PROJECT REPORT

Submitted by

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In partial satisfaction of the requirements for the degree of

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BONAFIDE CERTIFICATE

Certified that this Project Report titled **"DETECTION AND FIRE PREVENTION SYSTEM USING CISCO PACKET TRACER"** is the bonafide work done **ANKIT CHOUDHARY(RA2111003011748)**, **SHIVAM PANDEY(RA2111003011722) ,MRIDUL GUPTA (RA2111003011753) , YASH GOYAL (RA2111003011730) , AANYA GUPTA (RA2111003011729)** who completed the project under my supervision. Certified further, that to the best of my knowledge the work reported herein does not form part of any other work.

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1. ABSTRACT

- The aim of this project is to design and implement a Detection and Fire Prevention System using Cisco Packet Tracer.
- The system will utilize the TCP/IP protocol to enable real-time communication between different nodes in the network. The project seeks to address the need for an efficient and reliable fire detection and prevention system that can be used in both residential and commercial buildings.
- By leveraging the capabilities of Cisco Packet Tracer, the system will be designed to detect fire outbreaks in real-time and provide prompt alerts to the relevant authorities.
- The project will involve the design and implementation of the system architecture, testing, and evaluation of its performance.

2.INTRODUCTION

1. The Detection and Fire Prevention System project aims to develop an efficient and reliable fire detection and prevention system using Cisco Packet Tracer.
2. This project will utilize the client-server programming approach to separate information producers (servers) from information users (clients) in a distributed computing system.
3. The server will continuously operate and respond to client requirements, while the client will request resources or information from the server.
4. This project seeks to address the need for an effective fire detection and prevention system that can be used in both residential and commercial buildings.
5. By leveraging the capabilities of Cisco Packet Tracer, the project will be designed to detect fire outbreaks in real-time and provide prompt alerts to the relevant authorities.
6. The project will involve the design and implementation of the system architecture, testing, and evaluation of its performance.

3.REQUIREMENTS

Requirement Analysis

To design and simulate a detection and fire prevention system using Cisco Packet Tracer, you would need the following requirements:

1. **Cisco Packet Tracer software**: This is a network simulation tool that allows you to design, configure, and troubleshoot network devices and connections.

2. **Fire detection and prevention devices:** These can include smoke detectors, heat detectors, fire alarms, sprinkler systems, and fire extinguishers. These devices will be

connected to the network and configured to alert the relevant personnel in case of a fire.

3. **Network devices:** These include routers, switches, and firewalls that will be used to create a network infrastructure for the fire detection and prevention system.

4. **Power source:** A reliable power source is necessary to ensure that the system is always running, and the detection and prevention devices are operational.

5. **Internet connectivity:** This is necessary if the fire detection and prevention system is to be monitored remotely.

6. **IP addresses:** Each device on the network needs a unique IP address to be able to communicate with each other and the network infrastructure.

7. **Configuration knowledge:** Knowledge of configuring and troubleshooting network devices and connections is necessary to design and implement an effective fire detection and prevention system using Cisco Packet Tracer.

4. ARCHITECTURE AND DESIGN

Here is a possible architecture and design for a detection and fire prevention system using Cisco Packet Tracer:

1. Network infrastructure:

- A core switch to act as the main point of connectivity for all devices
- Distribution switches to connect to access switches, which will be used to connect fire detection and prevention devices
- Firewalls to protect the network from unauthorized access

