IoT Cloud on Local Machine

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Abstract: - Recently there is a wide adaption and deployment of IOT infrastructures and system for various crucial application, such as logistic, smart cities and healthcare. This has led to high demands on data storage processing and management services in cloud-based data centers, strong connections need between IOT and cloud services. Cloud services are mature and provide excellent elastic computation and data management capabilities for IOT. Cloud management capabilities technique are increasingly employed to manage IOT components. Thus, cloud services now act as a computational and data processing platform as well as management platforms for IOT. Cloud computing provide on-demand convenient and scalable network access which makes it possible to share computing resources. The integration of cloud computing with the IoT is the most effective way on which to overcome these issues. The vast number of resources available on the cloud can be extremely beneficial for the IOT, while the cloud can gain more publicity to improve its limitation with real world objects in more dynamic and distributed manner.

Key Words:— ***IoT, IoT cloud, ESP2866, DHT11, PHP, MySQL, API.***

I. INTRODUCTION

The Internet of Things (IoT) describes the network of physical objects— "things"—that are embedded with sensors, software, and other technologies for the purpose of connecting and exchanging data with other devices and systems over the internet. The Internet of Things is transforming our physical world into a complex and dynamic system of connected devices on an unprecedented scale. IoT is creating a giant network where all the devices are connected to each other and providing them with the capability to interact with each other. This is driving the automation to a next level where devices will communicate with each other and make decisions on their own without any human interventions. As per the Cisco report, IoT will generate $14.4 trillion in value across all industries in the next decade.

IoT being a network of devices that are interconnected require a space where the data can be collected and processed to extract information. Thus, IoT cloud plays an important role in this scenario. IoT cloud is An IoT cloud is a massive network that supports IoT devices and applications. This includes the underlying infrastructure, servers and storage, needed for real-time operations and processing.

NodeMCU is an open-source Lua based firmware for the ESP8266 Wi-Fi SOC from Espressif and uses an on-module flash-based SPIFFS file system. NodeMCU is implemented in C and is layered on the Espressif NON-OS SDK. The firmware was initially developed as is a companion project to the popular ESP8266-based NodeMCU development modules, but the project is now community-supported, and the firmware can now be run on any ESP module.

II. SYSTEM DESIGN

The system design is such that the ESP module is loaded with the Arduino code to send temperature data. The temperature sensor DHT11 collects data from the environment at an interval of every 3 seconds. DHT11 is mounted on ESP8266 or NodeMCU Module. The module is the hardware that helps collect data from the environment Then Arduino module code send the data from the device to the system through API. The temperature data and the humidity data are passed on to the hosted server through the use of API. Then, this data is stored on the database. The database used here is MySQL. However, any database can be used. The database is updated every 3

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seconds as the API receives the data. Then the data is updated in real-time on the web interface (webapp).

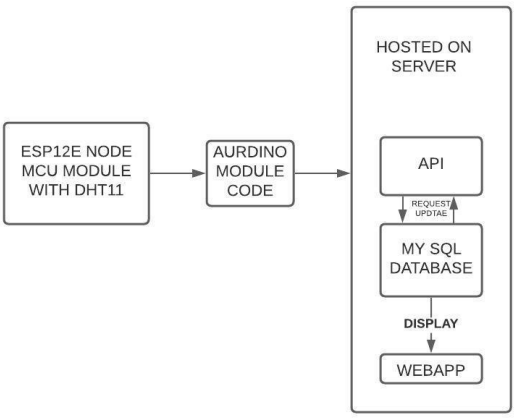

Fig.1. System Design (Block Diagram) for IOT Cloud.

The above system is hosted on the local server. The server uses MySQL for database and wamp to host locally. ESP2866 comes with Wi-Fi module which can be used to connect to the router.

III. APPLICATIONS

This system can be applied to connect the edge devices on a closed local network -best for small scale local networks which rely on simple predefined scripts like turning on and off based on certain predefined condition. The system can also be used as an interface to connect and control the edge devices to the above-mentioned networks. These simple networks have advantages and disadvantage but that doesn't undermine the role they can play in home automation. The proposed system is also secure to use in homes when hosted on local server. It reduces the chance of attacks as it is connected to internet. But this cloud cannot be used for data processing to find information. It cannot be controlled remotely because it's on a local network.

IV. RESULTS AND DISCUSSION

Our proposed system updated the temperature and humidity in the database with the help of API. The main advantage of the proposed system is that when configured properly, it can be low cost and secure from attacks, which is a major concern in IoT. IoT devices are often weak from security standpoint. The system show how each home can have a low cost solution for IoT devices. Also, it serves the users in real-time.

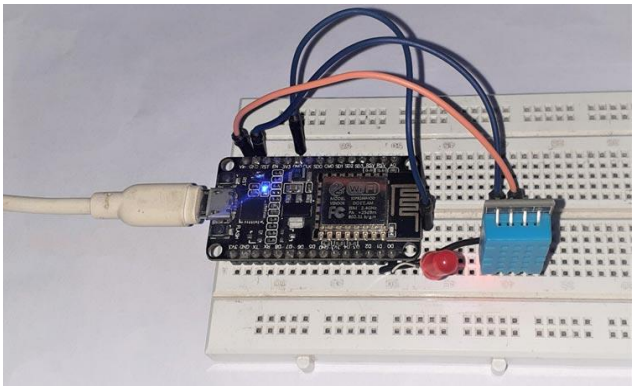

Fig.2. Connection with ESP8266 and DHT11 sensor.

The system generates temperate and humidity values using DHT11 temperature and humidity sensor. The data in the database can be used to make sense using analysis and add services based on the data.

V. CONCLUSION

In the proposed system, we have implemented the system on the server and on the local server. It can be hosted as per need. Thus, we can conclude that IoT system can be run on local machines. We don't require heavy computing power for this. The IoT cloud can be implemented on devices with low computing power such as raspberry pi. The above system can be developed further in better IoT cloud that runs on local machine.

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