Subnet Mask 255.255.255.0
Default Gateway 10.10.10.1
DNS Server 10.10.10.100
IPv6 Configuration
Automatic
Static
IPv6 Address
Link Local Address FE80::201:64FF:FE8B:D16B
Default Gateway
DNS Server
Fa0/1
Fa0
Fire Monitor
IoT6
Thing
IoT0


Cisco Packet Tracer File Edit Options View Tools Extensions Window Help
Sat 29 Jul 8:20 PM
Cisco Packet Tracer - /Users/hyndavi/Cisco Packet Tracer 8.2.1/saves/miniProject.pkt
Logical
Physical
21bce9202
B.Hyndavi
2811
Router0
Fa0/0
Fa0/3
Fa0/4
Fa0/5
Fa0/1
2960-24TT
Switch0
Fa0/2
Fa0
Fire Monitor
IoT0
Fire Sprinkler
IoT1
Thing
IoT6
Time: 00:17:46
Automatically Choose Connection Type
IoT6
Specifications
I/O Config
Physical
Config
Desktop
Thing Editor
Programming
Attributes
fire (JavaScript) - main.js
Open
New
Delete
Rename
Import
Install to Desktop
Stop
Clear Outputs
Help
..
main.js
Reload
Copy
Paste
Undo
Redo
Find
Replace
1 function setup()
2 {
3 setDeviceProperty(getName(),'IR',9
4 }
Starting fire (JavaScript)...
Top
Advanced


