Industrial Internet of Things

Smart Irrigation System using Cisco Packet Tracer

Mid-Course Project

L&T EDUTECH
Certificate in industrial IoT Architecture and Applications

By

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Github :-

https://github.com/amarjit787/Smart-Irrigation-System-using-Cisco-Packet-Tracer.git

1. Aim

To design and simulate a smart irrigation system that monitors soil moisture levels and automatically activates irrigation (sprinklers) only when necessary, thereby optimizing water usage in agricultural fields.

2. Problem Statement

Traditional irrigation systems operate on fixed schedules without considering real-time soil moisture conditions. This results in:

- Wastage of water resources.
- Poor crop yield due to over-irrigation or under-irrigation.
  The need is for an intelligent irrigation system that dynamically responds to soil conditions.

3. Scope of the Solution

- Real-time monitoring of soil (simulated via water level sensors).
- Automatic triggering of sprinklers based on water level threshold.
- Visualization and control via IoT dashboard on a smartphone or computer.
- Easily scalable for large agricultural deployments.
- Fully simulated using Cisco Packet Tracer's IoT devices and interface.

4. Architecture of the Solution

Diagram Summary :

- Two water level monitors simulate soil moisture at two field zones.
- A Home Gateway (IoT-enabled router) connects all devices.
- Four lawn sprinklers simulate irrigation outputs.
- A smartphone accesses the IoT server via Wi-Fi to set conditions and monitor status.
- Logic conditions are defined to:
    - Turn **on** sprinklers when **water level < 5.0 cm** (dry soil).
    - Turn **off** sprinklers when **water level > 5.0 cm** (sufficient moisture).

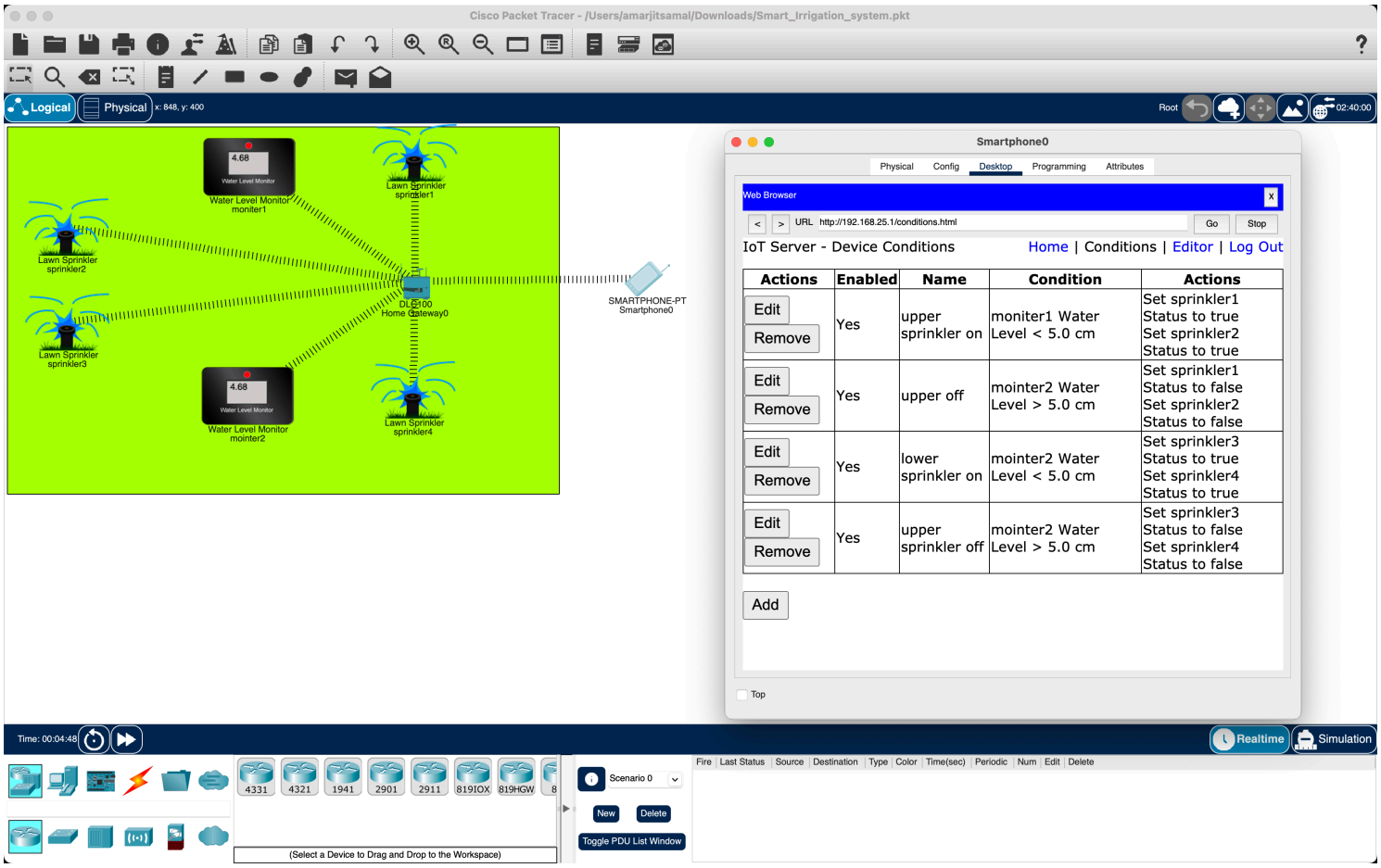
Data Flow:

