CISCO Academy

Packet Tracer – Adding IoT Devices

The Smart Home Network



Objectives

- Part 1: Explore the Existing Smart Home Network
- Part 2: Add Wired IoT Devices to the Smart Home Network
- Part 3: Add Wireless IoT Devices to the Smart Home Network

Background / Scenario

In this activity you will open a Packet Tracer file with an existing home network, explore the devices on the network, and then add additional wired and wireless IoT devices.

Part 1: Explore the Existing Smart Home Network

Step 1: Open the Smart_Home_Network.pkt file

- a. Open the Smart_Home_Network.pkt file.
- b. Save the file to your computer.

Step 2: Explore the Smart Home Network

a. Explore IoT end devices.

At the bottom left corner of the Packet Tracer window, locate and click the **End Devices** icon in the top row, and the **Home** icon in the bottom row of the **Device-Type Selection** box.

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Across the bottom of the Packet Tracer window, the **Device-Specific Selection** box displays the many different Smart Home IoT devices available.

Move the mouse pointer over each device and notice that the descriptive name of the device is displayed at the bottom of the **Device-Specific Selection** box. Take a moment to look at each device type.



b. Explore the Smart Home network.



In the **Logical** workspace is a prebuilt smart home network that consists of many wired and wireless IoT devices, and network infrastructure devices.

When you place your curser over a device, such as the Smart Fan, an informational window opens containing basic network information about that device.



To turn on or activate a device, simply hold down the **Alt** key on the keyboard and then move the cursor over the device. Try this on each of the smart devices to observe what they do.

The smart home network also consists of infrastructure devices such as a home gateway.

Click the **Home Gateway** icon to open the **Home Gateway** window.



The **Physical** tab is selected by default and shows a picture of the Home Gateway.

🤻 Home Gate	eway					—		×
Physical	Confi <u>c</u>	g GUI	Attributes					
MODULES	\wedge			Physical Devi	ce View			
		Zo	om In	Original S	Size	Zoo	m Out	
					0			
		Cus	stomize on in		Custo	omize n in		- 1

Next, click the **Config** tab and then in the left pane click **LAN** to view the LAN Settings of the Home Gateway.

Write down the IP Address of the home network for future reference.

R	Home Gateway						-	×
	Physical Config	GUI	Attributes					
	GLOBAL	$ $ \wedge			LAN S	ettings		
	Settings		IP Configura	tion				
	Algorithm Settings		IP Address			192.168.25.1		ון ר
	INTERFACE		Subnet Mas	k		255.255.255.0		- 11
	Internet							
	LAN							
	Wireless							

Click Wireless in the left pane to view the wireless settings of the Home Gateway.

Vrite down the SSID o	of the uture	home network reference.	a	nd the WPA2-PSK Pa	ss Phra
🤻 Home Gateway				- 0	×
Physical Config	GUI	Attributes			
GLOBAL	^	<u> </u>	Wireless	Settings	
Settings		SSID		HomeGateway	
Algorithm Settings	5	2.4 GHz Channel		6 - 2.437GHz	
INTERFACE		Coverage Range (meters)		250.00	
Internet		Authentication			
LAN		O Disabled O WEP V	NEP Key	r	
Wireless		○ WPA-PSK WPA2-PSK F	PSK Pas	s Phrase mySecretKey	
		O WPA O WPA2			
		RADIUS Server Settings			
		IP Address			
		Shared Secret			
		Encryption Type	AES		

Close the Home Gateway window.

Next, click the Tablet device icon to open the Tablet window.



In the Tablet window, select the Desktop tab and then click the Web Browser icon.



In the **Web Browser** window, type the IP address of the Home Gateway 192.168.25.1 into the URL box and click **Go**. In the **Home Gateway Login** screen, type admin for both the username and the password and click **Submit**.

🥐 Tablet	_	
Physical Config Desktop Programming Attributes		
Web Browser		Х
< > URL http://192.168.25.1	Go	Stop
Home Gateway Login		^
Username: admin Password: •••••		
Submit		

After you have connected to the Home Gateway web interface, a list of all the connected IoT devices appears.

Tablet	>
Physical Config Desktop Programming Attributes	
Veb Browser	x
VRL http://192.168.25.1/home.html IoT Server - Devices	Go Stop Home Conditions Editor Log Out
▶ ● Smoke Detector (PTT08101J06)	Smoke Detector
Garage Door (PTT0810QU96)	Garage Door
Smart Door (PTT08101WM9)	Door
Temperature Meter (PTT08104K8B)	Temperature Monitor
▶ ● Smart Coffee Maker (PTT08107XBP)	Appliance
▶ ● Smart Fan (PTT08109REZ)	Ceiling Fan
Smart Lamp (PTT0810V0ZJ)	Light

When you click a device in the list, the status and settings of that device is displayed.