21bce9202
B.Hyndavi
Server-PT
Server0
Fa0
Fa0/0
Fa0/3
IoT0
Specifications
I/O Config
Physical
Config
Desktop
Thing Editor
Programming
Attributes
fire (JavaScript) - main.js
Open
New
Delete
Rename
Import
Install to Desktop
Stop
Clear Outputs
Help
main.j
Reload
Copy
Paste
Undo
Redo
Find
Replace
Zoom:
1 function setup(){
2 setDeviceProperty(getName(),"IR",900);
3 }
Fire Monitor
IoT6
Thing
Window
IoT4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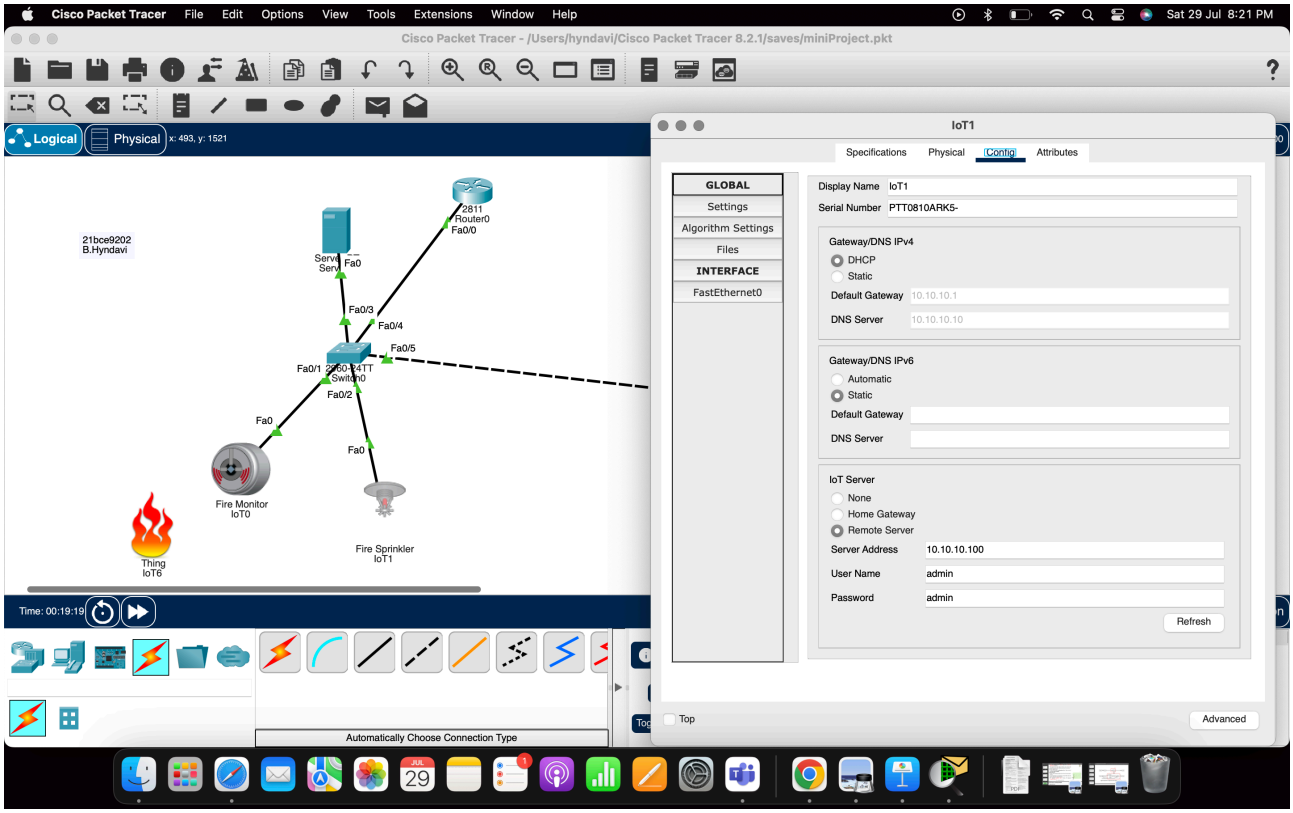
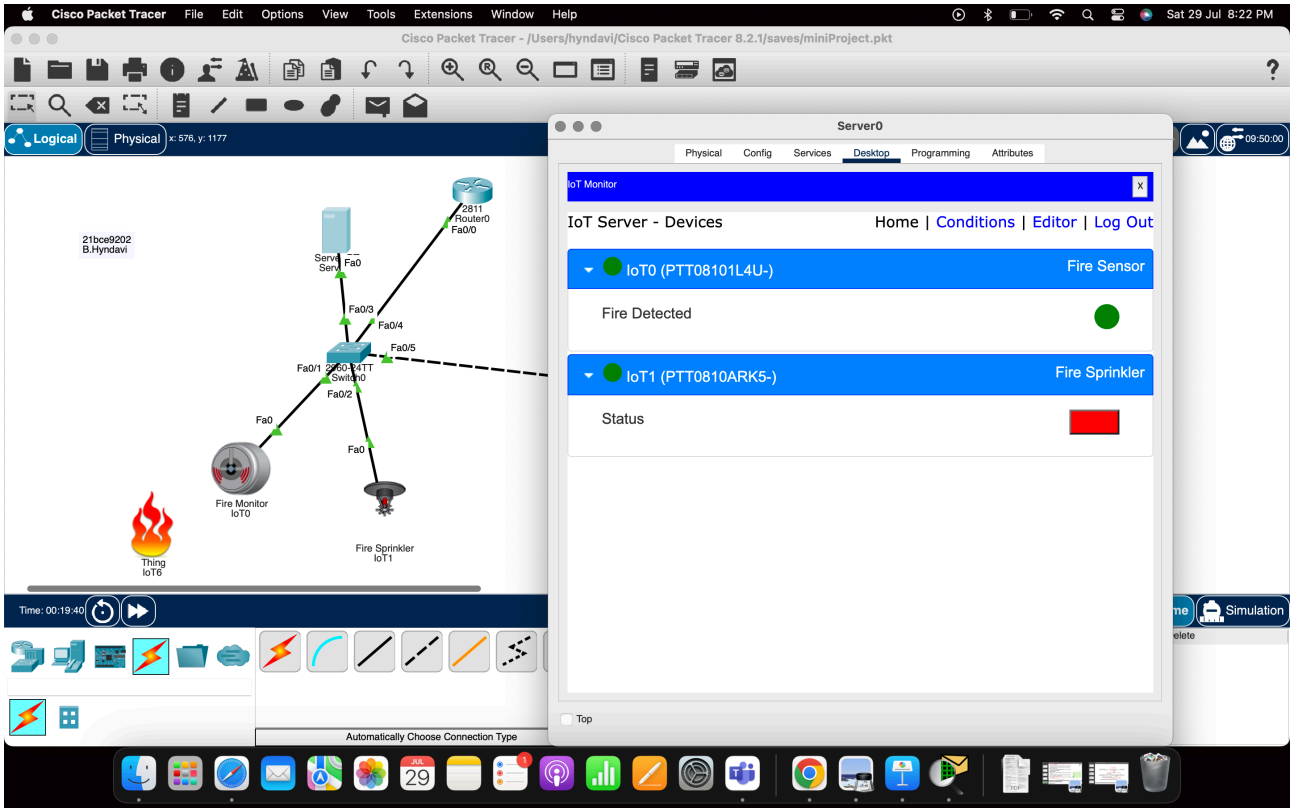
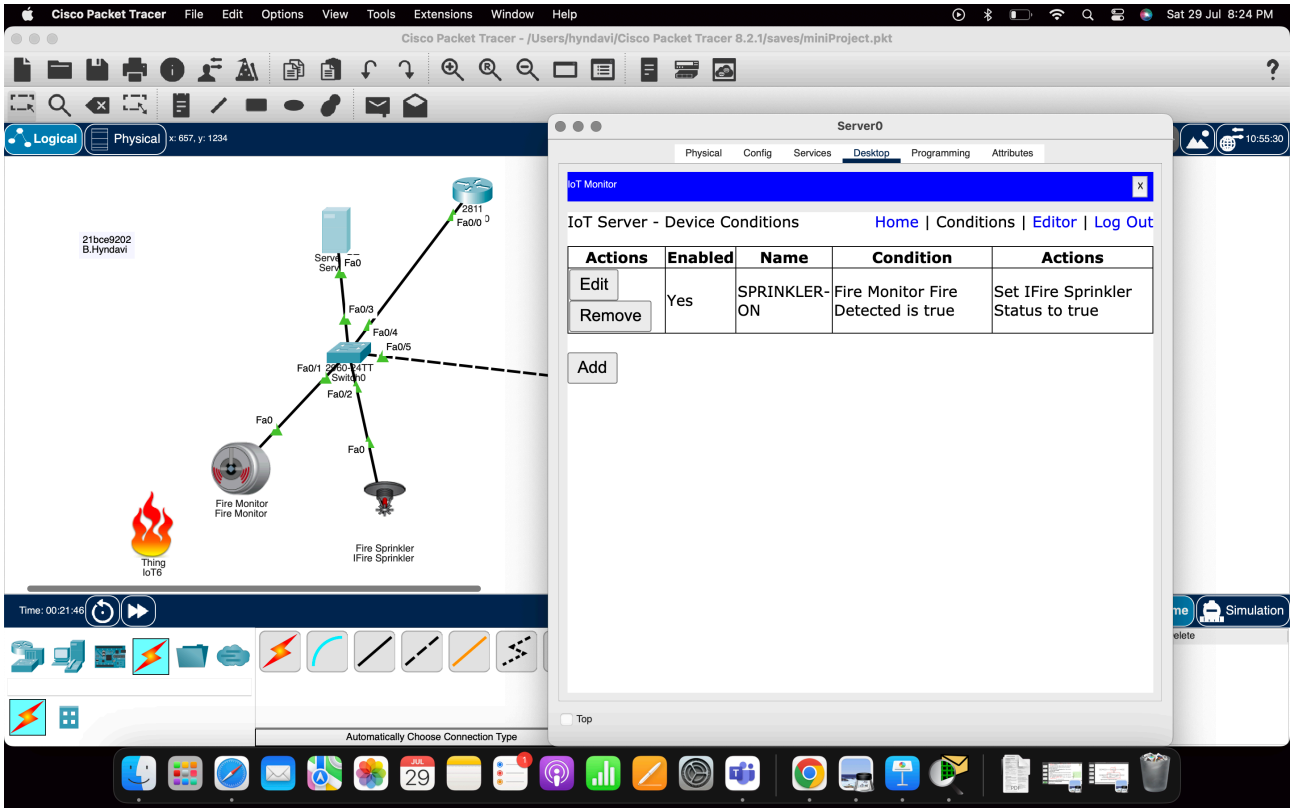
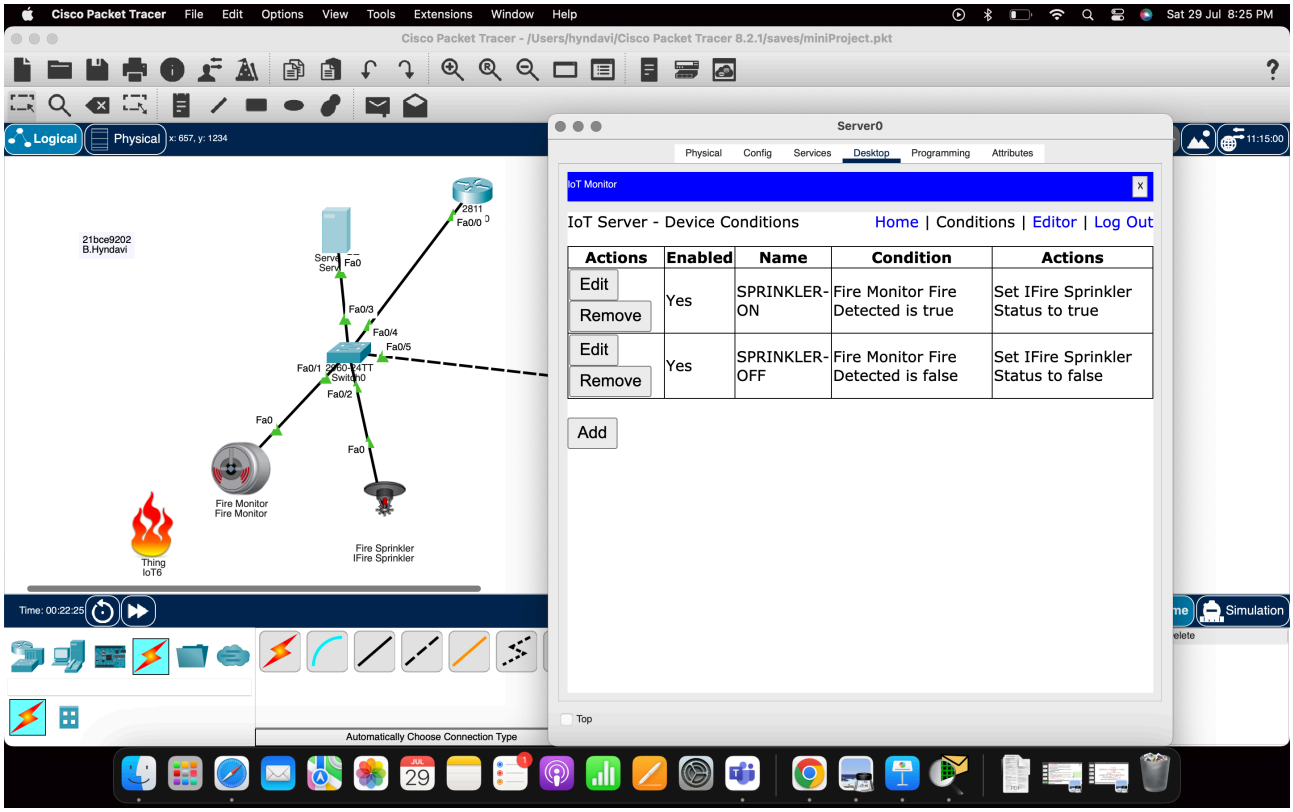
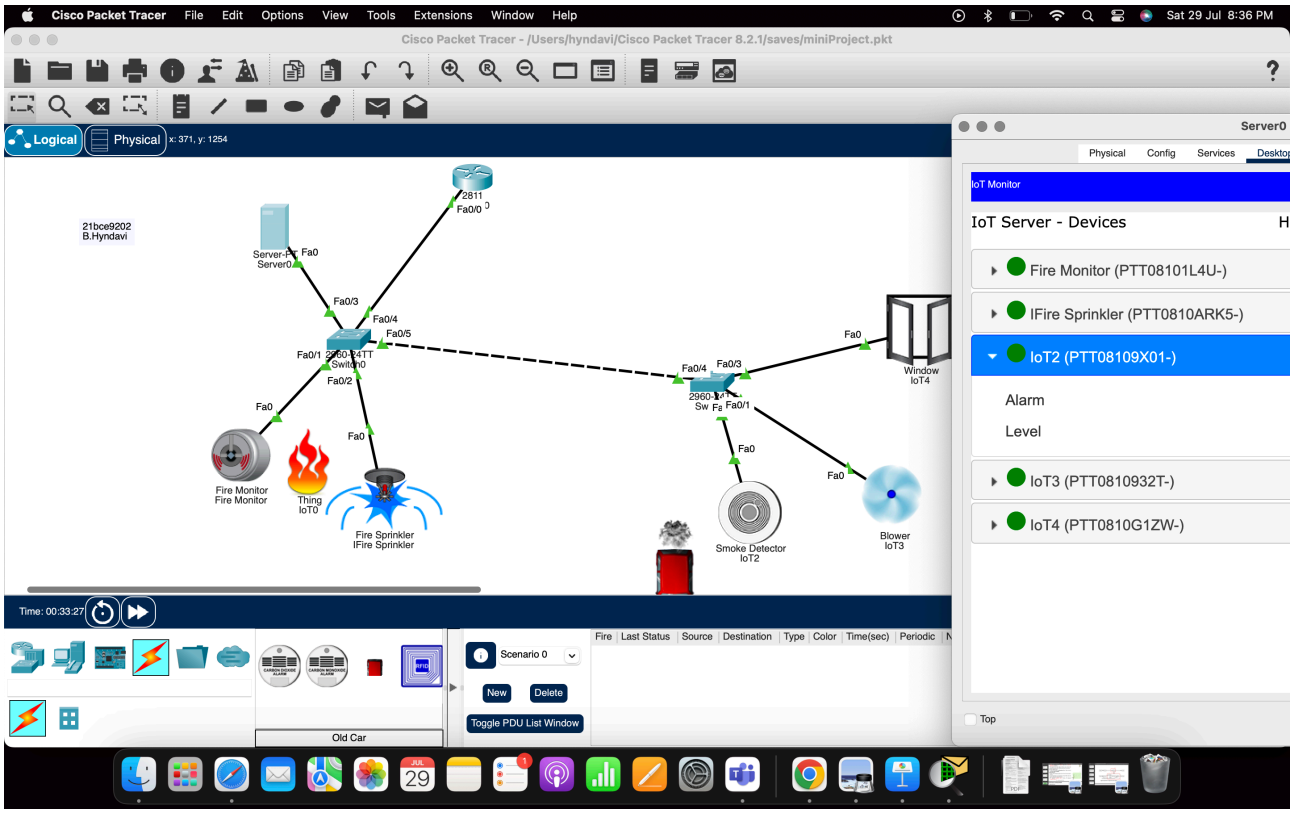
Logical
Physical
x: 485, y: 1383
09:19:00
21bce9202
B.Hyndavi
2811 Router0
Fa0/0
Fa0
Fa0/3
Fa0/4
Fa0/5
Fa0/1
Fa0/2
Switch0
Fire Monitor
IoT0
Thing
IoT6
Fire Sprinkler
IoT1
Time: 00:18:40
Realtime
Simulation
Num | Edit | Delete
Automatically Choose Connecti
IoT0
Specifications
Physical
Config
Attributes
GLOBAL
Settings
Algorithm Settings
Files
INTERFACE
FastEthernet0
Display Name IoT0
Serial Number PTT08101L4U-
Gateway/DNS IPv4
DHCP
Static
Default Gateway 10.10.10.1
DNS Server 10.10.10.10
Gateway/DNS IPv6
Automatic
Static
Default Gateway
DNS Server
IoT Server
None
Home Gateway
Remote Server
Server Address 10.10.10.100
User Name admin
Password admin
Refresh
Top
Advanced