2. Fire detection and prevention devices:

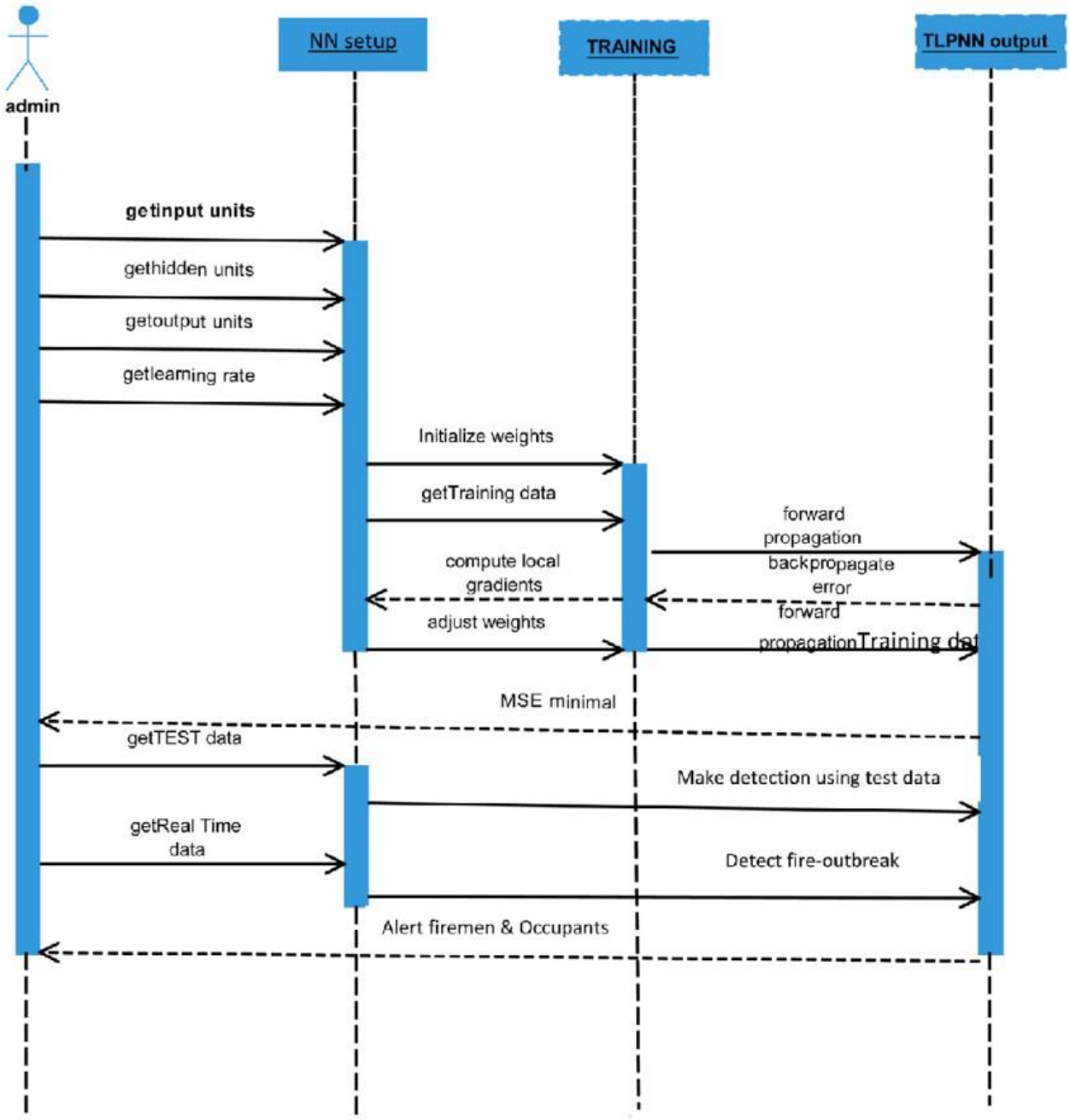
- Smoke detectors to detect smoke and trigger alarms

- Heat detectors to detect high temperatures and trigger alarms

- Fire alarms to alert personnel in case of a fire

- Sprinkler systems to automatically extinguish fires

- Fire extinguishers to manually extinguish fires



5. IMPLEMENTATION

Here are the high-level implementation steps for a detection and fire prevention system:

1. Determine the network topology and devices needed for the system. This will depend on the size and complexity of your network, as well as your specific requirements for detection and fire prevention. Common devices used in such a system include firewalls, switches, routers, and intrusion detection/prevention systems (IDS/IPS).

2. Install and configure the devices as per the manufacturer's instructions. Ensure that the devices are connected and can communicate with each other.

3. Configure the devices to detect and prevent fire-related incidents. This will depend on the specific network security policies you want to implement. For example, you might configure the firewall to block traffic from suspicious sources, or the IDS/IPS to monitor for unusual network activity.

4. Test the system to ensure it is functioning properly. Conduct a range of tests, including penetration testing, to identify any vulnerabilities in the system. Address any issues identified in the testing process.

5. Train network staff on the proper use of the system. Ensure that they understand how to use the system to detect and prevent fires, and that they are aware of the specific network security policies in place.

6. Implement a system for ongoing monitoring and maintenance. Regularly monitor the system for signs of fire-related incidents and make any necessary updates or modifications to ensure the system remains effective over time.

