

Future

OF
TECHNOLOGY

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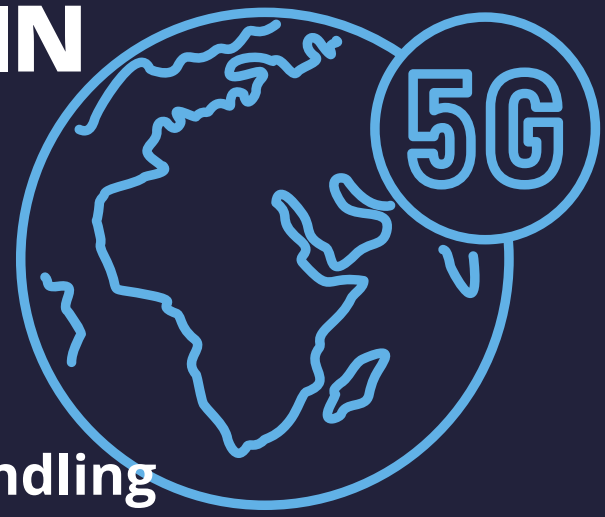
UNIVERSITY TECHNOLOGY MALAYSIA

APPLICATION OF
5G IN
SMART CAMPUS

EMERGING
TECHNOLOGY ON
NETWORK
INFRASTRUCTURE

5G, WIFI6 AND
EMERGING
NETWORK
TECHNOLOGIES

APPLICATION OF 5G IN SMART CAMPUS



Firefighting Management – System linkage and one-click handling

1. When a fire occurs, smoke alarm will send a sensor to the center.
2. Center staff can monitor fire status through linkage video.
3. IOC initiates a contingency plan with one click
4. System will automatically inform the emergency response team and dispatches security personnel to the site.
5. Electric locks can be open remotely by center
6. Center staff will select personnel in the fire area
7. Then, system will send evacuation SMS to them
8. Fire department will be alerted if it is necessary
9. The flexibly customized contingency plans with the highest speed
10. One-click command and dispatch, and multi-system linkage
11. Help us to handle emergency efficiently



COMPARISON BETWEEN FIREFIGHTING MANAGEMENT WITHOUT 5G AND WITH 5G

Firefighting management without 5G

- Response time is too long
- The entire evacuated crowd and rescue time is too long
- Fire is not controlled in the first place
- Cause great loss
- Cause more casualties
- There may be an error situation, for example, there is no fire but the sensor is not accurate, then the situation cannot be determined immediately, because someone needs to check it

Firefighting management with 5G

- The whole process took few minutes
- Reduce losses
- Reduce casualties
- Can be determined immediately if error situation occurred through the linkage video
- Fire can be controlled in the first place because firefighting and evacuation can be done at the same time



REFLECTION

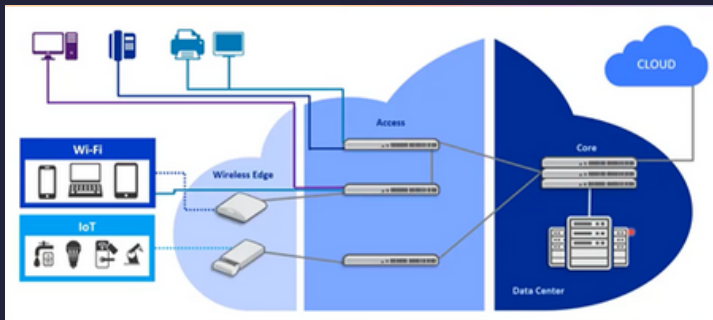
- Many new technologies are now beginning to cooperate with 5G and are launched in major cities based on business cases based on demand and number of users.
- 5G provide faster performance and less latency so 5G is expected to product lightning-fast speed for data uploads and downloads. Therefore, fire service can depend on data because 5g will have numerous effects.
- 5G will significantly increase data transmission and will enable comprehensive new connections between responders, firefighting equipment, and fire stations. In this way, what is happening at the moment can be resolved faster so as not to cause more harm.
- In my opinion, 5G bring more convenience to mankind not only firefighting management and also facial recognition system, perimeter management, energy efficient management and so on. These applications make our lives safer and more at ease. Hope that there will be more technology and 5G cooperation in the future, which will bring us a better quality of life



EMERGING TECHNOLOGY ON NETWORK INFRASTRUCTURE

Description

The hardware and software resources of an entire network that enable network connectivity, communication, operations, and management of an enterprise network are referred to as network infrastructure. It connects users, processes, applications, services, and external networks and the internet by providing a communication path and services. There are three main equipment in network infrastructure which are access (switch), core and data center. A network switch connects devices in a network such as computers, printers, and wireless access points and allows them to communicate by exchanging data packets. Furthermore, core network is the infrastructure that connects your computer system's various networks. If your core network fails, various parts of your computer system lose access to your data, and staff and customers are unable to access it. Lastly, data center is a storage that can collect various data. Users can find all kinds of information through the data center.



Example

WiFi 6 is latest wireless standard. Phone we used nowadays is smartphone which is a converged communication device. Phone before need to access through wires but smartphone do not. The users can bring how far away as they want.

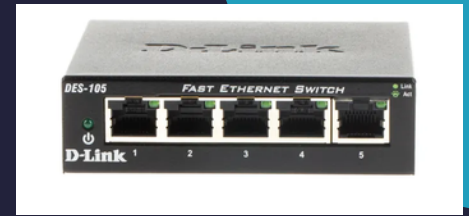
Besides, there are some device such as light bulb and sensor which have become smart. They can automatically detect with sound and action when people go in to a room and light up.

