

# Data security of IoT Automation using Private Cloud

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**ABSTRACT**—With the trend occurring, everything is being connected to the web and the human knowledge are used for many progressive functions. In general words, Iot is a network of many physical devices that are implanted with sensors, software etc to collect data and exchange data. It simply makes everything “smart”. Cloud computing and Iot both are used to increase the efficiency of each and every data that are generated through Iot and cloud can be pathway for this data to travel. The home automation can accomplished with the help of cloud and Iot. Certain data in the house and ability to control some parameters are taken with the help of Iot and cloud act as pathway .We can access these connected device from anywhere at any time and the cloud provided storage and computing resources to implement a cloud supporting environment.

**Index Terms**—IoT, Cloud, Security

## I. INTRODUCTION

Traditional areas of embedded systems, wireless sensor networks, control devices, automation (including home and construction automation), and others all add to the Internet of Things. The definition of the Web of things has advanced due to the joining of different innovations, real-time analytics, machine learning, product sensors, and inserted systems. Conventional areas of implanted frameworks, remote sensor systems, control frameworks, computerization (counting domestic and building robotization), and others all contribute to empowering the Web of things.

The essential drive for robotization IoT is to fundamentally diminish working uses when mechanization gadgets, sensors and actuators become Internet-empowered gadgets. It's the following gigantic jump in profitability on the grounds that there are significant favorable circumstances to be gotten from the securing and association of beforehand unimaginable measures

of information.

## II. HOME AUTOMATION

Home automation is building mechanization for a home to act as smart using latest updates with the help of IoT. A home automation framework will control lighting, atmosphere, theater setups, and machines. It might likewise incorporate home security, for example, get to control and alert frameworks. At the point when associated with the Internet, home gadgets are a significant constituent of the Internet of Things (“IoT”).

A home computerization framework commonly associates controlled gadgets to a focal center or “entryway”. The UI for control of the framework utilizes either divider mounted terminals, tablet or personal computers, a cell phone application, or a Web interface, that may likewise be open off-website through the Internet. The idea of Home Automation means to bring the control of working of the home electrical apparatuses to the tip of the finger, accordingly giving client reasonable lighting arrangements, better vitality preservation with ideal utilization of vitality. Aside from simply lighting arrangements, the idea additionally further reaches out to have a general authority over home security just as fabricate a unified home theater setup and considerably more. The Internet of Things based Home Automation framework, as the name proposes intends to control all the gadgets of brilliant home through web conventions or cloud based figuring.

The IoT based Home Automation framework offer a ton of adaptability over the wired frameworks and it accompanies different points of interest like convenience, simplicity of establishment, maintain a strategic distance from intricacy of going through wires or free electrical associations, simple flaw location and activating or more and all it even offers simple versatility.

#### A. Applications of home automation

Rebuilding the peoples need into digital result is the main aim of automation. From simple control of lightening to ad- vanced energy meters lies the wavelength of home automated appliance.

- Lighting control
- HVAC
- Lawn/Gardening management
- Smart Home Appliances
- Improved Home safety and security
- Home air quality and water quality monitoring
- Natural Language-based voice assistants
- Better Infotainment delivery
- AI-driven digital experiences
- Smart Switches
- Smart Locks
- Smart Energy Meters

### III. CLOUD MODEL

Cloud Computing happens when applications and services are moved into a place called "cloud". It is a paradigm that allow on-demand network access to shared computing resources. Cloud computing uses a virtualized software model for the sharing of physical services,storage and other applica- tions. The main cloud service providers are Google, Microsoft, Salesforce . The main characteristics of cloud are they are on demand provider, uses internet as the medium and resourses are plotted together.

Cloud computing could be effectively utilized for us to better understand the cloud provider and the companies that uses cloud as its basic foundation For example, Amazon and Google are two main service provides in which Google has its own private cloud like Google Docs etc.Amazon is also one of the leading cloud provider which provides Amazon Web Services(AWS) . Cloud provides three main basic models: Software as a Service (SAAS),Platform as a Service (PaaS),Infrastructure as a Service(IaaS).Software as a Service(SaaS) is a on demand service which means that pay per use of application software to users.They need not be installed in our PC.They are available for a multiple end users.Google drive,Ms Office uses SaaS.Platform As A Service (PaaS) is made up of programming language exe- cution environment,an operating system,a web server and a database.It has a encapsulated environment where users can build,compile and run their program without worrying of the underlying infrastructure.AWS uses PAAS. Infrastructure as a Service offer the computing architecture and infrastructure of all computing resources.

OwnCloud could be a suite of client server program for mak- ing and utilizing record facilitating administrations. OwnCloud practically has likenesses to the broadly utilized Dropbox. The essential utilitarian contrast between ownCloud and Dropbox is that own- Cloud does not offer information middle capacity to have put away records. The Server Version of ownCloud is free and open-source, in this manner allowing anyone to intro- duce and work it at no cost on their claim private server.Here the owncloud is secured with username and password to ensure authentication.Local cloud is also called private cloud .Private cloud is cloud framework worked exclusively for a single organization, whether overseen inside or by a third party, and facilitated either inside or remotely. a private cloud is made and kept up by an person undertaking. The private cloud can be based on assets and foundation as of now display in an organization's on-premises information center or on unused, isolated foundation.

