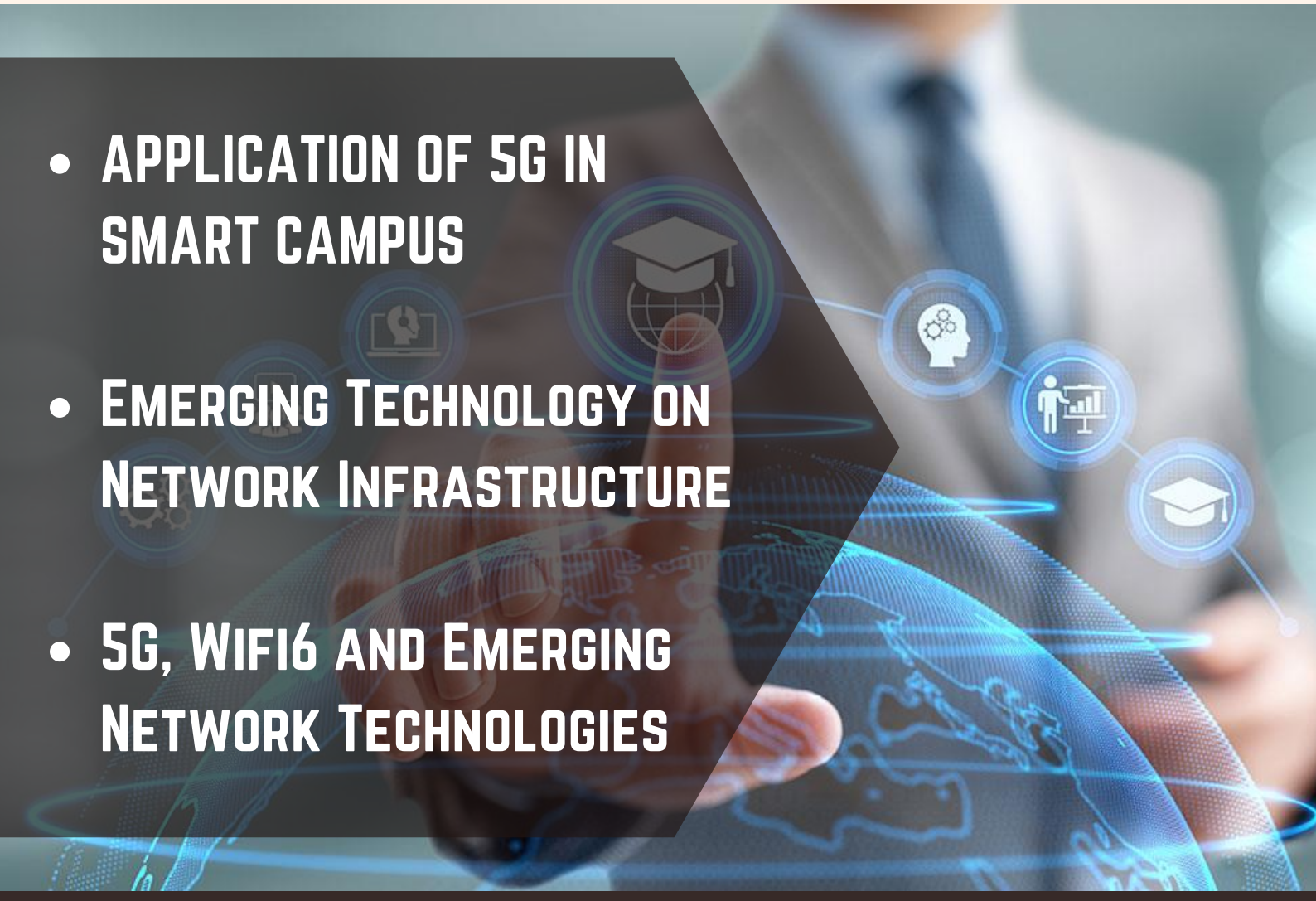
SECTION 06

SECP1513

UTM
UNIVERSITI TEKNOLOGI MALAYSIA

Emerging Network Technologies

Technology Information System



- Application of 5G in Smart Campus
- Emerging Technology on Network Infrastructure
- 5G, Wifi6 and Emerging Network Technologies