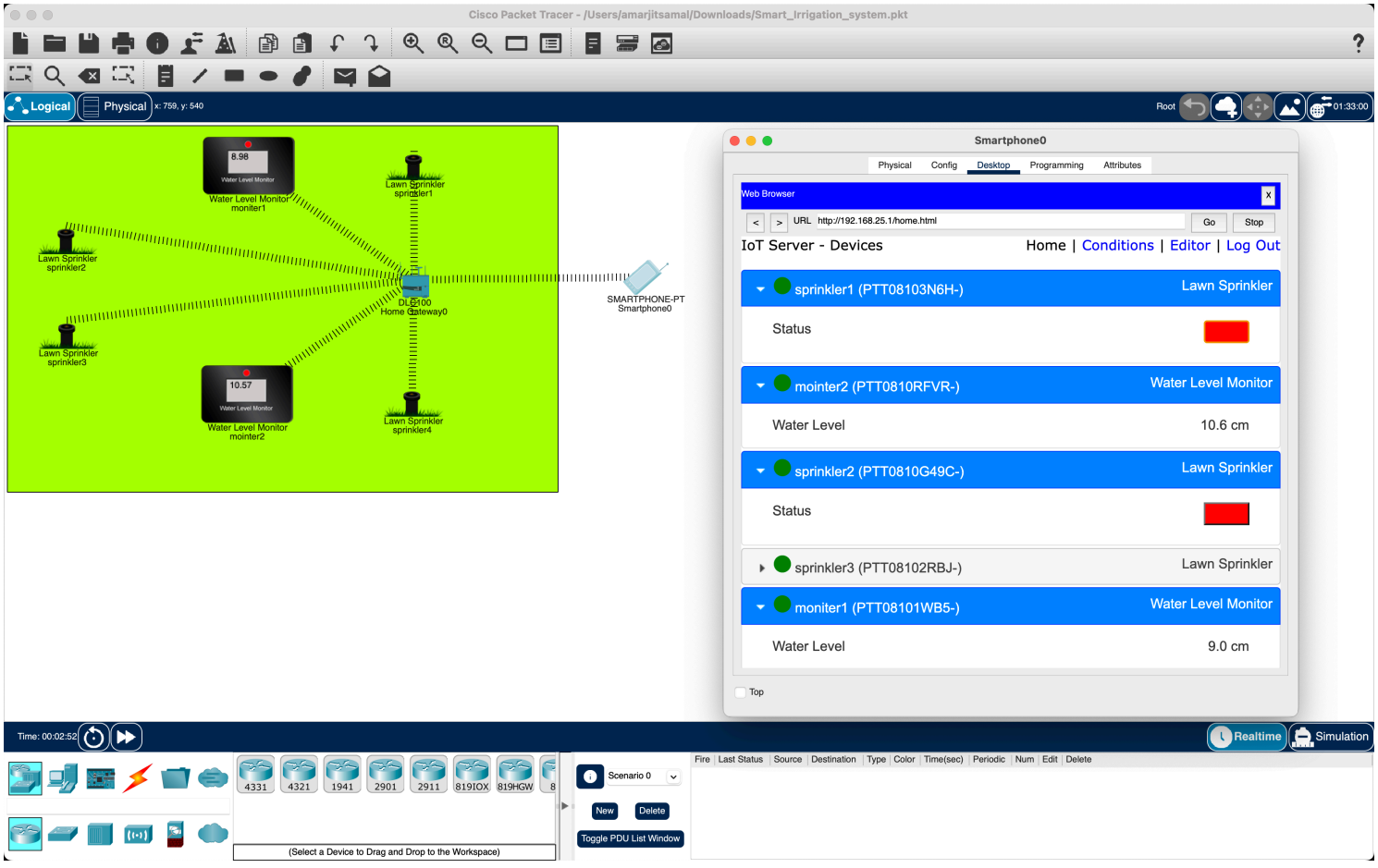
1. Sensors → Measure water level.
2. Gateway → Reads data and applies logic.
3. Sprinklers → Automatically turned on/off.
4. Smartphone/Web → Allows manual view and control of system state.