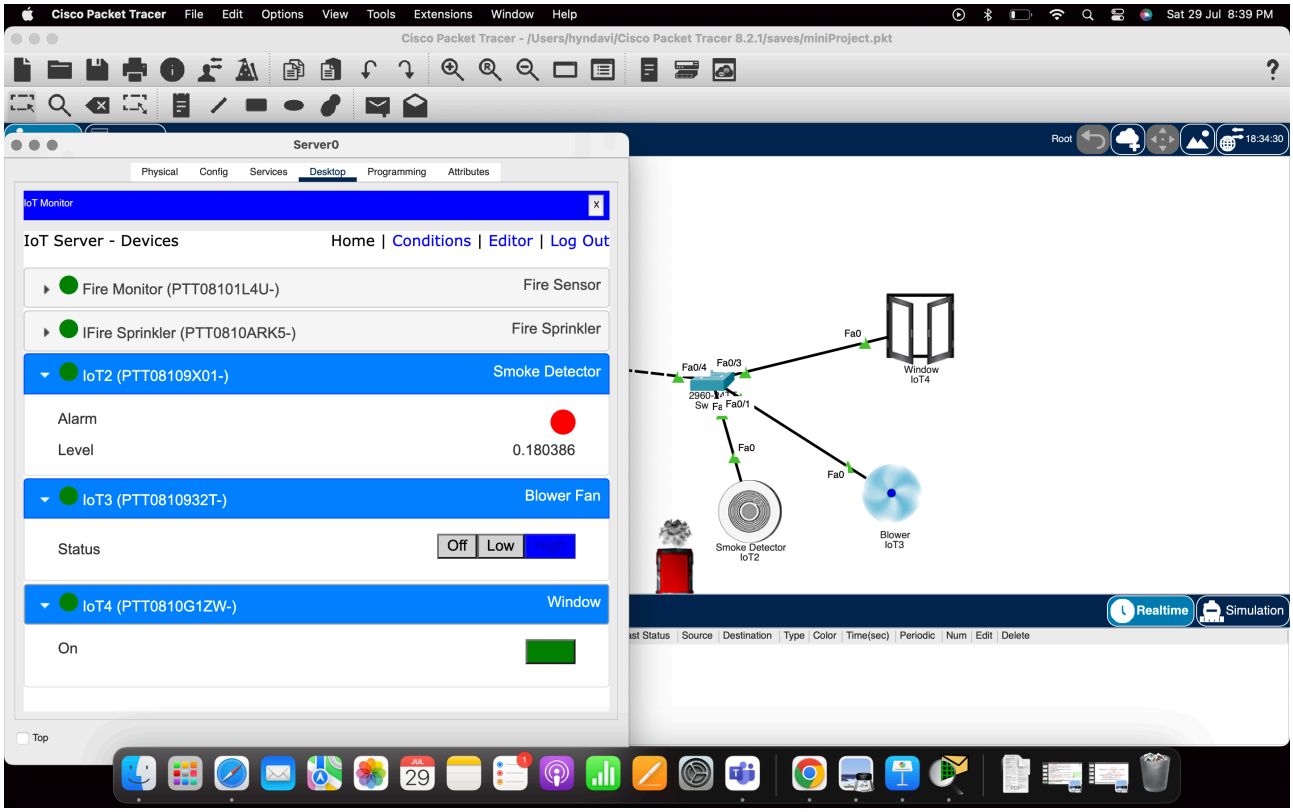

Cisco Packet Tracer File Edit Options View Tools Extensions Window Help
Sat 29 Jul 8:21 PM
Cisco Packet Tracer - /Users/hyndavi/Cisco Packet Tracer 8.2.1/saves/miniProject.pkt
Logical
Physical
x: 493, y: 1521
21bce9202
B.Hyndavi
2811 Router0
Fa0/0
Fa0
Fa0/3
Fa0/4
Fa0/5
Fa0/1
Fa0/2
Switch0
Fire Monitor
IoT0
Thing
IoT6
Fire Sprinkler
IoT1
Time: 00:19:19
Automatically Choose Connection Type
IoT1
Specifications
Physical
Config
Attributes
GLOBAL
Settings
Algorithm Settings
Files
INTERFACE
FastEthernet0
Display Name IoT1
Serial Number PTT0810ARK5-
Gateway/DNS IPv4
DHCP
Static
Default Gateway 10.10.10.1
DNS Server 10.10.10.10
Gateway/DNS IPv6
Automatic
Static
Default Gateway
DNS Server
IoT Server
None
Home Gateway
Remote Server
Server Address 10.10.10.100
User Name admin
Password admin
Refresh
Top
Advanced