BY

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APPLICATION OF 5G IN SMART CAMPUS

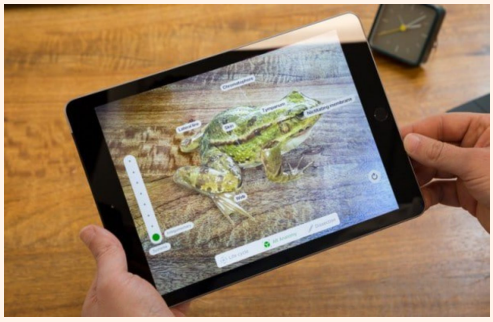
11 DECEMBER 2021

VR/AR TEACHING

One of the applications of 5G in Smart Campus is VR/AR teaching. 5G technology's high bandwidth and low latency enable education via VR/AR. VR/AR educational content may be stored in the cloud, and the AR application's rendering, display, and control can be performed on the cloud. Then, when the VR/AR audio-visual stream is effectively encoded, it may be broadcast in real-time across a 5G network. To meet the low latency requirements of VR/AR teaching, rendering functions on MEC architectures can be placed near the student's side which can increase the network's transmission rate and the time it takes for the cloud's services to arrive [1].

HOW 5G HELPS AR/VR TEACHING

High bandwidth and low latency are needed for mixed-reality content and video to work well. 4G can't keep up with the traffic needed for AR and VR experiences. But with 5G, things will be very easy. Students can tour the human body or other planets in virtual reality, and they can do it all in a virtual world. It's easier for them to learn with AR because they can touch things to learn about them. They can pinch and zoom through the Earth's layers as quickly as they think [2]. For instance, the AR app Froggipedia enables students to explore the internal organs of a frog without injuring any live frogs. Additionally, it helps pupils to visualize the transition of tadpoles into adult frogs. Another example is VirtualSpeech, a virtual reality technology that enables individuals to practice their public speaking abilities in a more effective way [3].



Froggipedia

VirtualSpeech

" IF WE TEACH TODAY AS WE TAUGHT YESTERDAY, WE ROB OUR CHILDREN TOMORROW "
-JOHN DEWEY

ADVANTAGES

5G's superior bandwidth will help a lot with VR/AR teaching which has more advantages over traditional methods of teaching which is:

- The 3D teaching content and method can make a student's classroom experience better than it was before and lets students see things that can't be seen, which helps them improve their understanding.
- Deeper learning experiences through VR/AR teaching can inspire students, and they may want to be more involved in the process of learning.
- VR and AR methods can be used to make teaching content into very appealing games, which makes learning fun and interesting for students.

REFLECTION

5G in the field of teaching can be beneficial in the learning process of students in a university. Additionally, the VR/AR technology will make the learning process easier as it will be more about hands-on experience/ learning than a traditional whiteboard.

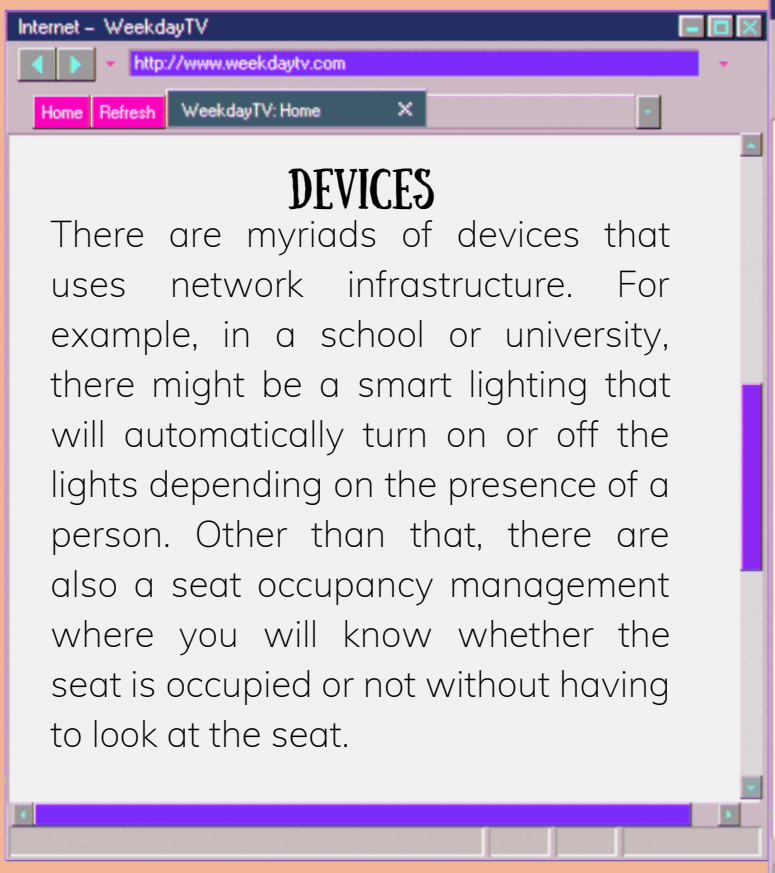
AR/VR useage in the field of education can be revolitionary but this widespread adaptaion takes time.

