

Prototype Implementation Using Cisco Packet Tracer

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1 System Overview

The prototype was implemented in Cisco Packet Tracer to simulate a smart home security IoT system. The design integrates essential IoT components and demonstrates interaction between sensors, actuators, and a monitoring device.

2 Components Used

- Smart Door
- Smart Window
- Motion Detection Sensor
- Smart Camera
- Siren
- Smart Light
- Home Gateway
- Switch
- Home Router
- Smartphone (monitoring device)

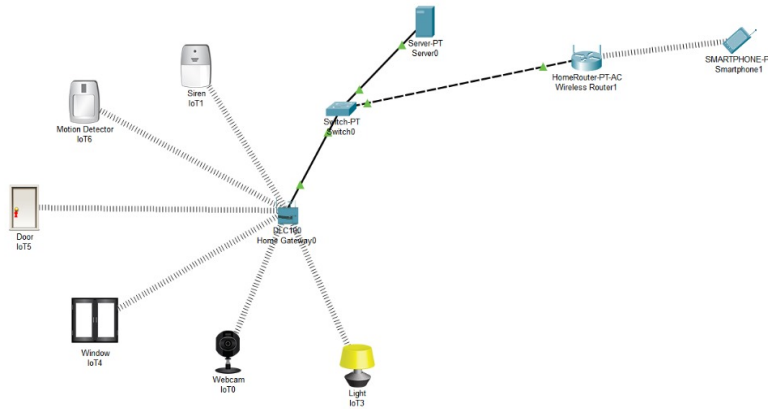


Figure 1: Overall System.

3 IoT Levels of Implementation

1. Level 1 – Motion Detection

A motion sensor detects any movement within the monitored area.

2. Level 2 – Network Setup

The smart devices (door, window, light, siren, and camera) were connected to the home gateway through a switch. A home router was integrated to allow smartphone connectivity for monitoring.

3. Level 3 – Automated Response

When motion is detected, the system automatically activates the siren, camera, and smart light.

IoT Monitor					
IoT Server - Device Conditions				Home Conditions Editor Log Out	
Actions		Enabled	Name	Condition	Actions
Edit	Remove	Yes	S-W	IoT1 On is true	Set IoT0 On to true
Edit	Remove	Yes	OFF	IoT6 On is false	Set IoT1 On to false Set IoT0 On to false
Edit	Remove	Yes	D-L	IoT5 Open is true	Set IoT3 Status to On
Edit	Remove	Yes	MD-S2	Match all: • IoT6 On is true • IoT5 Lock is Lock	Set IoT1 On to true

Figure 2: Conditions of System.

4. Level 4 – Remote Monitoring

A smartphone connected via Wi-Fi to the home router acts as the user interface, enabling monitoring of the smart home devices.

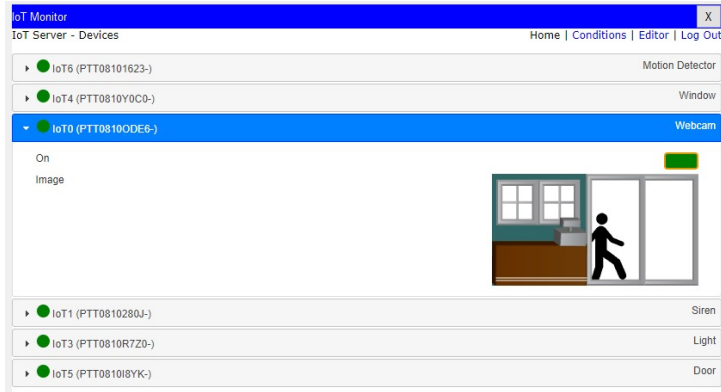


Figure 3: Monitoring the System.

4 Challenges Encountered and Solutions

1. Level 1 – Sensor Customization

The motion detection sensor had limited configuration options, restricting flexibility.

2. Level 2 – Addressing and Connectivity

Initially, the smartphone was incorrectly connected directly to the home gateway. Reconfiguration was required so that the smartphone connected to the home router, ensuring proper addressing and device registration.

3. Level 3 – Limited Automation Capabilities

The system supported only basic *if/then* automation rules, without advanced analytics or complex conditional logic.

4. Level 4 – Monitoring vs. Control

While monitoring through the smartphone was possible, full device control was not supported in the simulation environment.

5 Conclusion

The simulation successfully demonstrated a functional smart home prototype with motion detection, automated responses, and remote monitoring through a smartphone. Despite limitations in customization, control, and analytics, the project highlights the core features of an IoT-enabled home security system. Future improvements could include enhanced automation

logic, two-way control via the smartphone, and integration with cloud-based analytics platforms.