P Tablet	- □ >
Physical Config Desktop Programming Attributes	
Web Browser	Х
< > URL http://192.168.25.1/home.html IoT Server - Devices	Go Stop Home Conditions Editor Log Out
→ ● Smoke Detector (PTT08101J06)	Smoke Detector
→ ● Garage Door (PTT0810QU96)	Garage Door
▼ ● Smart Door (PTT08101WM9)	Door
Open Lock	
▶ ● Temperature Meter (PTT08104K8B)	Temperature Monitor
▶ ● Smart Coffee Maker (PTT08107XBP)	Appliance
▼ ● Smart Fan (PTT08109REZ)	Ceiling Fan
Status	Off Low High
▶ ● Smart Lamp (PTT0810V0ZJ)	Light

Close the Tablet window.

Part 2: Add Wired IoT Devices to the Smart Home Network

Step 1: Cable a device to the network

- a. In the **Device-Specific Selection** box, click the **Lawn Sprinkler** icon and then click in the workspace where you would like to locate the **Lawn Sprinkler**.
- b. Cable the Fire Sprinkler to the Home Gateway.

In the **Device-Type Selection** box, click the **Connections** icon (this looks like a lightning bolt). Click the **Copper Straight Through** connector type icon in the **Device-Specific Selection** box. Then click the **Sprinkler** icon and connect one end of the cable to the Sprinkler's FastEthernet0 interface. Next, click the **Home Gateway** icon and connect the other end of the cable to an available Ethernet interface.

Step 2: Configure the sprinkler for network connectivity

a. Click the **Lawn Sprinkler** device icon in the workspace to open the device window. Notice that right now the name of the Lawn Sprinkler is a generic IoT0.

The device window will open to the **Specification** tab which gives information about the device which can be edited.



🥐 IoTO —		×
Specifications Physical Config Attributes		
Lawn Sprinkler A Sprinkler for Lawn.		^
<u>Features:</u>		
 Registration Server Compatible Raises the water level 		
Usage:		
• N/A		
Direct Control:		
 ALT-Click to interact 		
Local Control:		11
 Connect device to MCU/SBC/Thing. Use the "customWrite" AP Data Specifications. 	l per	
Remote Control:		
 Connect device to Registration Server using Config Tab 		
	Edit	~
Пор	Adva	inced

b. Click the **Config** tab to edit the device configuration settings.

In the **Config** tab, make the following changes to **Settings**:

- Set the **Display Name** to Sprinkler1 (notice the window name changes to Sprinkler1)
- Set the IoT Server to Home Gateway

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Specifications Physical	Config Attributes		
GLOBAL ^	Global Settings		^
Algorithm Settings			
Files	Display Name IoT0		
INTERFACE	Serial Number PTT081075D5-		
FastEthernet0			
	Gateway/DNS IPv4		
	Static		
	Gateway		
	DNS Server		
	Gateway/DNS IPv6		
	O DHCP		
		_	
	Pv6 Gateway		
	IPv6 DNS Server		
	loT Server		
	None		
	O Home Gateway		
	O Remote Server		
	Saruar Addraga		
	Scivel Address		
	User Name		
V	Password		~
Тор		Adva	nced

Click FastEthernet0 and change the IP Configuration to DHCP.

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	Specifications Physical	Config Attributes						
	GLOBAL		FastEthernet0					
	Settings	Port Status	☑ On					
	Algorithm Settings	Bandwidth	💿 100 Mbps 🔵 10 Mbps 🗹 Auto					
	Files	Duplex	🔵 Half Duplex 🖲 Full Duplex 🗹 Auto					
	INTERFACE	MAC Address	000B.BE8D.7970					
	FastEthernet0	IP Configuration DHCP Static IP Address Subnet Mask	192.168.25.114 255.255.255.0					

Close the Sprinkler1 window.

c. Verify that the sprinker is on the network.

Log into the Home Gateway from the Tablet.

The device Sprinkler 1 should now appear in the IoT Server – Devices list.

Tablet	- 0				
Physical Config Desktop Programming Attributes					
Neb Browser	×				
< > URL http://192.168.25.1/home.html	Go Stop				
IoT Server - Devices	Home Conditions Editor Log Out				
▶ ● Smoke Detector (PTT08101J06)	Smoke Detector				
→ Garage Door (PTT0810QU96)	Garage Door				
▶ ● Smart Door (PTT08101WM9)	Door				
Temperature Meter (PTT08104K8B)	Temperature Monitor				
Smart Coffee Maker (PTT08107XBP)	Appliance				
→ ● Smart Fan (PTT08109REZ)	Ceiling Fan				
→ ● Smart Lamp (PTT0810V0ZJ)	Light				
 Sprinkler1 (PTT081075D5-) 	Lawn Sprinkler				

Close the Tablet window.

Step 3: Experiment by adding other types of IoT devices to the smart home network.

