Amazon Halo Network

INST346 | Technologies, Infrastructure and Architecture

Group 24
Tristan Clark | Cybersecurity Engineer & Data Analyst
Jomer Paulino | UX Researcher & Network Engineer
Asad Raheem | UX Designer & Scrum Leader
Brandon Sapp | Solutions Architect & Software Developer

The Problem and The Persona

Persona

People with physical fitness goals, people who regularly exercise, people who wish to track their fitness
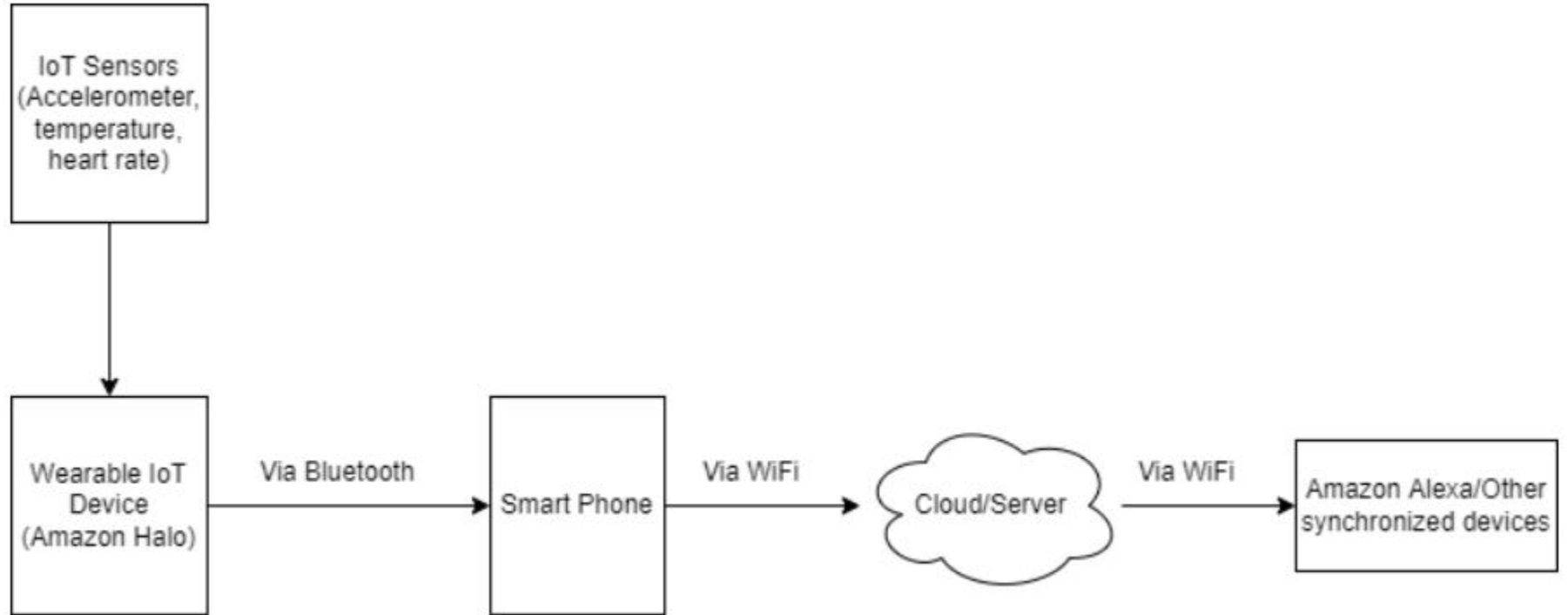
Problem

