



# Smart Student Residences: An IoT-Based Model Implemented via Cisco Packet Tracer

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## Abstract

Student residences play a crucial role in overall of student success, and with the development of technology and the spread of network concepts. Students now rely on a reliable and secure network connection to collaborate with their classmates and access resources. Our proposed model employs Cisco Packet Tracer to design an IoT-based smart student residence model network that fulfills all student requirements and goals of presenting a dependable network that advances the students both living and educational environments.

## Introduction

- This Smart Student Residences network model topology is designed for students' housing, where various devices are set up to facilitate communication and interaction among the students and the housing managers.
- Network model was implemented using the Cisco Packet Tracer tool.
- The network model includes multiple LANs: smart students' rooms, a studying room, a gym, a security room, smart parking, and a smart garden.
- The network model maintain the integrity of the network, security is essential for preserving a safe and productive learning environment.
- The network utilizes the IoT by including technologies like web cameras and smart smoke-detecting systems to provide a safe and secure environment for students.
- The designed network model allows remote control, students can control and manage their device, and the housing managers can control public property technologies from their smartphones.

## Objectives

- 1.Design a network for student accom-modation that meets the essential connectivity demands, prioritizing safety, productivity, and comfort.
- 2.Utilizing Internet of Things (IoT) technologies.
- 3.Create a Secure and safe student residence that includes smoke detector, motion sensors and web cameras in the residence.
- 4.Enhancing the overall living experience for students with housing facilities like a modern gym, study room, parking and a garden all provided with IOT and network techniques.
- 5.Creating a comfortable environment for students by managing light, and smart devices using IOT and network techniques.

## Methodology

By using the Cisco Packet Tracer tool, we have designed an IoT-based Smart Students Residence network. Our network is designed to meet the goals of offering a reliable network that improves the students both living and educational environments. By using the appropriate network topologies we implemented a network that enhances the student's lifestyle and provides a safe and secure environment.

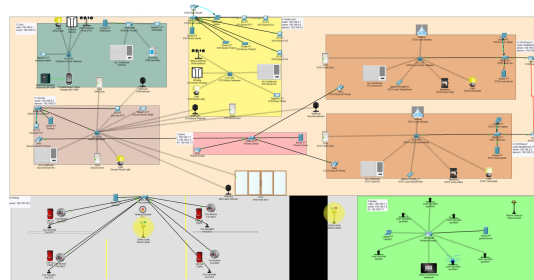


Figure 1. Student Residence Network

### 1 Students Room

- Devices connected with server to a switch, and a home gateway connected to the switch.
- The routers of the rooms connected using serial DCE cable.
- IoT devices can be controlled by smartphone.

### 2 Studying Room

- The switch connects the room devices using straight cables.
- Server service used in the network DHCP HTTP, and Email.
- Window connected to wind detector detectors to close the window automatically once the detector detects a wind.

### 3 Gym

- IoT devices connected to wireless router, allowing remote controlling by students.
- Bluetooth speaker, lights are connected to home gateway to be controlled via table by employees.

### 4 Security Room

- Switch is connected to the PC with a cable console and it is protected with a password.
- Web cameras placed around the students residence monitored by security's home gateway.

### 5 Smart Parking

- Server that provides the IoT Server to rem-ote control the IoT devices such as fire motion and fire sprinklers.
- Fire sprinklers are activated automatically when the fire motion sense a heat.

### 6 Smart Garden

- Wireless router that is connected wirelessly to a laptop to monitor water level.
- Water sprinklers and the water level mon-itor has a condition, once the water level in the soil reaches 9 cm or less, the sprinkler will turn on until the water level in the soil rises to 10 cm or more.

## Results

The network achieved its key goals of providing a reliable, layered model with efficient routing, easy communication, and remote controlling of IoT devices, and appliances. This results to a more positive living and learning environment for students, with increased comfort, convenience, and safety, fostering a sense of community and promoting responsible resource usage.

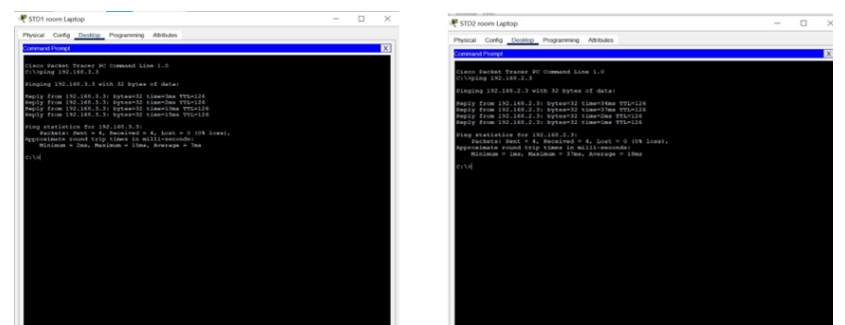


Figure 2. Ping Between STD1 Room Laptop and STD2 Room Laptop

Fire	Last Status	Source	Destination	Type	Color	Time(ser	Periodic	Num	Edit	Delete
	Successful	Admin	STD Room ...	ICMP		0.000	N	0	(edit)	
	Successful	STD ...	Admin	ICMP		0.000	N	1	(edit)	
	Successful	STD ...	STD Room ...	ICMP		0.000	N	2	(edit)	
	Successful	STD ...	Printer1	ICMP		0.148	N	3	(edit)	

Figure 3. Ping Between Study Room Devices

## Future Work

We aspire to develop our model in many aspects in the future, and one of the most important developments that we seek to achieve is improving the efficiency of connectivity between the devices in our network, in addition to facilitating connections between the devices in our student housing network by adding more distinctive technologies. To elaborate, we aspire to improve our network by adding an extra security network system and smart fire system inside the building in addition to a smart clinic room network and small smart supermarket network.

## Conclusion

In conclusion, a student housing network design was implemented using a Cisco Packet Tracer to enhance students' lives and serve their needs. Moreover, the network design used wired and wireless topology and contained the most critical concepts, such as DHCP, Email, VLANs, and VoIP. Lastly, the network model has different LANs: smart student room, smart studying room, smart gym, smart security room, smart parking, and smart garden.

## Resources