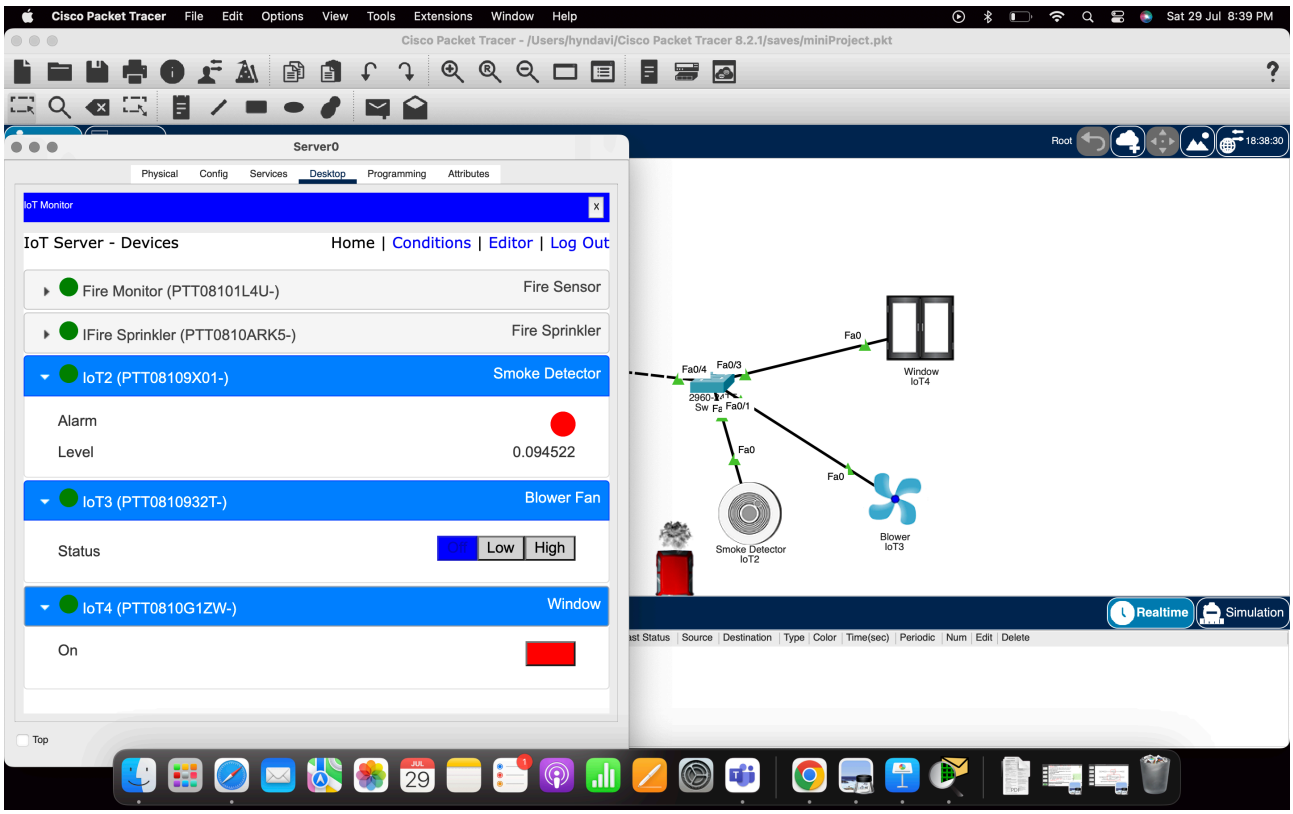

Cisco Packet Tracer File Edit Options View Tools Extensions Window Help
Sat 29 Jul 8:22 PM
Cisco Packet Tracer - /Users/hyndavi/Cisco Packet Tracer 8.2.1/saves/miniProject.pkt
Logical
Physical
x: 576, y: 1177
Server0
Physical Config Services Desktop Programming Attributes
IoT Monitor
IoT Server - Devices
Home | Conditions | Editor | Log Out
IoT0 (PTT08101L4U-)
Fire Sensor
Fire Detected
IoT1 (PTT0810ARK5-)
Fire Sprinkler
Status
21bce9202
B.Hyndavi
2811
Router0
Fa0/0
Fa0/3
Fa0/4
Fa0/5
Fa0/1
Fa0/2
Switch0
Fa0
Fire Monitor
IoT0
Thing
IoT6
Fire Sprinkler
IoT1
Time: 00:19:40
Simulation
Automatically Choose Connection Type
Top