Hard to maintain your fitness or achieve goals if you can't track your progress
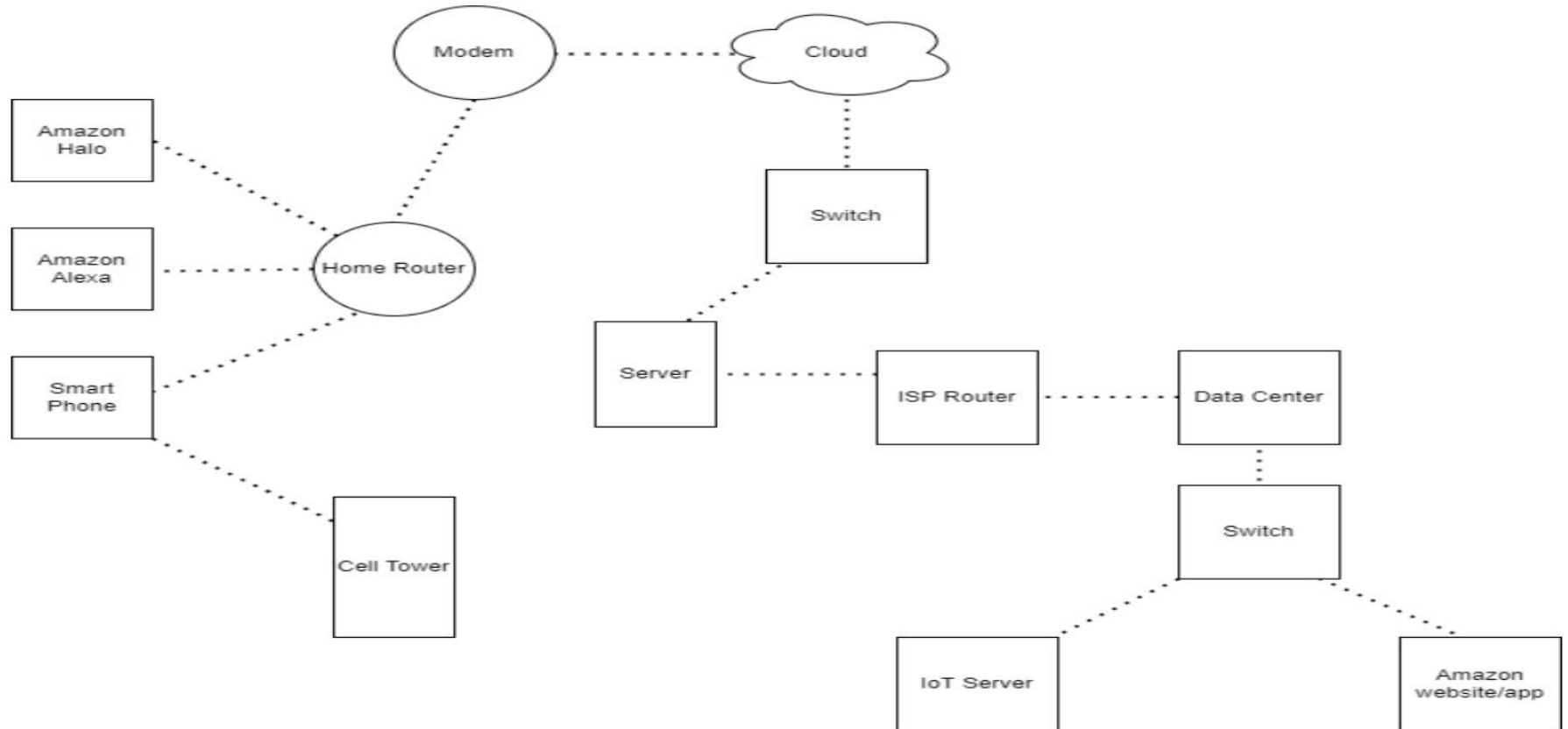
Solution

