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MAGAZINE ON INDUSTRIAL TALKS:
-"Emerging Technology on Network
 Infrastructure" (CommScope Malaysia)
-5G, Wifi6 and Emerging Network Technologies
(HUAWEI)

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Application of 5G in Smart Campus

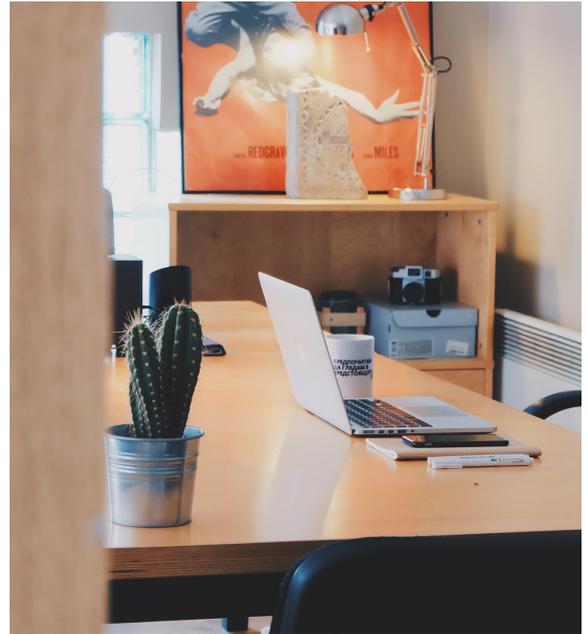# How IoT will help enable the Smart Campus

What is smart campus?

The concept of smart campus has emerged around the world in recent years. the applications of IoT in such campuses is one of the main drivers for this emergence towards the future of modern education.

A smart campus is basically uses internet connected devices on an advanced network infrastructure (5G) to provide engaging experiences and supportive environment between people, devices and the applications.

Some Examples IoT Technologies in Smart Campuses

- Monitor attendance at stadiums, hostels, classrooms and resource usage.
- Advanced security systems by using facial recognition devices, gunshot detectors and location intelligence trackers.
- safety sensors devices that can detect a fire outbreak, faulty appliances and water leakage.
- IoT enabled parking systems allows users to identify the available vacant spaces to place their vehicles.
- Reduction of operational cost. By connecting buildings and utilities to smart technologies, things like temperature, lights, air condition and utilities can be automated by applying IoT sensors to HVAC systems (heating, ventilation, and air conditioning). With such connected environment, maintenance needs can be identified easily and efficiently via the system.

These amazing smart campuses features clever technological touches to make your educational journey more efficient.

What do we think about it?

Reflection

As a whole, we believe that 5G amazing speed together with IoT implementations bring the future even closer. Smart campuses technologies can improve student experience. It provides healthier and inclusive experience. the combination of automated and interactive technology enables students to personalize their learning and living environment. internet connected security services provides peace of mind to both students and their families. Services such as location intelligence, smart lock, geofencing and smart IP video cameras provides easy access control for administrators to monitor and secure the premises of campuses.

References

smart campus. (2021, December 10). [Photos]. https://www.schoolofthefuture.sg/smart

5G APPLICATIONS - Smart Campus. (2021, July 10). [Video]. YouTube. https://www.youtube.com/watch?v=TDQwfJXWDXk

http://hdl.handle.net/10419/224860

NETWORK INFRASTRUCTURE

Descriptions

OF THE INFRASTRUCTURE DISCUSSED

Industry Talk By Mr Goh Bih Der
From COMMSCOPE
29 November 2021

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The talk is about the current and the latest network infrastructure. The first one is about about wireless which represents the Wi-Fi and the access point. The Wi-Fi is is predicted to have greater demand on the 2025 which expected around 4.9 trillion USD sales. The latest Wi-Fi that has created called Wi-Fi 6 which still not available Malaysia but expected to be approves in 2022. In order to get fastest connectivity, we need to check on the access point and the wireless devices. The Wi-Fi 6 which the current WIFI technology will solves the problems. Wi-Fi 6 solves the OFDMA technology which it increase the efficiency of how the files transmit the data in terms of upload and download. Wi-Fi 6 also improve multiuser- MIMO technology on how the access point communicates with multiple wireless devices. Wi-Fi 6 has target rate-time technology which improves the battery life of IOT devices. It also has 1024 QAM and long OFDM symbol that can carries 10 bit which increase the throughput and also the outdoor reliability. With the current BSS coloring technology, the access point can ignore the neighbor's AP which is less interference and increase the Wi-Fi performance. The next one is transforming wireless communication where phone is actually function to call people that far away but with smartphone nowadays, it can do more such as messaging, taking a photo and surfing internet. For the access point nowadays it also embedded other protocol like Bluetooth.

Next is multigigabit technology can solve the problems which refers to the campus core networks where rapid requirements and increase Wi-Fi speeds, increase of IoT devices and more applications and video streaming coming in. Multigigabit switch can maximize the performance of the access point. Next is unified network management where now we have the network controller that can manage both access point and switches. Then, we have the IOT devices which give a lot of benefits such as cost reduction and enhance customer services. There are challenges for deploying IOT devices in term of connectivity, security and compatibility. Next is cloud analytics which have more automated system because nowadays there are many IT technologies in the environment which make it hard for administrator to handle.

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Devices used

WIFI

Wi-Fi used is the latest and current Wi-Fi technology which is Wi-Fi 6. It provides better performances for Wi-Fi user. Its also embedded in many devices like PlayStation 5, the latest smartphones and laptops.

NETWORK CONTROLLER

It can manage to centralize for both access points and the switches.

IOT DEVICES

Smart light bulb, smart sensor, smart lock, thermostat, smart CCTV and many more.

Types of Domains

USER DOMAIN

The User Domain covers all the users (of any rank) that have access to the other six domains.