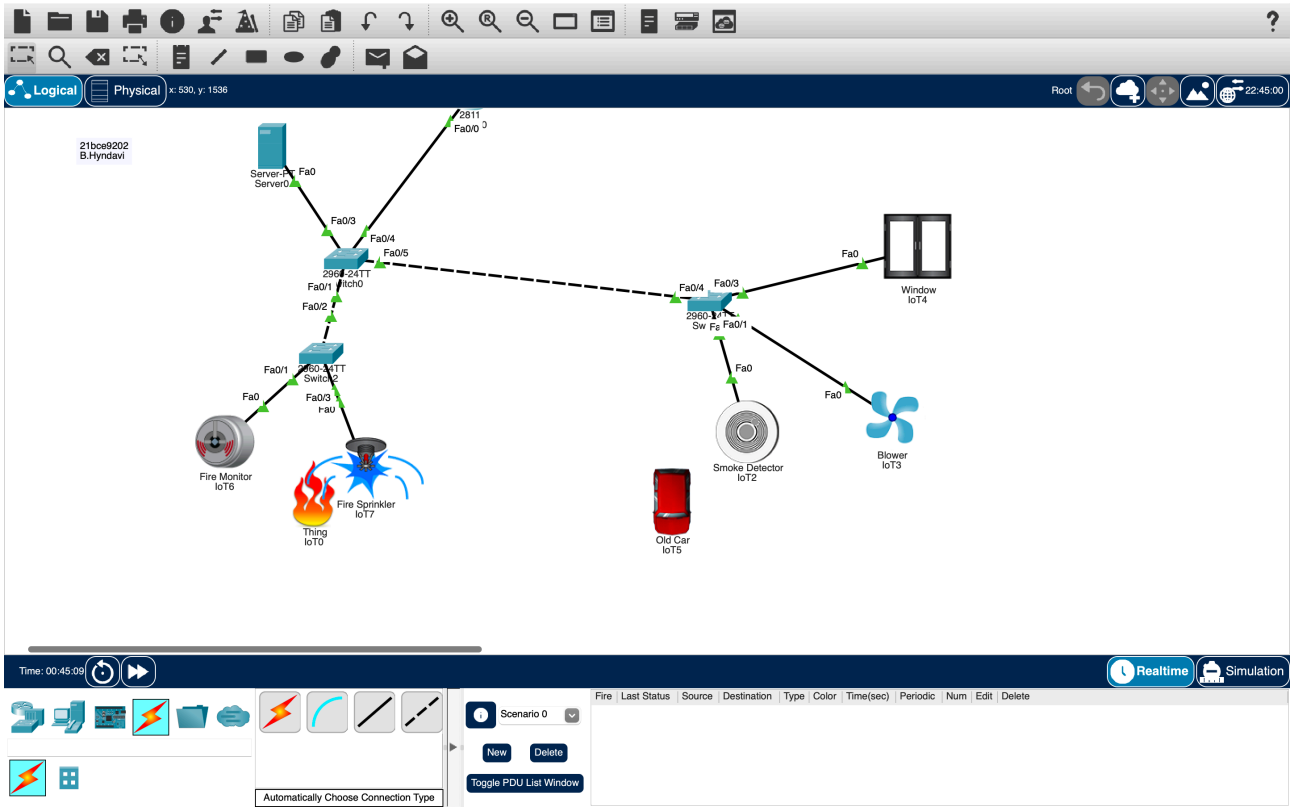

Cisco Packet Tracer File Edit Options View Tools Extensions Window Help
Sat 29 Jul 8:24 PM
Cisco Packet Tracer - /Users/hyndavi/Cisco Packet Tracer 8.2.1/saves/miniProject.pkt
Logical
Physical
x: 657, y: 1234
Server0
Physical Config Services Desktop Programming Attributes
IoT Monitor
IoT Server - Device Conditions
Home | Conditions | Editor | Log Out
Actions
Enabled
Name
Condition
Actions
Edit
Remove
Yes
SPRINKLER-ON
Fire Monitor Fire Detected is true
Set IFire Sprinkler Status to true
Add
21bce9202
B.Hyndavi
2811
Fa0/0
Fa0/3
Fa0/4
Fa0/5
Fa0/1
Fa0/2
Switch0
Fa0
Fire Monitor
Fire Monitor
Thing
IoT6
Fire Sprinkler
IFire Sprinkler
Time: 00:21:46
Simulation
Automatically Choose Connection Type
Top


Cisco Packet Tracer File Edit Options View Tools Extensions Window Help
Sat 29 Jul 8:25 PM
Cisco Packet Tracer - /Users/hyndavi/Cisco Packet Tracer 8.2.1/saves/miniProject.pkt
Logical Physical x: 657, y: 1234
Server0
Physical Config Services Desktop Programming Attributes
IoT Monitor
IoT Server - Device Conditions
Home | Conditions | Editor | Log Out
Actions | Enabled | Name | Condition | Actions
Edit Remove | Yes | SPRINKLER-ON | Fire Monitor Fire Detected is true | Set IFire Sprinkler Status to true
Edit Remove | Yes | SPRINKLER-OFF | Fire Monitor Fire Detected is false | Set IFire Sprinkler Status to false
Add
21bce9202 B.Hyndavi
2811
Fa0/0
Fa0/3
Fa0/4
Fa0/5
Fa0/1
Fa0/2
Switch0
Fa0
Fire Monitor
Fire Monitor
Thing
IoT6
Fire Sprinkler
IFire Sprinkler
Time: 00:22:25
Simulation
Automatically Choose Connection Type
Top


Cisco Packet Tracer File Edit Options View Tools Extensions Window Help
Sat 29 Jul 8:36 PM
Cisco Packet Tracer - /Users/hyndavi/Cisco Packet Tracer 8.2.1/saves/miniProject.pkt
Logical Physical x: 371, y: 1254
Server0
Physical Config Services Desktop
IoT Monitor
IoT Server - Devices
Fire Monitor (PTT08101L4U-)
IFire Sprinkler (PTT0810ARK5-)
IoT2 (PTT08109X01-)
Alarm
Level
IoT3 (PTT0810932T-)
IoT4 (PTT0810G1ZW-)
21bce9202 B.Hyndavi
2811
Fa0/0
Server-PT Server0
Fa0
Fa0/3
Fa0/4
Fa0/5
Fa0/1
Fa0/2
Switch0
Fa0
Fire Monitor
Fire Monitor
Thing
IoT0
Fire Sprinkler
IFire Sprinkler
Window
IoT4
Smoke Detector
IoT2
Blower
IoT3
Time: 00:33:27
Scenario 0
New
Delete
Toggle PDU List Window
Old Car
Top

