TECHNOLOGY INFORMATION SYSTEM

EMERGING NETWORK TECHNOLOGIES

What's inside ?

APPLICATION OF 5G IN SMART CAMPUS

5G , WI-FI 6 & EMERGING TECHNOLOGIES NETWORK (HUAWEI)

EMERGING TECHNOLOGY ON NETWORK INFRASTRUCTURE (COMMSCOPE MALAYSIA)

Muhammad Ridzuan Bin Bakar   A21EC0091
Nur Dini Fatini bt Mohd Kamal   A21EC0110
Farhanah Aina binti Md Ayub   A21EC0024
Muhammad Fazreen Bin Azhar   A21EC0074

Application of 5G in Smart Campus

Comprehensive Security Protection

Fire extinguishing linkage can be work more properly when there is instalment of intelligent pre – incident warning in the system linkage. The system can be operated only by one – click handling during the incident. This will bring a lot of benefit as it will alert the emergency alarm as the system will check - on site videos to identify the fault location and report to the emergency team. The system will check the security personal distribution and make a call so that people can be distribute during in the accident area in order to push an escape route and emergency exit as the system enable the fire control broadcast. At the same time, the system also able to open the door access to increase the chance of escape routes. In addition, the system will automatically turn off the electric switch in the accident area and shut down the non-fire extinguishing elevator as same as the fan of ventilation to reduce the oxygen gas that can combust the fire even more.

Citation: https://academy.tdra.gov.ae/course?course_id=294

Facial recognition and video retrieval are one example that commonly used in smart campus as it able to make distribution of the blacklisted person in order to avoid any suspicious person to walk freely in the campus. This system will secure any personal's staff from being leaked out and ensure their safety as their identity and information were record in the system. Hence, any person without authorization will being put in the blacklist as it will decrease the safety of the staff if the system did not conduct properly. In addition, by making a restriction on entering the zone video analysis and in the control centre room is a must to avoid any chance of disaster situation occur since only specific and authorize person are given permission to enter the place.
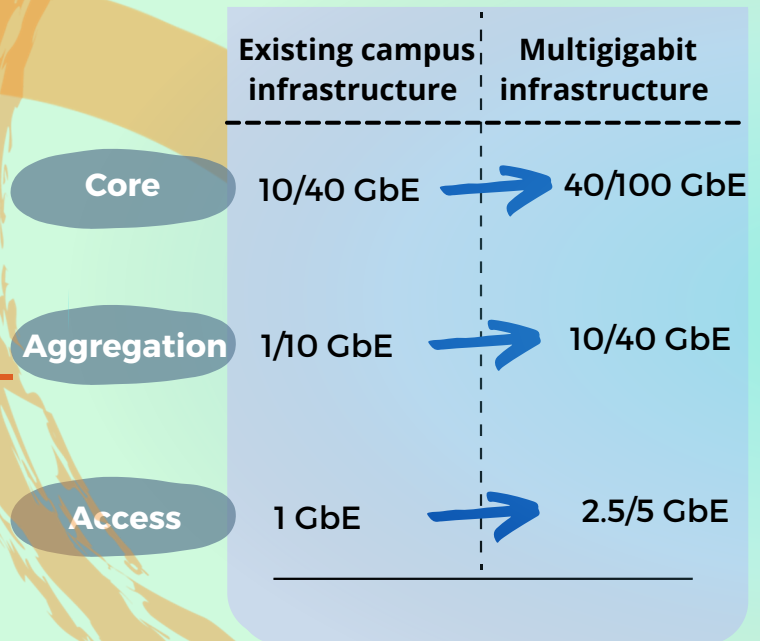
REFLECTION