7. Conduct regular audits of the system to ensure it is still functioning properly and meeting your organization's needs. Use the results of the audits to make any necessary changes or improvements to the system.

6. Code

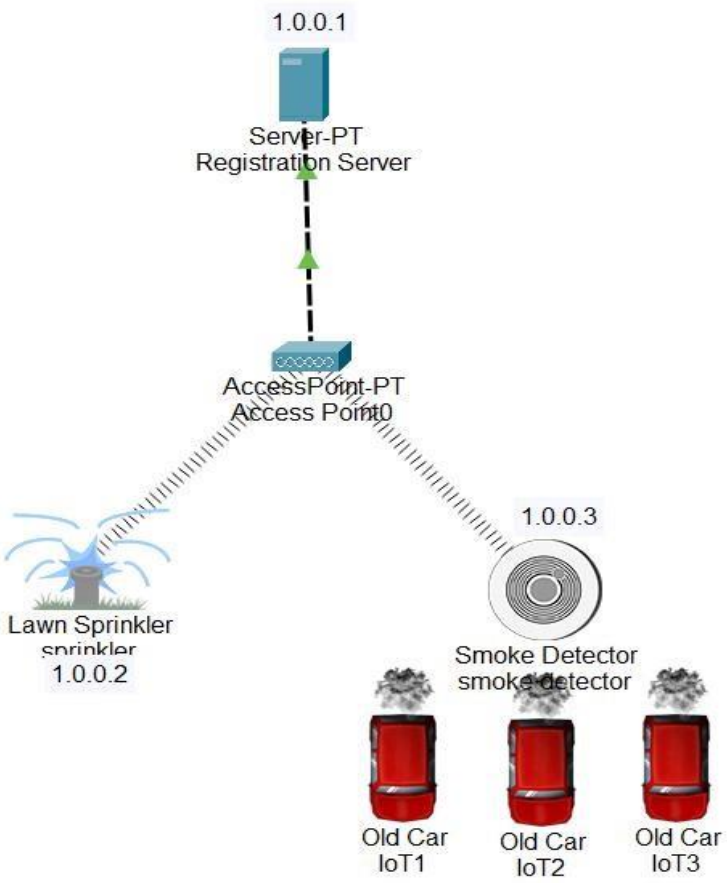
```
import requests
import json

url_base = "http://localhost:8080/rest/v1/"
headers = {"Content-Type": "application/json"}

url = url_base + "topology"
response = requests.post(url, headers=headers) topology_id
= response.json()["id"]
```