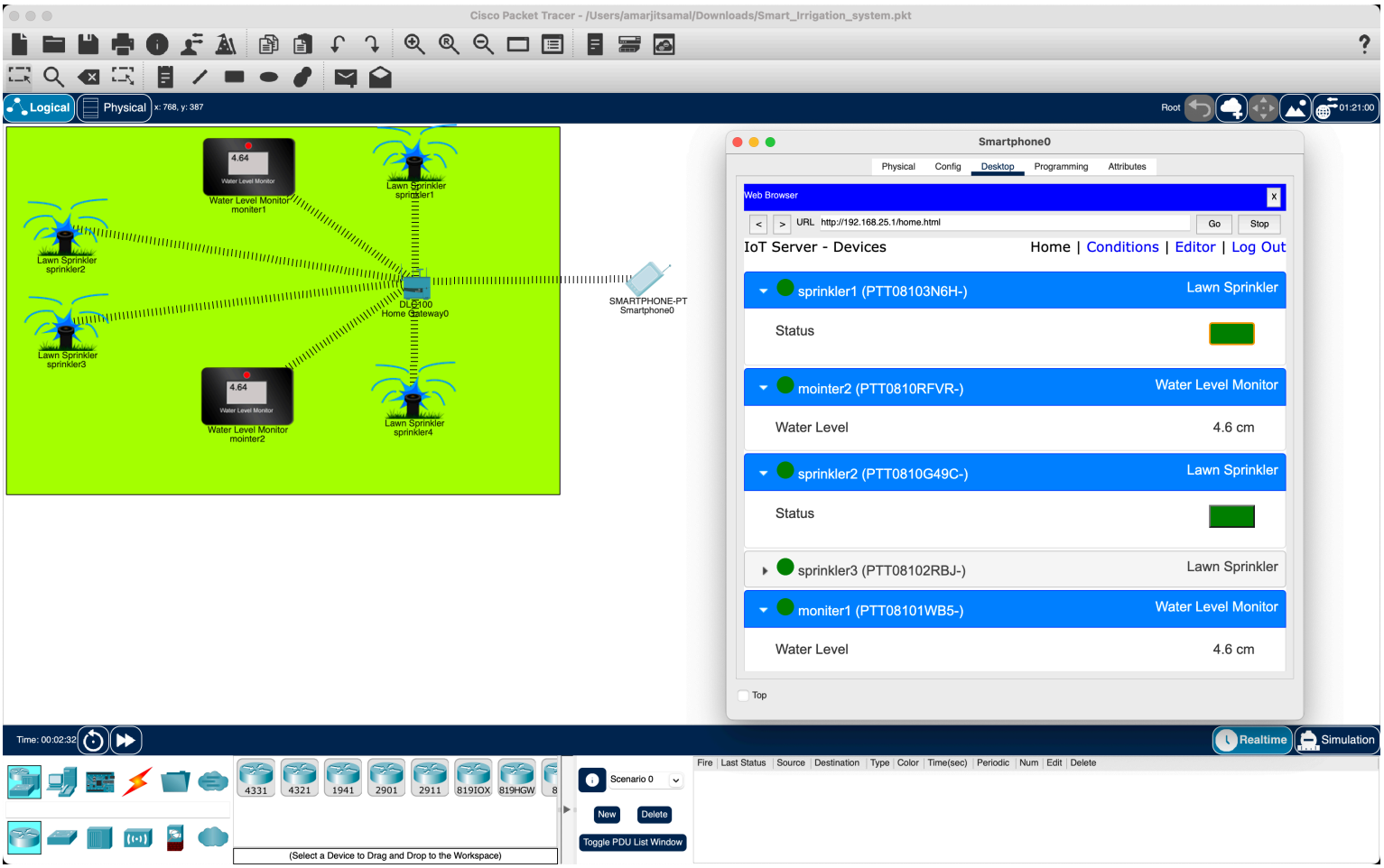
5. Required Components (from Cisco Packet Tracer)

Component	Description
Water Level Monitor	Simulates soil moisture sensors.
Lawn Sprinkler	Simulates irrigation output (on = water released).
Home Gateway	Central IoT gateway that collects data and triggers actuators.
Smartphone	Used to configure rules and view status via IoT server.
IoT Server Interface	Accessed via browser at `http://192.168.25.1` to configure device conditions.

6. Simulated Circuit






Cisco Packet Tracer - /Users/amarjitsamal/Downloads/Smart_Irrigation_system.pkt
Logical
Physical
x: 768, y: 387
Root
01:21:00
4.64
Water Level Monitor
moniter1
Lawn Sprinkler
sprinkler1
Lawn Sprinkler
sprinkler2
DLB300
Home Gateway0
SMARTPHONE-PT
Smartphone0
Lawn Sprinkler
sprinkler3
4.64
Water Level Monitor
mointer2
Lawn Sprinkler
sprinkler4
Smartphone0
Physical
Config
Desktop
Programming
Attributes
Web Browser
URL
http://192.168.25.1/home.html
Go
Stop
IoT Server - Devices
Home | Conditions | Editor | Log Out
sprinkler1 (PTT08103N6H-)
Lawn Sprinkler
Status
mointer2 (PTT0810RFVR-)
Water Level Monitor
Water Level
4.6 cm
sprinkler2 (PTT0810G49C-)
Lawn Sprinkler
Status
sprinkler3 (PTT08102RBJ-)
Lawn Sprinkler
moniter1 (PTT08101WB5-)
Water Level Monitor
Water Level
4.6 cm
Top
Time: 00:02:32
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