As our world pursuing to be more advance in tech day by day. There is no doubt, smart campus is a must do because of its benefits to not just our students but also lecturers and the staff. one of its benefits is enhancing the facility overall security. Although, crimes at universities declined on the last few decades, the security continues to be an issue. Nowadays good lighting and normally guarding the institute wasn't enough to ensure students safety. By placing **facial recognition** CCTV, we can recognize or tracking students going in or out of the institute avoiding unauthorized people from lurking out in the facilities. Internet-connected security services can let students and the staff be at ease in the institute. Smart campus solutions help reduce crime while increasing awareness. With reliable connected systems, universities can deploy intelligent technologies to protect assets and people. Other than that, **smart fire extinguisher** can help in handling fire outbreak in the campus. The smart thing about this is how the fire extinguisher operate during emergency cases which is require one simple button to put the fire off. It is easier to use and more practical in emergency

Emerging Technology on Network Infrastructure (CommScope Malaysia)
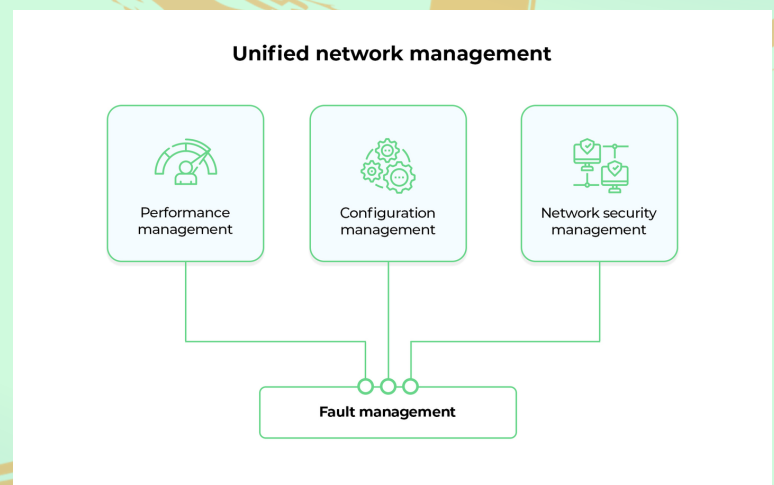
Multigigabit Technology

An AP can now support more than one gigabit throughput thanks to the introduction of Wi-Fi 5 and Wi-Fi 6. One gigabit per second connection between access points and switches may now be the bottleneck for Wi-Fi consumers, resulting in increased interest in connections faster than one gigabit per second.

For example, the campus core network that is under stress because of the rapid requirements on the wireless that cause increases in Wi-Fi speeds, increment of IoT devices/Smart building in the market, more cloud applications and video streaming that come into the network need to be upgraded using the Multigigabit Technology

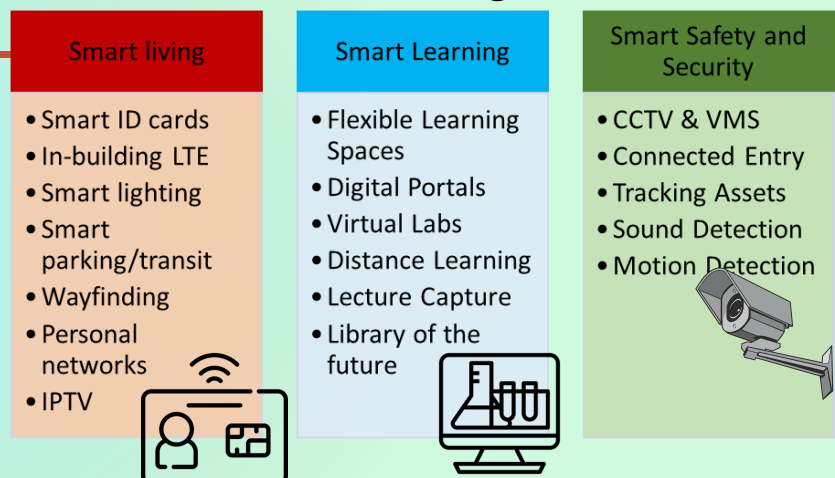|	Existing campus infrastructure	Multigigabit infrastructure
Core	10/40 GbE	→ 40/100 GbE
Aggregation	1/10 GbE	→ 10/40 GbE
Access	1 GbE	→ 2.5/5 GbE

Unified Network Management

Instead of existing as two separate networks, a unified network combines wired and wireless components, sharing network parts and services where possible. Unified networking is becoming more popular as a solution to deal with an increasingly mobile workforce accessing corporate networks remotely via a number of devices, such as smartphones and tablets, as well as notebook and desktop PCs.