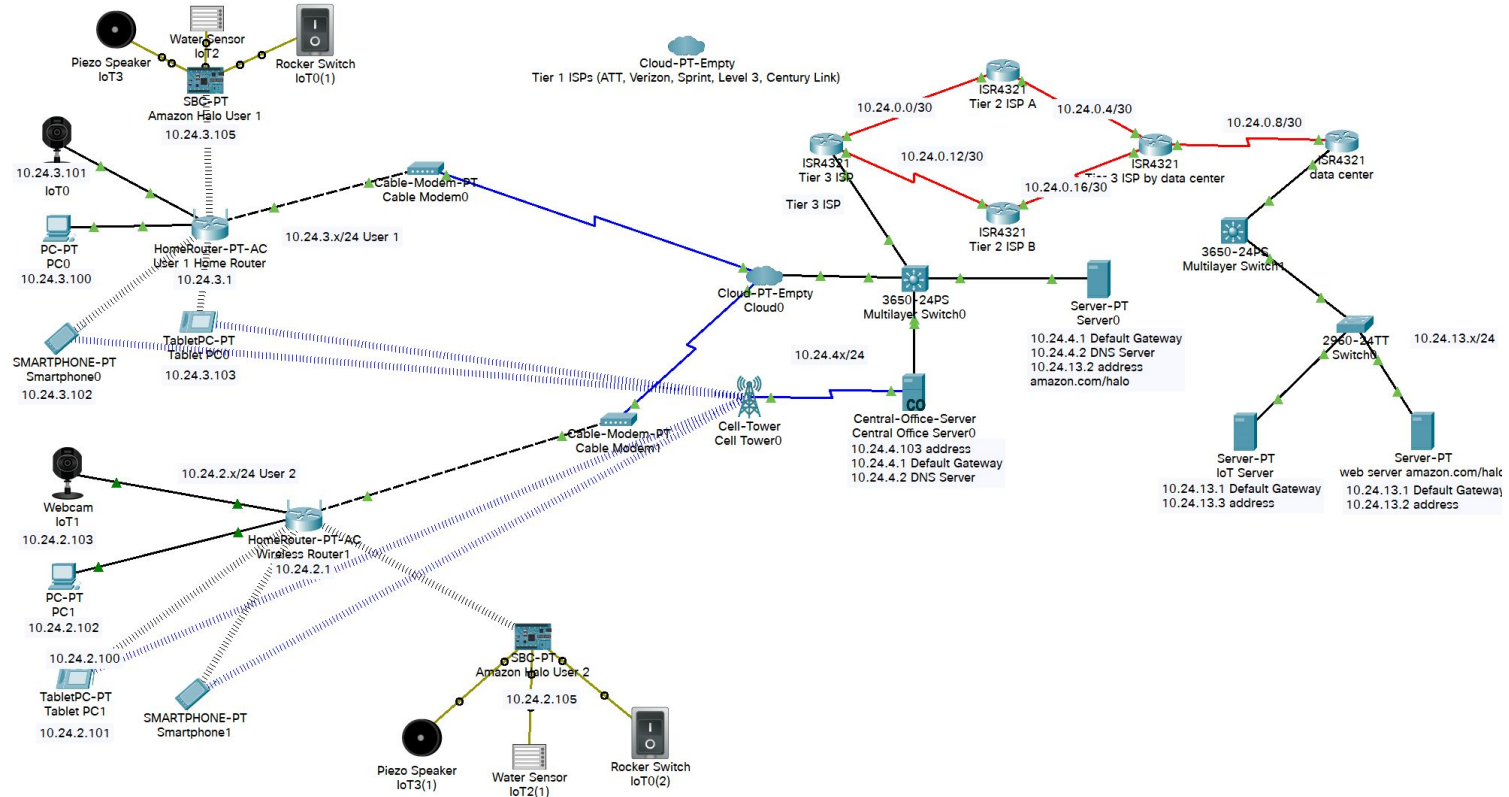Automatically track daily fitness and activity via a wearable IOT device
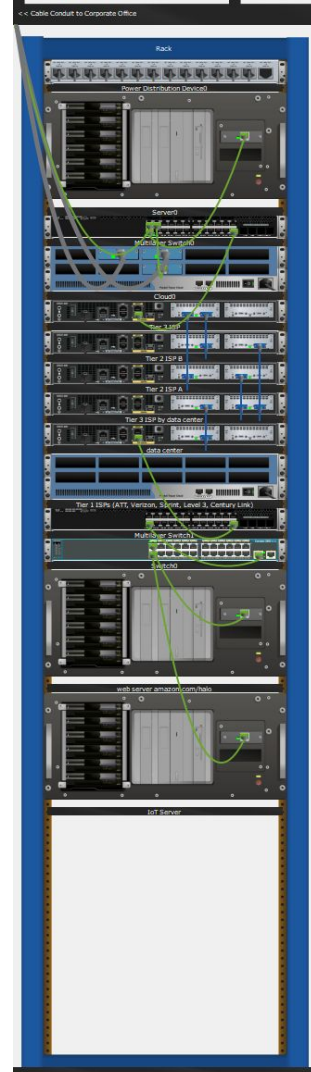
High Level Block Diagram

