

SMART COLLEGE NETWORK DESIGN

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Abstract



- ❑ Smart College Network Design covers the entire university. It provides different service such as connect user to internet, data sharing among user, accessing different web service for different functionalities.
- ❑ Smart Campus Network Design is the proposed method to design campus network by *integrate IoT device with networking device, to facilitate different activities in campus network.*

Problem Identification

- ❑ We noticed the need for implementation of IOT in *our current college environment* and expect it to be really beneficial when it comes to power and energy savings.
- ❑ Most college networks are a set of Virtual Local Area Networks(VLANs) connected to cover the entire university.
- ❑ We also wanted to try a different approach than the existing native college network systems, with the implementation of *IOT smart devices*.



Proposed Methodology

To sophisticate the campus network service, this paper proposed Smart Campus Network Design(SCND) by integrating internet of thing device with classically network device in campus network and each smart device for different application must be registered to IOE server and controlled by legitimate user.

Proposed Methodology

In order to design campus network we used cisco packet tracer. Cisco Packet Tracer is a networking simulator used for teaching and learning program by offering a unique combination of realistic benefits of packet tracer are:

- ❑ Offers a realistic simulation and visualization.
- ❑ Permits users to design, build, configure, and troubleshoot complex networks.
- ❑ Allows students to explore concepts, conduct experiments.

Proposed Methodology (contd.)

Currently released cisco packet tracer included new feature like new device, sensor, and Programming Languages with classically networking device, those devices stated below,

- ❑ **Smart Things** are smart object attached to the Registration Server or Home Gateway through a network interface. They are divided into 4 subcategories: Smart City, Home, Industrial, and Power Grid.
- ❑ **Components** are smart objects that link to microcontroller (MCU-PT) or single boarded computers (SBC-PT. This smart object can communicate through analog or digital slots.
- ❑ Registration server for IoT devices
- ❑ IOE devices and sensors in a new IoE devices category: solar panel, power meter, car, wireless home gateway, power meter, motion detector, temperature sensor, conveyor sensor,
- ❑ Programming languages for IoE.
- ❑ Single board Computer (SBC)
- ❑ Microcontroller Unit (MCU)
- ❑ Wireless IOE RFID sensor.
- ❑ Wireless IOE RFID items.

Software Requirements



To design this Smart College Network we used **CISCO PACKET TRACER SIMULATOR SOFTWARE**.

Cisco packet tracer is simulation software used to design, configure, troubleshoot, different cisco devices and currently included IOT devices in the latest version of the software.

Outcome of our Proposed Work

- ❑ The outcome of the proposed methodologies when implemented will be *a smart, efficient, and comprehensible college campus network* which will not be just a bunch of VLANs.
- ❑ The network technology is *intelligent* and *scalable* in both size and enhancement of the technology.
- ❑ There will be complete access to the entire classroom or lab through an admin providing control of each function to the user.
- ❑ There will also be remote access to the devices connected to the network which can be used to do on the fly operations through long distances.

Applications

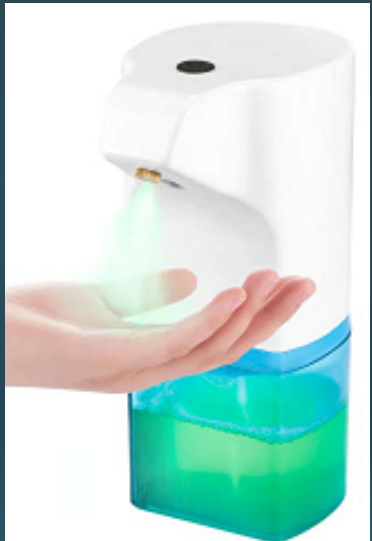
- ❑ The following network idea can be implemented in any classroom of the college network and then be scaled up to the entire college easily.
- ❑ The facilities of the network can provide the convenience of ***continuing the class without the presence of the admin on site*** while can still monitor the class through the cameras connected to the internet.
- ❑ There is a legitimate user set to control operations both on site and offsite and is authorized by username and a password. But also, only a certain IP address is declared legitimate user which increases the level of security two fold since, to misuse the network, one has to get hold of the device that's declared legitimate, but also know the login credentials.
- ❑ The following network can be used to ***conserve resources*** like electricity, since, the devices left on can be seen and remotely switched off. In a scalable implementation, this process can also be automated.

Real-time Applications (if feasible)



- ❑ In the times of the present pandemic crisis the network can be added with ***an IR thermometer to monitor the temperature*** of each student on entry and to alert the admin when someone is symptomatic.

- ❑ RFID sensors can be used to the for ***automatic attendance*** purposes using the ID card RFID chip.



- ❑ The sprinklers can be used to ***sanitize the class rooms***.
- ❑ A PIR sensor can be used to detect human presence and a timeout adjusted to it can help the ***automation of devices*** switch off like lights, fan, air-conditioner etc. when no human is detected for a substantial amount of time.