Unified network management

Performance management

Configuration management

Network security management

Fault management

Cloud analytics

Cloud analytics is the process of using analytic algorithms in the cloud to analyse data in a private or public cloud and then delivering a desired result. Cloud analytics entails the use of scalable cloud computing in conjunction with strong analytic software to find patterns in data and derive new insights.

Internet of Things (IoT)

Smart living
- Smart ID cards
- In-building LTE
- Smart lighting
- Smart parking/transit
- Wayfinding
- Personal networks
- IPTV

Smart Learning
- Flexible Learning Spaces
- Digital Portals
- Virtual Labs
- Distance Learning
- Lecture Capture
- Library of the future

Smart Safety and Security
- CCTV & VMS
- Connected Entry
- Tracking Assets
- Sound Detection
- Motion Detection

What does Commscope RUCKUS provide for users?

Software & SaaS

Ruckus R750

World 1st Wi-Fi 6 certified vendor in market

Wireless Access Point

When it comes to connectivity, businesses rely to RUCKUS. It has a wide range of indoor and outdoor wireless access points to suit any budget, performance demand, or deployment scenario. Whether you're dealing with a high client density, Wi-Fi-unfriendly building materials, or just escalating employee or customer demands, these access points enable safe, dependable access in any situation. Every RUCKUS access point, from the most basic to the most advanced, is loaded with unique technologies that go above and beyond the norm to assure exceptional connections and incredible user experiences.

Switches

To provide amazing customer experiences, CommScope innovates across wired and wireless technologies. Our RUCKUS ICX fixed form-factor switch family works together to simplify network setup and maintenance, improve security, reduce troubleshooting, and make upgrades simple. For the most demanding applications, our low-latency, non-blocking architecture offers great throughput.

MANAGEMENT CONTROL SYSTEM

Control & Management

CommScope has a comprehensive network management and control portfolio to meet the feature, capacity, and architectural needs of businesses of all sizes. The one thing they all have in common is the ease with which they can connect.

Reflection

Network infrastructure development really give a lot of benefits to users with its efficiency and cost-effectiveness. Creating a secure network infrastructure reduces downtime and maximises productivity. Our network's operating costs will be predictable, and we'll have fewer network outages that could hurt our bottom line. With network infrastructure , I believe it provides better quality of education . More students are able to connect online without having network traffic problems . Besides, having more studying resources like digital portals and libraries . Students become more engaged to campus life as collecting data for projects can be done easier and smoother .

Citation

- Ruckus®. CommScope. (n.d.). Retrieved December 9, 2021, from https://www.commscope.com/ruckus/.
- Domenico, T. D. (2021, July 23). The importance of a strong network infrastructure. Plow Networks. Retrieved December 9, 2021, from https://plow.net/thought-leadership/the-importance-of-a-strong-business-backbone-the-network-infrastructure/.

5 G , W I - F I 6 & E M E R G I N G T E C H N O L O G I E S N E T W O R K

HUAWEI

5G

or fifth generation of wireless technology system is a cellular network use for outdoor wide coverage . Faster than anything exist before like 4G .

WHY 5G ?

Lower Latency and Greater Bandwith
Faster download speeds up to 10 gigabits per second Gbps