EMERGING TECHNOLOGY ON NETWORK INFRASTURUCTURE

5th Industrial Talk - 29 November 2021

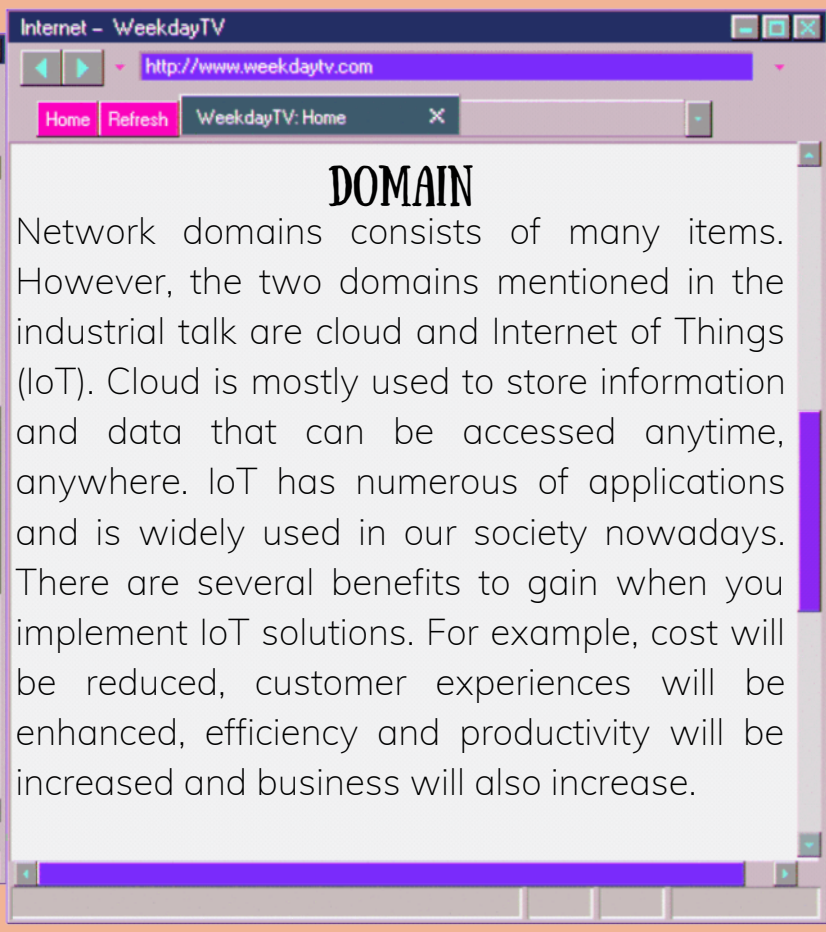
INFRASTRUCTURE

What is network infrastructure? The communication path and services between users, applications, services and etc. are provided by the network infrastructure. It is the software and hardware resources of an entire network[4]. There are two infrastructure discussed in the 5th Industrial Talk. One is the networking hardware, called switches and the other is the networking software called the network management. The network switch which is also called switching or bridging hub connects devices on a computer network to receive and give data to a destination device by using a packet switching[5]. Moving forward, the network management uses network management system to run the process of managing, administering and operating a data network. It uses hardware resources such as switches - the one mentioned before, routers and access points[6]. The traditional approach for a network management is to have two elements which is the WLAN controller and the network management system. However, in the unified network management, all elements will be under the network controller.