IoT Sensors (Accelerometer, temperature, heart rate) → Wearable IoT Device (Amazon Halo) → Via Bluetooth → Smart Phone → Via WiFi → Cloud/Server → Via WiFi → Amazon Alexa/Other synchronized devices
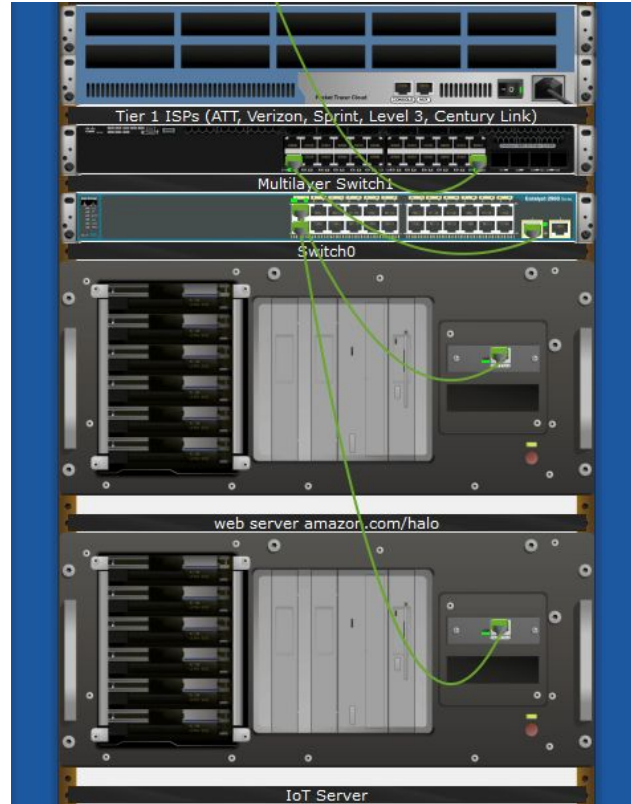
Network Diagram

Logical Topology

Packet Tracer Physical Topology

4 Vs of Big Data Applied IoT Data

- Volume
  - Source - 2Gb
  - Cloud - 50Tb
- Velocity
  - Source - 1Mb/minute
  - Cloud - 10Gb/minute

- Variety
  - Source - Structured data all from one source
  - Cloud - All structured data of combined Halo devices
- Veracity
  - Source - Given the lack of variety, the certainty of the data will be very high
  - Cloud - Will have similar certainty of data as source due to collecting same data from multiple sources