More reliable
-Better transmission of data in extreme condition
-A million connection within 1 square kilometers
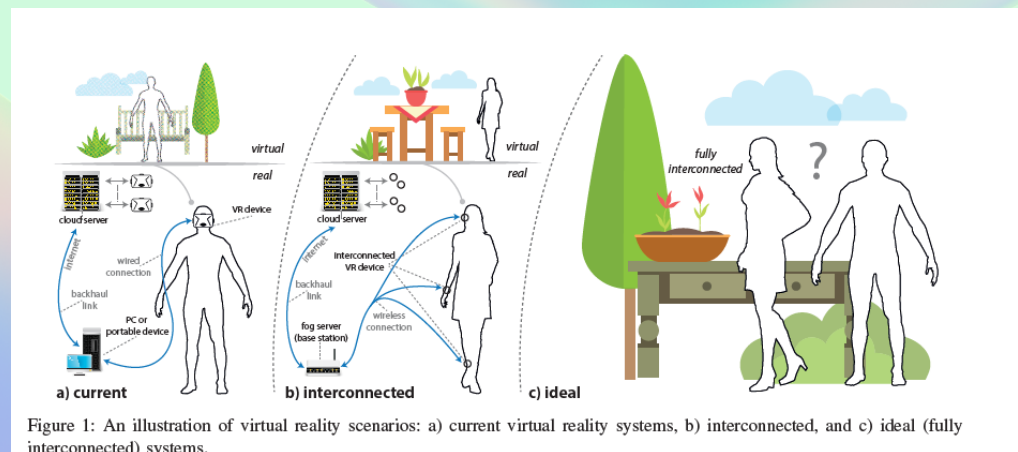
More flexible than Wi-Fi
Support wider range of devices , sensors and wearables

Huawei is building a digital platform & ecosystem that uses intelligent technology therefore open to wide range of opportunities that requires 5G. For instance , efficiency manufacturing , smart medical centre , smart transportation , smart education and smart city .

Huawei's Infrastructure includes

- Devices
- Intelligent automotive components
- Connectivity
- Computing & Cloud
- Digital Power

The use of 5G enhances the performance of Virtual Reality (VR) as lagging is extensively reduced.Hence ,motion sickness can be prevented

Figure 1: An illustration of virtual reality scenarios: a) current virtual reality systems, b) interconnected, and c) ideal (fully interconnected) systems.

smart city

Huawei has built 160 Smart Cities in over 100 countries .
Huawei facilitates in the delivery of digital to every sector and organisation for a fully connected, intelligent world as cities progress toward Internet of Things (IoT)

Wi-Fi 6 (802.11ax)

is the most latest released wi-fi which has better performance than its predecessor wi-fi 5 and has speed of up to 9.6 Gbps. It is also an indoor ultra high density internet provider suitable for home network , supermarket ,universities , classrooms and stadium . It uses an upgrader version of multi -user, multiple input , multiple output (MU-MIMO).

Why choose Huawei AirEngine Wi-Fi 6 ?

- **Low Power consumption** terminal power consumption is just 30%
- **Large bandwith** 4x more than 5g
- **High concurrency number of terminals** on a single AP is 1024
- **Low latency** which is reduced to 20ms
- **Most secure** because uses dual-signature boot and hardware encryption
- **Most advance IoT apps** due to its built-in Iot and module has a ready Iot chip ready
- **Great performance** uses 16x16 MU-MIMO
- **Full house coverage of 5Ghz Signals**

Huawei next-generation AirEngine Wi-Fi 6 series products

- 10.75 Gbps Lightning Speed
- Always-on Mobility
- 100Mbps@everywhere

Learn More

REFLECTION

The development of 5G and Wi-Fi 6 has been very beneficial for mankind . I believe that it will not just make our daily lives easier yet providing various job oppurtunities . The use of AR and VR powered by 5G or Wi-Fi 6 connection will enhance the transmission rate thus reduce lagging time .This will give a huge advantage in the education system as distant learning will be more resourceful and in depth reaching to every parts of nation . Moreover, 5G powered manufacturing increases productivity and efficiency as better test runs, shorter time and lower development costs. I believe that smart cities connected through 5G will provide better security for citizens . This is due to the integrated cameras connecting directly to the emergency services . Reduce in pollution as more smart cars and electric cars around the city besides having a very efficient public transportation . In short , I hope 5G will start to implement soon in our country to enable us having a better standard of life .

Citation

- Kastrenakes, J. (2019, February 21). Wi-Fi 6, explained: how fast it really is. The Verge. https://www.theverge.com/2019/2/21/18232026/wi-fi-6-speed-explained-router-wifi-how-does-work
- How 5G Will Make Smart Cities a Reality. (2021, August 13). Telit. https://www.telit.com/blog/5g-smart-city/