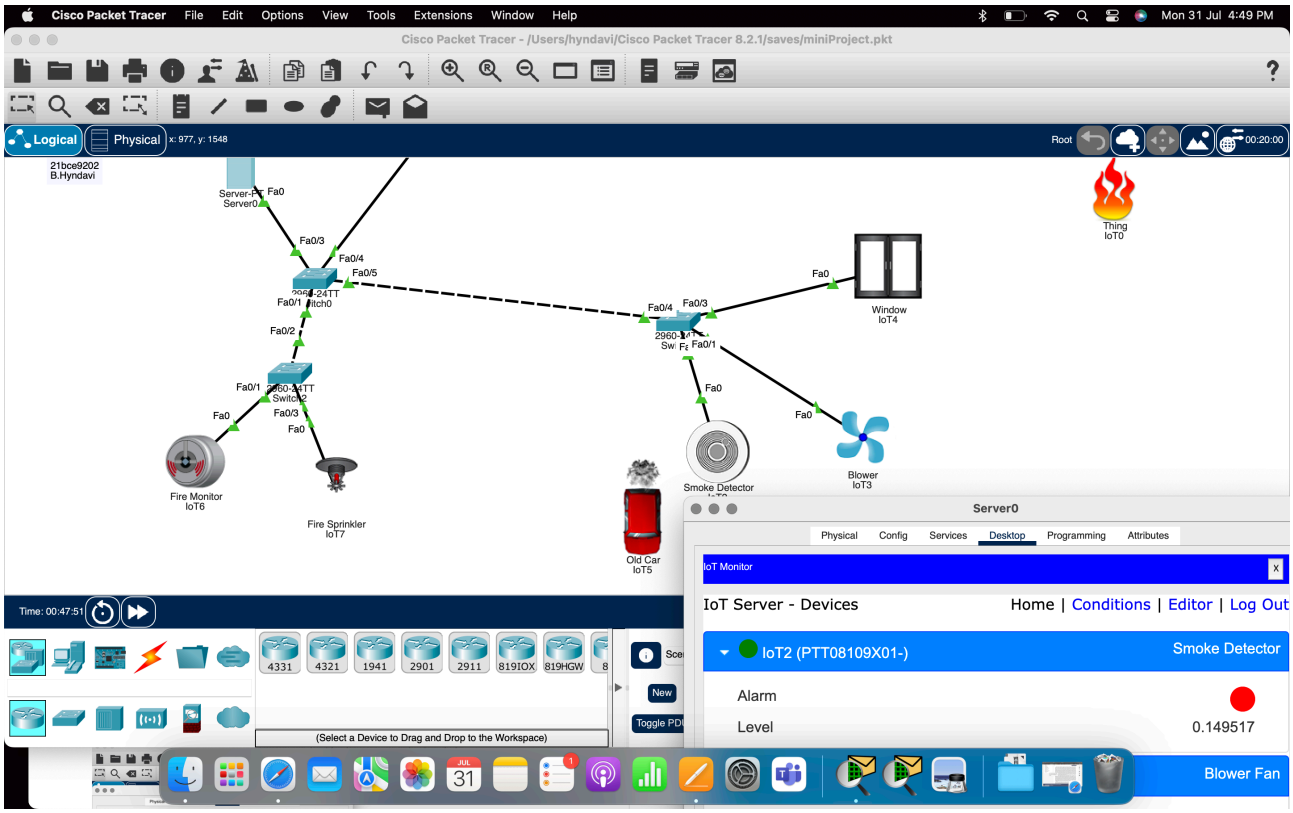

Cisco Packet Tracer File Edit Options View Tools Extensions Window Help
Sat 29 Jul 8:39 PM
Cisco Packet Tracer - /Users/hyndavi/Cisco Packet Tracer 8.2.1/saves/miniProject.pkt
Server0
Physical Config Services Desktop Programming Attributes
IoT Monitor
IoT Server - Devices
Home | Conditions | Editor | Log Out
Fire Monitor (PTT08101L4U-)
Fire Sensor
IFire Sprinkler (PTT0810ARK5-)
Fire Sprinkler
IoT2 (PTT08109X01-)
Smoke Detector
Alarm
Level
0.180386
IoT3 (PTT0810932T-)
Blower Fan
Status
Off Low High
IoT4 (PTT0810G1ZW-)
Window
On
Top
Root
18:34:30
Fa0
Fa0/4
Fa0/3
Fa0/1
Window IoT4
Smoke Detector IoT2
Blower IoT3
Realtime
Simulation
Source Destination Type Color Time(sec) Periodic Num Edit Delete

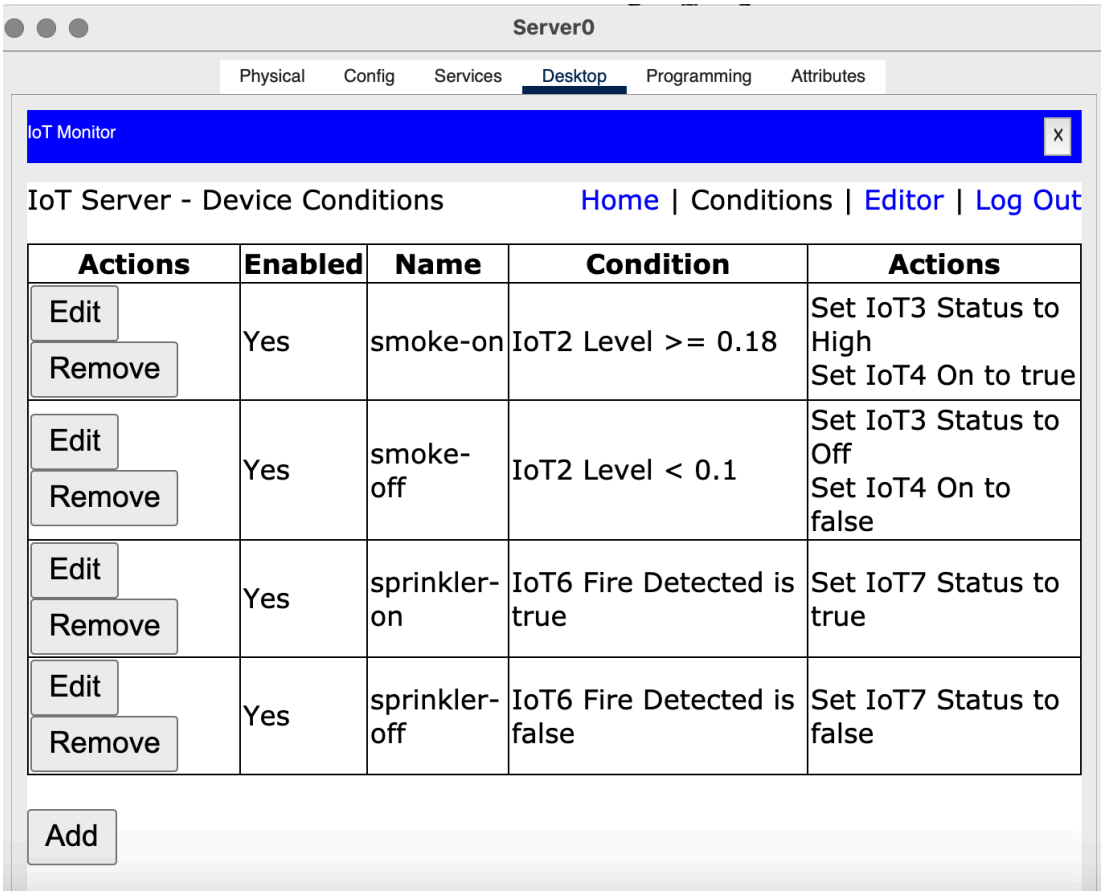

Cisco Packet Tracer File Edit Options View Tools Extensions Window Help
Sat 29 Jul 8:39 PM
Cisco Packet Tracer - /Users/hyndavi/Cisco Packet Tracer 8.2.1/saves/miniProject.pkt
Server0
Physical Config Services Desktop Programming Attributes
IoT Monitor
IoT Server - Devices
Home | Conditions | Editor | Log Out
Fire Monitor (PTT08101L4U-)
Fire Sensor
IFire Sprinkler (PTT0810ARK5-)
Fire Sprinkler
IoT2 (PTT08109X01-)
Smoke Detector
Alarm
Level
0.094522
IoT3 (PTT0810932T-)
Blower Fan
Status
Off Low High
IoT4 (PTT0810G1ZW-)
Window
On
Top
Root
18:38:30
Fa0
Fa0/4
Fa0/3
Fa0/1
Window IoT4
Smoke Detector IoT2
Blower IoT3
Realtime
Simulation
Source Destination Type Color Time(sec) Periodic Num Edit Delete