Part 3: Add Wireless IoT Devices to the Smart Home Network

Step 1: Add a wireless device to the network

a. In the **Device-Specific Selection** box click the **Wind Detector** icon and then click in the workspace where you would like to locate the **Wind Detector**.

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b. Add wireless module to the Wind Detector.

Click the **Wind Detector** icon in the workspace to open the IoT device window. In the bottom right corner of the IoT device window, click the **Advanced** button. Notice more tabs become visible at the top of the window. Click the **I/O Config** tab.

🚩 loT1	_		×
Specifications VO Config Physical Config Thing Editor Programming Attributes			
NetworkAdapter PT-IOT-NM-1W		•	
Network Adapter 2 None		-	
Digital Slots 0		•	
Analog Slots 0		*	
USB Ports 0		*	
Bluetooth 🗌 Built-in			
Desktop Show			
Usage Smart Device Component			

Change the Network Adapter drop down list to PT-IOT-NM-1W, which is a wireless adapter.

c. Configure the Wind Detector for the wireless network.

Click the **Config** tab.

Change the **Display Name** to **Wind_Detector** and change the **IoT Server** to **Home Gateway**.

Next click **Wireless0** in the left pane. Change the Authentication type to **WPA2-PSK** and in the **PSK Pass Phrase** box type **mySecretKey.** These are the wireless settings from the Home Gateway that you recorded in Part 1.

Wind_Detecto	r								-		×
Specifications	VO Confi	g Physical	Config	Thing Editor	Programming	Attrib	utes				
GLOBAI	L					Wire	ess0				
Settings	s	Port Status								\checkmark	On
Algorithm Se	ttings	Bandwidth					11 Mbps				
Files		MAC Address					00E0.F718.8047				
INTERFA	CE	SSID					HomeGateway				
Wireless	:0	Authenticat	tion								
		O Disable	d	⊖ w	'EP		WEPKey				
		O WPA-P	SK	• w	PA2-PSK		PSK Pass Phrase	mySecret	(ey		
		0.000					User ID				
		U WPA		0 W	PAZ		Password				
		0 802.1X		Metho	d:		MD5				/
							User Name				
							Password				
		Encryption	Туре				AES				-
	Wind_Detecto Specifications GLOBA Settings Algorithm Se Files INTERFA Wireless	Wind_Detector Specifications VO Confi GLOBAL Settings Algorithm Settings Files INTERFACE Wireless0	Wind_Detector Specifications VO Config Physical GLOBAL Port Status Settings Bandwidth Algorithm Settings SSID INTERFACE Wireless0 Wireless0 WPA-P: WPA 802.1X Encryption Settings	Wind_Detector Specifications VO Config Physical Config GLOBAL Settings Algorithm Settings Files INTERFACE Wireless0 Authentication Disabled WPA-PSK WPA 802.1X 	Wind_Detector Specifications VO Config Physical Config Thing Editor GLOBAL Settings Algorithm Settings Files INTERFACE Wireless0 Authentication Disabled WRA WRA WRA WRA S02.1X Method 	Wind_Detector Specifications VO Config Physical Config Thing Editor Programming GLOBAL	Wind_Detector Specifications VO Config Physical Config Thing Editor Programming Attrib GLOBAL Settings Algorithm Settings Files INTERFACE Wireless0 Authentication Disabled WPA WPA2 802.1X Method: Encryption Type Encryption Type 	Wind_Detector Specifications VO Config Physical Config Thing Editor Programming Attributes GLOBAL	Wind_Detector Specifications VO Config Physical Config Thing Editor Programming Attributes GLOBAL	Wind_Detector — Specifications VO Config Physical Config Thing Editor Programming Attributes GLOBAL	Wind_Detector Specifications V0 Config Physical Config Thing Editor Programming Attributes Port Status Bandwidth MAC Address SD WirelessO Muthentication Disabled WPA2 Disabled WPA2 Password S02.1X Method: MD5 User Name Password AES

A wireless connection should be formed between the Wind Detector and the Home Gateway.



d. Verify the Wind Detector is on the network.Log into the Home Gateway from the Tablet.

The device Wind Detector should now appear in the IoT Server - Devices list.

< > URL http://192.168.25.1/home.html	Go Stop
oT Server - Devices	Home Conditions Editor Log Out
▶ ● Smoke Detector (PTT08101J06)	Smoke Detector
 Garage Door (PTT0810QU96) 	Garage Door
 Smart Door (PTT08101WM9) 	Door
 Temperature Meter (PTT08104K8B) 	Temperature Monitor
 Smart Coffee Maker (PTT08107XBP) 	Appliance
 Smart Fan (PTT08109REZ) 	Ceiling Fan
 Smart Lamp (PTT0810V0ZJ) 	Light
 Sprinkler1 (PTT08108279) 	Lawn Sprinkler
Wind Detector (PTT0810G007)	Wind Detector

Close the Tablet window.

Step 2: Experiment by adding other types of IoT devices to the smart home wireless network.