Moreover, there are also have virtual labs for smart learning. Virtual labs are the good option for them because it have more space to let the students research, the virtual labs do not need a real place to use it, students and lecturers can use it in any places and when have any free time. It is more comfortable for the users.

Devices Used

1. Switch

- A multiport device that improves network efficiency.
- Switch stores limited routing information about internal network nodes and permits connections to systems such as hubs and routers.



2. Access point

- A device that creates a wireless local area network, or WLAN, in a building or office.
- An access point uses an Ethernet cable to connect to a wired router, switch, or hub and broadcasts a Wi-Fi signal to a specific area.



3. Wireless edge

- Controls data flow between two networks.



4. Core

- Infrastructure that connects the different networks together that make up your computer system.
- Essential part in network infrastructure.



Reflection

- Multigigabit technology can improve equipment utilization, increase network capacity, and reduce equipment and line investment to reduce operating costs as much as possible. From the perspective of the enterprise, multigigabit technology can help them maintain new markets and reduce operating costs. From the user's point of view, this technology can improve cell coverage and Internet speed so that customers can conveniently carry out mobile communications anytime and anywhere. Therefore, the ultimate goal of technological optimization is to enhance user satisfaction and maximize corporate effects.
- The Internet of Things system may assist businesses in tracking all inventory goods through remote and real-time monitoring, and also maintaining all inventory data in a systematic and structured way to minimize inventory loss or theft. When IoT devices are connected and organized, it speeds up cargo handling and other work processes by reducing employees' manual work and promoting completing more work in a shorter time. The Internet of Things can also use big data in cloud computing to help companies find product defects before customers buy, solving problems faster and improving customer satisfaction.
- The birth of a smart city includes smart living, which allows people to remotely control devices at home through smart phones to create a more intelligent home. Smart learning can use cloud services to connect the equipment like whiteboards, auditoriums, gyms, playgrounds, desks, tablets, and the entire classroom to the cloud, allowing students to arrange their learning progress according to their actual situation can improve students' completion rate of classwork. Teachers may give one-on-one education to pupils while also assessing their performance. Besides, the use of IoT services in conjunction with sensors and cameras allows for full monitoring and inspection of the workplace to guarantee safety, lowering the possibility of theft and fire.

5G, Wifi6 and Emerging Network Technologies



The text '5G' is written in a large, glowing white font. Below it is a blue and white image of the Earth's horizon, suggesting global connectivity.

5G

5G is the latest wireless technology systems. It called as 5G because it is the fifth generation of wireless technology systems. It provides speeds faster than any previous generation and also comparable to fiber optic cable. 5g is still in the early stages of adoption and has not yet been popularized in every corner of the world. 5G has three main benefits. That are lower latency, more reliable, and more flexible than Wi-Fi. Besides, 5G also used in industry. There are a lot of top potential industrial application such as 5G smart education, 5G smart port, 5G smart medical, 5G smart manufacturing and etc. It can be said that 5G foster new opportunities and benefits.

Wi-Fi 6

Wi-Fi 6 is the latest generation in Wi-Fi technology. Wi-Fi 6 also known as 802.11ax Wi-Fi and improved the current 802.11ac Wi-Fi standard. So, Wi-Fi 6 is more speed and also greater stability. Furthermore, it provides high bandwidth because of spatial stream, sub-carrier quantity, symbol duration and coding mode. Next, it has wide coverage. For example, 5GHz coverage is enabled for a home of 120 square meters. It also provides low latency, multi-user access and low power consumption and let us have a better experience. Lastly, Wi-Fi 6 usually used in indoor ultra-high density building and house.

EXAMPLE & DEVICE USED

The devices used in 5G and WiFi 6 are all of the device which can and need to connect network such as Augmented and Virtual Reality Device that 5G and WiFi 6 needed the most . Besides, 3D video devices and automation machine also are the device used such as self-driver.

Movie can watch much more clearly and interesting because the scene from 4k become to 8k. For example a football contest, normally the watcher can't see clearly the football outline, but when it become 8k, they can see it. Besides, virtual reality device need to transfer a huge data to the users for instance high-quality scene, clearly background sound as well as characters voice. It need a good connection to let the users have a good experience.



REFLECTION

- 5G has two features that support mobile and user-wide, bringing disruptive change to the energy, healthcare, transportation and other industries—for example, medical aspects. There is an uneven distribution of medical resources throughout the world. Increased investment alone will not allow quality medical resources to be replenished in short periods to areas where medical resources are relatively scarce.
 - However, 5G can help improve medical conditions across the board in these areas. With 5G technology, doctors can see patient information accurately and operate on patients by remotely manipulating medical robot arms. With 5G technology, the camera can monitor the vehicle, people and environment, and the image can be transmitted on time, significantly increasing the accuracy and speed of image recognition.
 - By using 5G, VR technology can work very well, like face recognition. The police can quickly identify suspects; Faster information reading when identifying license plates can shorten city commutes and enhance public safety.
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- WiFi-6 isn't just an increase in rate of upload and download. It also reduces network congestion significantly, enabling more devices to connect to wireless networks, allowing families to share a network without affecting network speed and having a better experience. Faster networks allow users to save time downloading applications and freely switch points in time while watching videos without waiting for a cache.
 - WiFi-6 uses the WPA 3 security protocol to make customers' networks more secure and not compromised by others. TWT technology is used in WiFi-6 to minimize wireless network antenna utilization and signal search time, enabling mobile phones to consume less power and have longer battery life.

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