" WORKSTATION DOMAIN

A computer of an individual user where the production takes place.

" LAN DOMAIN

Contains all of the workstations, hubs, switches, and routers. The LAN is a trusted zone.

" LAN-TO-WAN DOMAIN

The boundary between the trusted and un-trusted zones. The zones are filtered with a firewall.

" REMOTE ACCESS DOMAIN

The domain in which a mobile user can access the local network remotely, usually through a VPN.

" WAN DOMAIN

The system that links devices across long distances.

" SYSTEM DOMAIN

This domain is made up of user-accessed servers such as email and database.

REFERENCES:
ALEXANDRA, J. (2018, JANUARY 15). THE SEVEN DOMAIN OF A TYPICAL IT INFRASTRUCTURE. SCHOOL OF INFORMATION SYSTEMS. HTTPS://SIS.BINUS.AC.ID/2018/01/15/THE-SEVEN-DOMAIN-OF-A-TYPICAL-IT-INFRASTRUCTURE/

Reflections

The information that we gained from the network infrastructure talk is we can see that even though Malaysia is still behind the developed countries like Japan and China, its still keeps improving the technologies that we have in terms of speed of connectivity and also having more IoT devices as daily uses and also frequently see in the environment. That's how important is the network infrastructure development which can maximize the performances of future technologies. We can see that the development of smart home and smart campus give lots of benefits to the users. This also increase the productivity of students and making them enjoying their campus life because of how comfortable to learn especially for computer science student. It is because of easier to solve the problem regarding of the computers and also having high speed connection which reduces the time for waiting to download or upload content from the internet. We also can see that by improving the network infrastructure, IoT devices can worked together with security to build the best security systems such as security system for the smart campus where devices like smart CCTV can be use to detect the intruders automatically rather than depending on the security guard. The benefit, it will be more accurate and also more secure.

"TECHNOLOGY IS THE BEST WHEN BRINGING PEOPLE TOGETHER." -MATT MULLENWEG

REFERENCES:
CRITERIA FOR SUCCESS. (2021, AUGUST 19). 18 AWESOME TECHNOLOGY QUOTES TO INSPIRE & MOTIVATE. HTTPS://CRITERIAFORSUCCESS.COM/18-AWESOME-TECHNOLOGY-QUOTES-TO-INSPIRE-MOTIVATE/

HUAWEI : 5G & WIFI6

ANIS SOFEA A17KM0045

Reference: Wikimedia Foundation. (2021, December 12). Huawei. Wikipedia. Retrieved December 14, 2021, from https://en.wikipedia.org/wiki/Huawei.

BRINGING DIGITAL TO EVERY PERSON, HOME AND OGRANIZATIONS FOR A FULLY CONNECTED WORLD

-HUAWEI-

In Huawei, they have been serving various people such as individual consumers, carriers, government, and also enterprises. There are also several types of products and also R&D that has been released or produced by Huawei such as devices(Smartphone), Intelligent automotive components, connectivity, and also computing & cloud.

Huawei: Leading Provider of ICT Infrastructure & Smart Devices

Huawei is a technology corporation that has ben designed, developed, and sells telecommunications equipment, consumer electronics, and various smart devices. Till now, it has been hiring 197 000 employees where half of it are working in the R&D field. It is also known as multinational technology cooperation that been deployed its products and services to 170 countries and regions. Not only that, it has been ranked as 3rd in R&D investment and 44 in Global 500.

Huawei Malaysia: Globalized positioning, Localized operations.

As we currently know, Huawei's southern pacific regional headquarters is located in Malaysia and is the largest ICT solution provider that serves almost 90% of Malaysia's population. It has been ranked 11 in Global Shared Service Centers, and Number 1 in Customer Solution Innovation Center and also Global Training Centers. It also won the "Cyber Security Innovation of the Year" in 2018.

A New Innovation: 5G in Malaysia.

It's the fifth generation of wireless technology. Provides faster speeds than before. Additionally, once 5G is widely accessible, consumers may see real-world rates of 700-3025Mbps. What makes you think that'll be interesting? With 5G, a movie that takes minutes to download on 4G will be downloaded in seconds! It's a wonderful thing, isn't it? Why is 5G being developed? It has a reduced latency, is more reliable, and is more flexible, among other things. 5G will also be used in some of the most promising industrial applications, such as 5G Smart Education, Smart Medical, and 5G Smart Transportation.

WiFi6 : A New Standard For Intelligent World

Do you know that Wifi6 has been verified for more than 3 years? In 2019 WIFI 6 has entered the mature commercial use phase. For some highlights, in October 2018, WiFi Alliance specified a new name for different Wifi standards, 802.11ax that being named as WiFi6 First release of wifi6 is in 2019 and some of the devices that will appear the WIFI-6 tagged are iPhone 11, Samsung S10, Huawei P40 series and also Intel laptop with 10th Generation Cpu.

At this time, Huawei expert was elected of the WiFi6 working group and also it has submitted 240 new proposals of it. Not only that, but Wifi6 also supports gigabit broadband promotion ad it has fast download and also provides cloud backup experience. In terms of coverage, Wifi6 has been enabled to improve the coverage which means it can provide a full house coverage of 5Ghz signals. In addition, it also supports the evolution of home value-added services for video services such as multiscreen IPTV, Online education, VR, and e-sports. It also supports a better multi-user experience as it has more than 100 terminals being connected but with power consumption reduced. The main core of WiFi6 is it has a large bandwidth m high concurrency, low latency, and also low power consumption which makes it better than WIFI5 and previous.

- **Reflection: As much as business is accomplishing on wireless networks today, networks can and will get a lot better. If businesses want to get the most out of their technology, they need to be open to new generations of those technologies.**