### IV. RSA ALGORITHM MODULE

RSA security depends on the computational trouble of calculating huge integrability. As computing control incre- ments and more productive figuring calculations are found, the capacity to calculate bigger and bigger numbers moreover increments. Encryption quality is specifically tied to key esti- mate, and multiplying key length can convey an exponential increment in quality, in spite of the fact that it does disableexecution. RSA keys are regularly 1024- or 2048-bits long, but

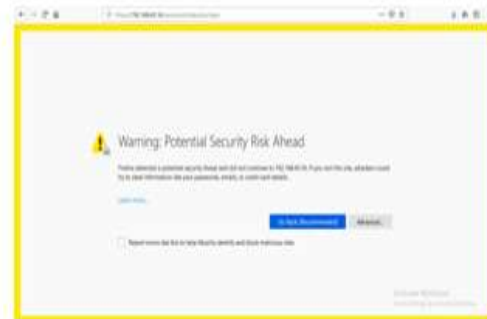


Fig. 1. RSA encryption

specialists accept that 1024-bit keys are now not completely secure against all assaults. This is often why the government and a few businesses are moving to a least key length of 2048- bits. In RSA cryptography, both the open and the private keys can encrypt a message; the in-verse key from

the one utilized to encrypt a message is utilized to decode it. This trait is one reason why RSA has ended up the foremost broadly utilized asymmetric calculation. It provides a strategy to guarantee the privacy, judgment, realness, and non-repudiation of electronic communications and information capacity.

## V. CLOUD IOT MODULE

CloudIot is a technical term used to represent Iot and cloud. Combining cloud and iot is not easy. But the advantage of combining iot and cloud is extra ordinary. Internet of Things can advantage from the versatility, execution and pay-as-you-go nature of cloud computing foundations. Undoubtedly, as IoT applications create expansive volumes of information and contain numerous computational components (e.g., information handling and analytics calculations), their integration with cloud will reduce the data storage in host computer. Instead it can be placed in cloud which is cost-effective and also on-demand scaling.

## VI. IMPLEMENTATION

### A. OwnCloud

OwnCloud login page is initialised with unique username and password. This username and password is set at the initial stage of developing the local cloud. ownCloud gives you all inclusive access to your records through a web interface. It gives a stage to effectively see, match up your contacts, calendars and bookmarks over all the gadgets and empowers essential altering right on the internet. Establishment has negligible server prerequisites, doesn't require special permissions and is fast. ownCloud is extendable through a straightforward but effective API for applications and plugins.

Soon after the login page, the details of the files and folders in the host computer will be listed. From that we can upload or download to and from the cloud respectively. Whenever a file or folder is uploaded to the cloud, the file will be available in the cloud and can be accessed from anywhere through the cloud's URL.



Fig. 2. OwnCloud Login Page



Fig. 3. OwnCloud index view

core page which contains the Owncloud part and automation part. When the OwnCloud part is selected from the dashboard, it goes to the URL which is made static and a message will be shown (RSA encrypted). Later after confirming authentication username and password should be entered. If the username and password matches, the particular user can enter the private cloud. Then a separate module will be present which indicates the automation part. When the coding part is done using arduino, when the command is passed in cloud for lightening the led, simultaneously light (LED) will be lightened. There is a link between the cloud's internet source and arduino's internet source. It should be under one internet source.

## VII. CONCLUSION

The concept of an data security in iot automation using local cloud has been developed, tested and the results discussed. The proposed model demonstrate the effectiveness of the statistical technique used to determine if the data is safe based on the overall collected data. Data is more secure when the data is placed in the cloud. IoT automation will make life easier by connecting all most all the devices in the house in a single interface.

### B. Iot automation

Iot automation made to run using arduino board, wires, led light, node mcu. Node mcu is used for providing wifi because arduino uno does not have its own wifi module in it. For doing arduino projects one should have arduino studio installed in the host computer.

### C. Working of Iot automation module

Data security in iot automation using local cloud is implemented using dashboard as the main platform. A dashboard could be a sort of graphical client interface which regularly gives at-a-glance sees of key execution pointers pertinent to a specific objective or trade handle. The

”dashboard” is regularly shown on a web page which is connected to a database that permits the report to be always upgraded. In

remote industrial embedded system identification. in In proceedings Emerging Technologies and Factory Automation (ETFA), 2014.



Fig. 4. Dash board of cloud and iot

the dashboard there are two fields, one for the cloud part and other for the iot automation part. The cloud part include the owncloud module followed by the the log-in page and the storage and the IoT part display the LED light on and off according to the input parameters. The dashboard is the

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