Scale this network

- One method to increase scalability within the network would be to add cellular to the device
- Giving the device the ability to use a cellular network would eliminate the need for a LAN
- Integrating the processing of data to the device rather than the cloud would allow any amount of users to connect
- Increasing the amount of web servers available to accommodate future devices
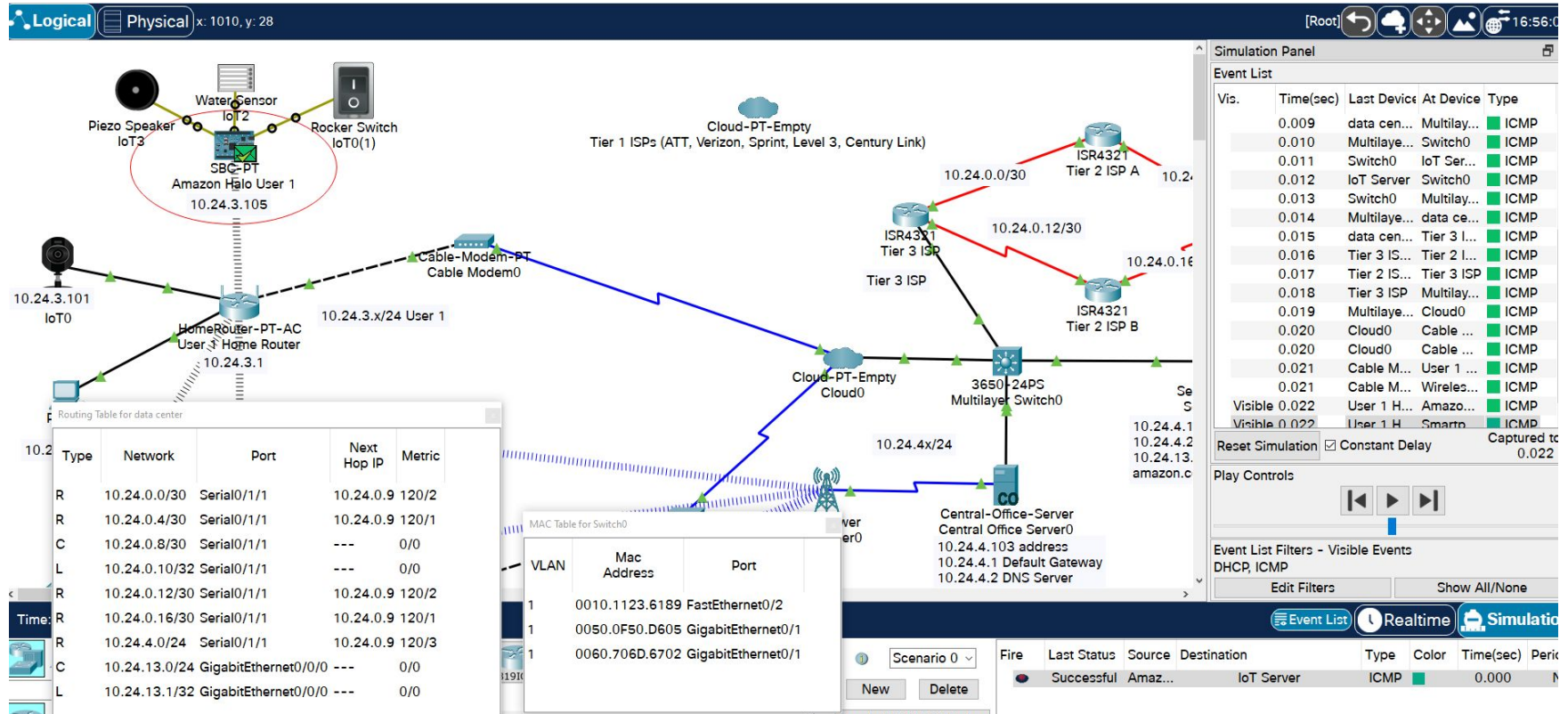- The network is already quite scalable and could be upgraded seamlessly by adding more processors and devices

Annotated PT Logical Topology Showing Vulnerabilities

Vulnerability from the wireless connection between the device and the home network. Likely bluetooth or wifi which can be accessed if on the same LAN.

Wireless and cellular cell phones connected have vulnerabilities and may contain data linked to the Halo device. Since there are many ways to access smartphones, keeping Halo data on it risks vulnerabilities.

Company cloud server containing personal data could be accessed. Many high level corporations have had data leaked to the public.