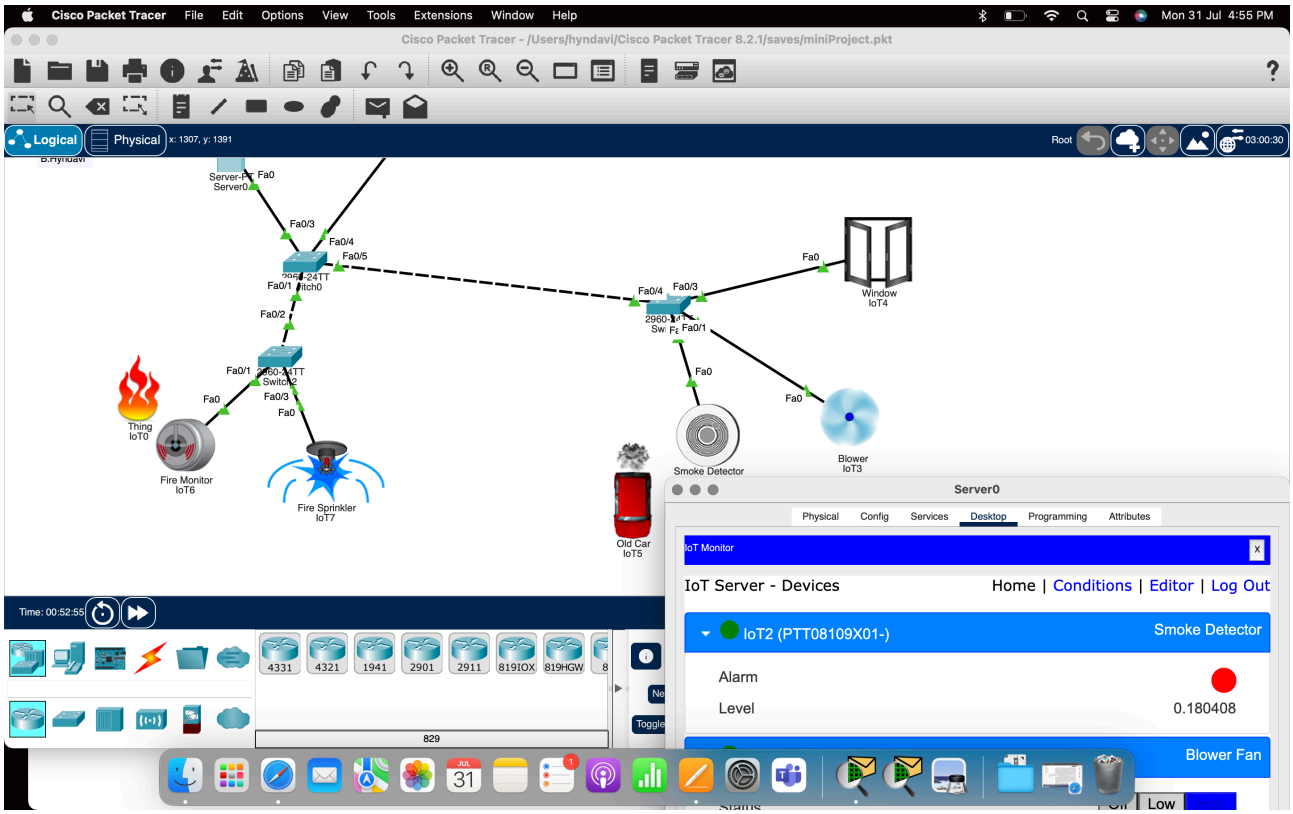


Working:

Putting on the smoke of the old car and fire sprinkler by clicking option in keyboard and clicking on the symbol on fire sprinkler or old car in cisco packet tracer.
When the fire is far away from the fire monitor then the sprinkler will not be on and if car smoke level is less than 0.18 then blower will not be on and windows will not be opened.
When value of the car smoke level in alarm goes above 0.18 then smoke detector will detect the smoke the blower will turn on and the windows will be opened.if fire is detected by fire motor then fire sprinkler will be put on.


Cisco Packet Tracer File Edit Options View Tools Extensions Window Help
Mon 31 Jul 4:49 PM
Logical
Physical
Root
Thing IoT0
Window IoT4
Fire Monitor IoT6
Fire Sprinkler IoT7
Old Car IoT5
Smoke Detector
Blower IoT3
Server0
Physical Config Services Desktop Programming Attributes
IoT Monitor
IoT Server - Devices
Home | Conditions | Editor | Log Out
IoT2 (PTT08109X01-)
Smoke Detector
Alarm
Level
0.149517
Blower Fan
(Select a Device to Drag and Drop to the Workspace)


Server0
Physical Config Services Desktop Programming Attributes
IoT Monitor
IoT Server - Device Conditions
Home | Conditions | Editor | Log Out
Actions Enabled Name Condition Actions
Edit Remove Yes smoke-on IoT2 Level >= 0.18 Set IoT3 Status to High Set IoT4 On to true
Edit Remove Yes smoke-off IoT2 Level < 0.1 Set IoT3 Status to Off Set IoT4 On to false
Edit Remove Yes sprinkler-on IoT6 Fire Detected is true Set IoT7 Status to true
Edit Remove Yes sprinkler-off IoT6 Fire Detected is false Set IoT7 Status to false
Add



CONCLUSION:

In conclusion, the IoT-based Smoke and Fire Monitor System using Cisco Packet Tracer demonstrates the potential of IoT technology in enhancing fire safety and early detection. By integrating smoke and fire sensors with a microcontroller and establishing communication with an IoT cloud platform, the system can monitor and analyze real-time data remotely. The cloud platform enables instant alerts and notifications to relevant personnel in case of smoke or fire detection, improving response time and mitigating potential risks. This simulation showcases the power of IoT in creating intelligent and connected monitoring systems that can contribute significantly to safety and security in real-world applications.