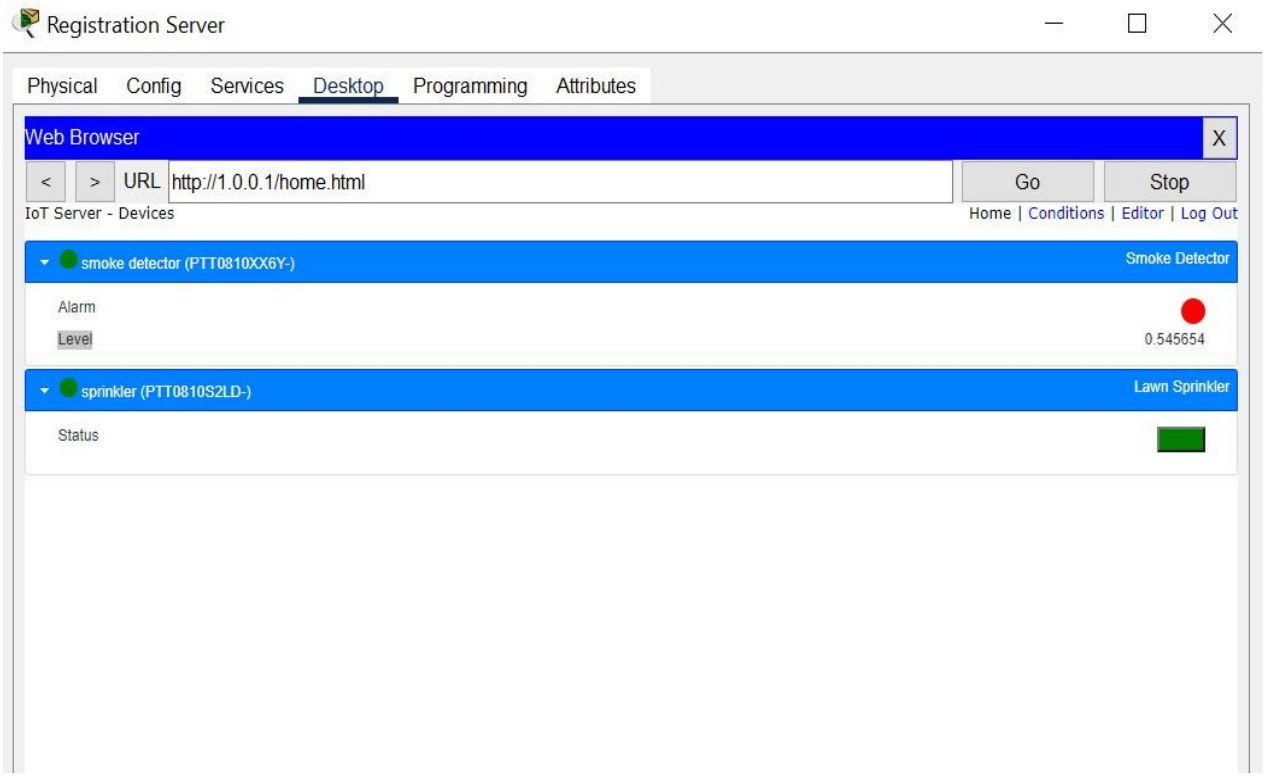
#Create and add devices to the topology using the requests.post() method: # Create a firewall device

```
firewall_payload = {
"name": "Firewall1",
   "type": "Firewall",
   "label": "Firewall 1",
   "properties": {
      "ip": "192.168.1.1",
      "blocking": True
   }
}
url = url_base + f"topology/{topology_id}/devices"
response = requests.post(url, headers=headers, json=firewall_payload) firewall_id =
response.json()["id"]

# Create a switch device
switch_payload = {
"name": "Switch1",
   "type": "Switch",
   "label": "Switch 1",
   "properties": {
      "ip": "192.168.1.2",
      "vlanCount": 2
   }
}
```

```
response = requests.post(url, headers=headers, json=switch_payload) switch_id =
response.json()["id"]

# Connect firewall to switch

connections_payload = {     "startDeviceId":
firewall_id,
   "startInterfaceId": 0,
   "endDeviceId": switch_id,
   "endInterfaceId": 0
}
url = url_base + f"topology/{topology_id}/connections"
response = requests.post(url, headers=headers, json=connections_payload)

url = url_base + f"topology/{topology_id}/start"
response = requests.post(url, headers=headers)

# Wait for the simulation to start url = url_base +
f"topology/{topology_id}/status" while True:
response = requests.get(url, headers=headers)
status = response.json()["status"]     if status ==
"STARTED":        break

# Stop the simulation url = url_base +
f"topology/{topology_id}/stop"
response = requests.post(url, headers=headers)

url = url_base + f"topology/{topology_id}/start"
response = requests.post(url, headers=headers)

# Wait for the simulation to start url = url_base +
f"topology/{topology_id}/status" while True:
response = requests.get(url, headers=headers)
status = response.json()["status"]     if status ==
"STARTED":        break

# Stop the simulation url = url_base +
f"topology/{topology_id}/stop"
response = requests.post(url, headers=headers)
```

7. Experiment Result & Outputs





8.CONCLUSION & FUTURE ENHANCEMENT

In conclusion, a detection and fire prevention system is an essential component of any organization's network security infrastructure. It is designed to detect and prevent fire-related incidents, such as network breaches and cyber attacks, and to ensure that critical business operations are not interrupted. The implementation of such a system requires careful planning, configuration, testing, and ongoing maintenance to ensure its effectiveness over time.

There are several future enhancements that could be made to a detection and fire prevention system, including:

1. Implementation of artificial intelligence (AI) and machine learning (ML) algorithms to better detect and prevent fire-related incidents in real-time.

2. Integration of cloud-based solutions for more scalable and flexible deployment.

3. Implementation of advanced analytics and visualization tools to better analyze network traffic and detect potential threats.

4. Introduction of threat intelligence feeds to proactively monitor for potential threats and vulnerabilities.

5. Integration with other network security solutions, such as intrusion detection/prevention systems (IDS/IPS) and security information and event management (SIEM) platforms, to provide a more comprehensive security posture.

9. REFERENCES

1. Wikipedia

2. researchgate.net

3.slashrootdotin channel - detection and fire prevention system