Sequence Diagram of IoT Interaction
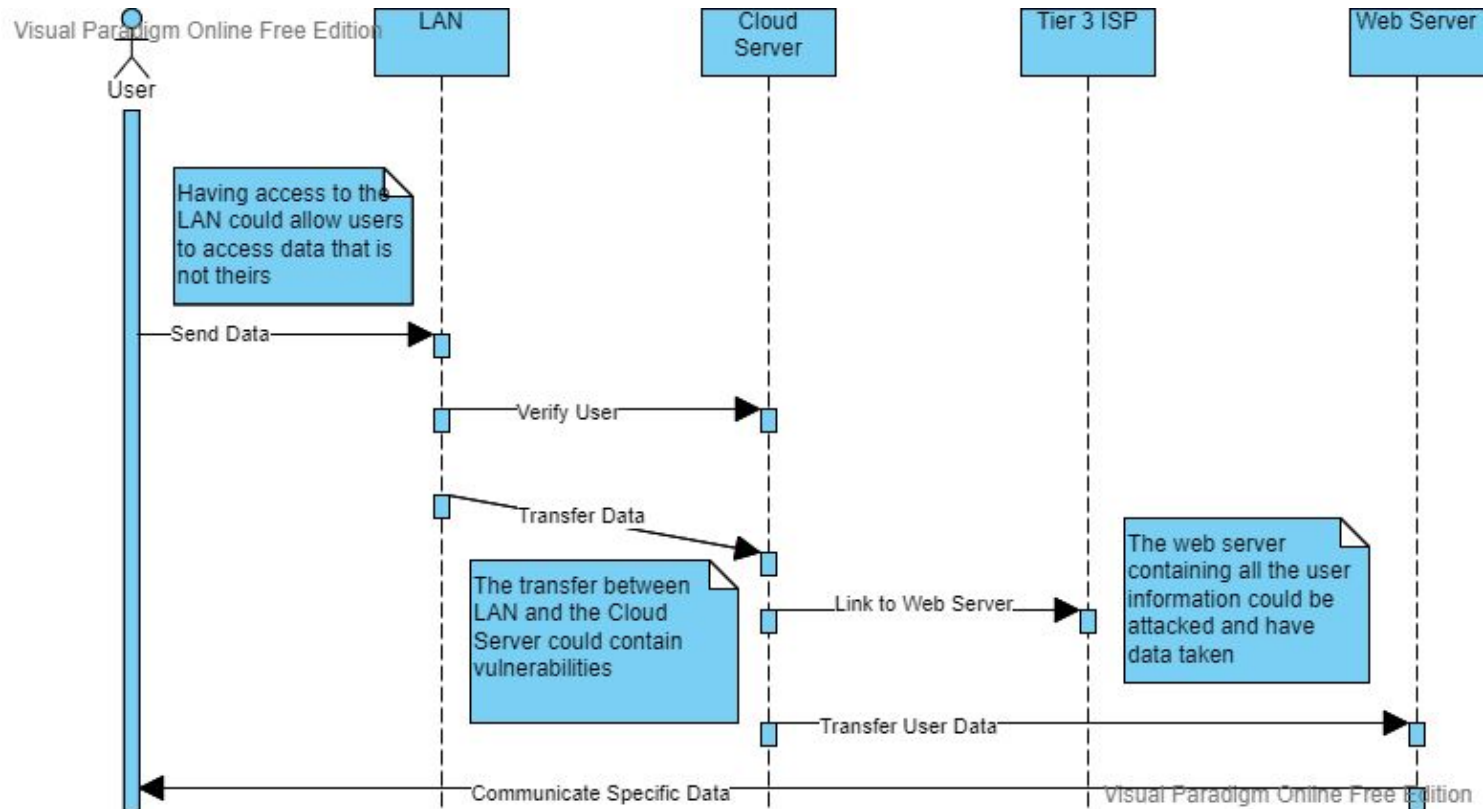
Ping 1 (User to IoT Server)

HTTPS Web Page request and response

IoT Registration request and response

API Code and Results