DEVICES

There are myriads of devices that uses network infrastructure. For example, in a school or university, there might be a smart lighting that will automatically turn on or off the lights depending on the presence of a person. Other than that, there are also a seat occupancy management where you will know whether the seat is occupied or not without having to look at the seat.



DOMAIN

Network domains consists of many items. However, the two domains mentioned in the industrial talk are cloud and Internet of Things (IoT). Cloud is mostly used to store information and data that can be accessed anytime, anywhere. IoT has numerous of applications and is widely used in our society nowadays. There are several benefits to gain when you implement IoT solutions. For example, cost will be reduced, customer experiences will be enhanced, efficiency and productivity will be increased and business will also increase.

REFLECTION

This industrial talk has really opened my mind on how much we have used the network infrastructure without even realizing it. Without the evolution of network infrastructure, our lives would not have been the same. The wireless nor IoT devices would not have existed and that would make our lives a bit harder especially in the times of pandemic like now.

5G, WIFI 6 & EMERGING NETWORK TECHNOLOGIES

INDUSTRIAL TALK 6
2nd December'2021

INFRASTRUCTURE

5G technology commercialisation is accelerating across the world. From the angle of industrial development drivers, 5G technologies are considered as the key to individual utilization experience and outstanding mechanical change. The fifth-generation mobile network innovation standard requires the setup of macro- and small-cell base stations with edge computing capabilities, which is referred to as the 5G framework. 5G has had a far-reaching impact on businesses, and it has the potential to be transformative for lower inactivity by allowing us to use a faster transmission of a larger data stream, more dependable by allowing us to have way better transmission of information in extreme conditions like torrential rain and storms, and more adaptable than standard Wi-Fi by supporting a wider range of gadgets, sensors, and wearables. Control applications like as IoT devices, semi-autonomous cars, and virtual reality are all tightly tied to 5G. Models with Wi-Fi 6 setup will give greater performance.

DEVICES

Since 5G offers such a big improvement in speed, benefit providers are now providing purchasers a another choice for connecting to broadband through distant broadband networks to their residences by way of 5G.

Because 5G's ultra-low latency and fast transfer speed are key in enabling the use cases, VR is the most significant use of 5G. Virtual reality has the ability to provide a wide range of new commercial applications, such as extra specialists, preparation, maintenance, and repairs, to mention a few.

When employed in a remote framework, 5G also contributes in the creation of intelligent receiving wires that boost SNR while improving range spread by 20%.
A 5G Radio Access Network (RAN) employs 5G radio frequencies to offer distant networks to devices, enabling for the delivery of these fantastic applications.

DOMAIN

The open-air web, which is an outside wide-scope industry and city that covers the urban scope, business road, interstate, and scenic zone, may arise in the 5G area. The 5G administrations area covers the business case for 5G administrations as well as the repair lesson necessities. Benchmarks and open-source enhancements may be found in the TM Gathering and Open Arrange Robotization Stage, the 5G Open Private Association, and other organizations.

With the commercial availability of next-generation remote systems, Wi-Fi 6 and 5G are projected to bring portability, speed, and perfect execution. These innovations enable significantly faster information rates and reduced latencies, even in congested areas, to meet growing demands for improved remote connectivity, such as smart cities, IoT, and independent arrangements. To summary, Wi-Fi 6 and 5G were extensively tested and utilized to investigate client interactions. According to the findings, Wi-Fi 6 may be more acceptable in some situations and 5G may be more appropriate in others, depending on client conditions and scenarios. In a nutshell, the goals set for this year's extension were achieved.

REFLECTION

I learned a lot regarding 5G and Wi-Fi 6 while listening to Mr. Nicholas Yong, Huawei's Official Industry Arrangement Chief for Asia Pacific Locale, speak about it.

Radio Get to Organize comprises of receiving wires, radios, baseband (RAN Compute), and RAN program to deliver unimaginable speeds and mobility. Meanwhile, Wi-Fi 6 will remain the most productive and popular mode of communication.

INDUSTRIAL TALK 6

2nd December'2021

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