TECHNOLOGY INFORMATION SYSTEM, EMERGING NETWORK TECHNOLOGIES

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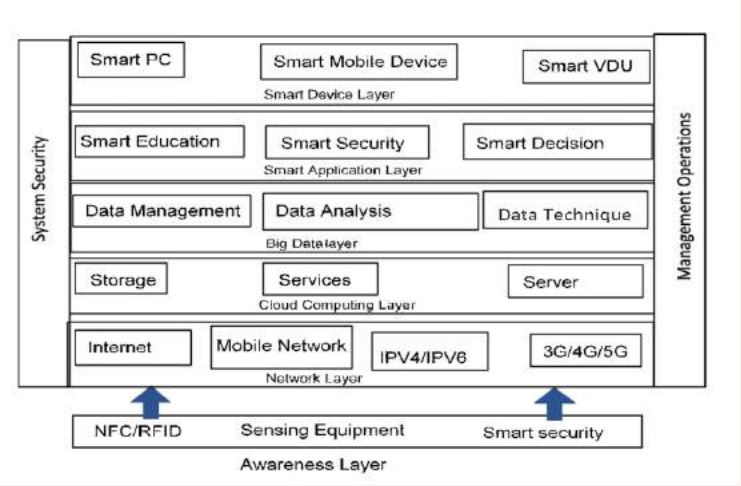
TOPICS

Application of 5G in Smart Campus

"Emerging Technology on Network Infrastructure" (CommScope Malaysia)

5G, Wi-Fi 6 and Emerging Network Technologies (HUAWEI)



https://www.researchgate.net/figure/Proposed-smart-campus-model_fig2_331600226

APPLICATION OF 5G IN SMART CAMPUS

WHAT IS A CAMPUS?

A campus is a basic unit of cities and plays an important role in economic development and public services and helps us enter the intelligent world. A campus can be simply defined as an area or ground containing the buildings of a university or college.

WHAT MAKES A CAMPUS 'SMART'?

The ease of interaction between people, devices and applications on campus by sharing a similar technology foundation. Smart campus enables students to experience new things and services, and increase the efficiency of the performances of the services.

WHAT ARE THE TYPES OF APPLICATIONS OF SMART CAMPUS OF COMMSCOPE?

There are three main fields of applications namely smart campus living, smart campus learning, and smart campus security and safety.

SMART CAMPUS LIVING APPLICATIONS

· Smart ID Cards/Smart Payments
· Building Automation
· Smart Lighting
· Smart Transit And Parking
· Location Based Services

SMART ID CARDS/ SMART PAYMENTS

People nowadays aim for efficiency for whatever tasks they do. Students can connect their ID cards to their bank credit and debit card or mobile payment applications. Students then can pay for food or purchase things on the campus just using a single card. Besides, students use their ID cards to record their attendance for each lecture, borrow books in the library, access restricted areas, and many more automatically by just scanning their ID cards. These ID cards enable the students to prove their identity on campus and enjoy the infrastructure specialized for campus students.

REFLECTION : HOW CAN SMART ID CARDS/ SMART PAYMENTS HELP US?

The student ID card application in the 'smart' campus increases the efficiency. The ID card helps the machines to recognize and differentiate people and perform their tasks. With a single card, the campus can cut down the costs to hire security guards and workers to deal with students. With the student ID cards, the students can do all their tasks individually and no need to wait such a long time for other people to serve them. Hence it makes the students, lecturers, staff, and visitors have smoother campus life.

https://www.istockphoto.com/photos/id-card

Industrial Talk 5: "Emerging Technology on Network Infrastructure"

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PROBLEM SOLVED BY WI-FI 6 :

- OFDMA (network capacity)
- MU-MIMO (network capacity)
- Power efficiencies (Device battery life)
- 1024-QAM (peak throughput increase)
- Long OFDM symbol (outdoor reliability)
- BSS coloring (network capacity)

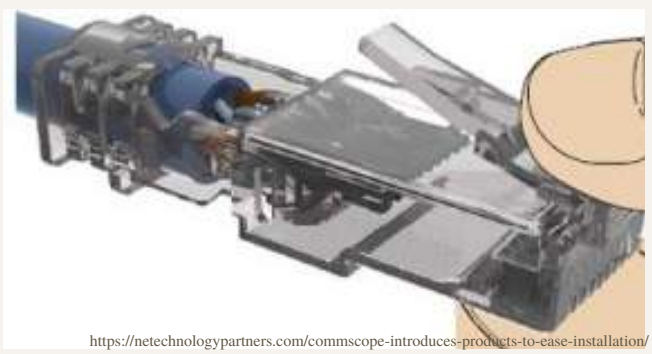
ADVANTAGES OF IMPLEMENT OF IOT SOLUTIONS :

- Reduce cost
- Improve customer experiences
- Increase productivity and efficiency
- Increase business opportunities

https://www.intelligentcio.com/africa/2021/05/12/commscope-helps-inwi-streamline-network-infrastructure-to-pave-way-for-5g/

IMPROVEMENT BROUGHT BY MULTIGIGABIT INFRASTRUCTURE :

- CORE : 10/40GBE -> 40/100GBE
- AGGREGATION : 1/10GBE -> 10/40GBE
- ACCESS : 1GBE -> 2.5/5GBE

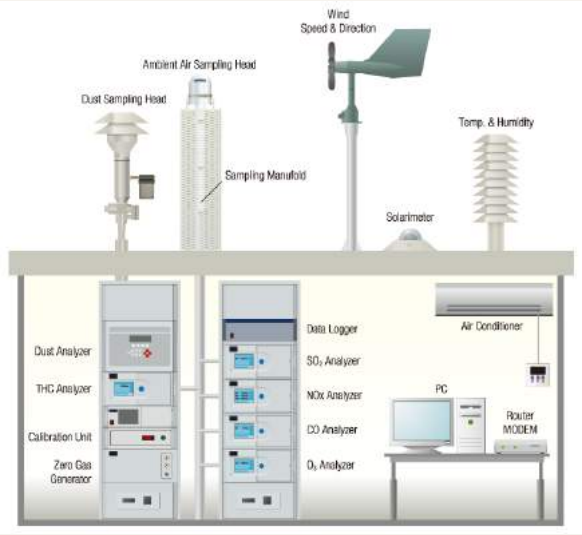

https://netechnologypartners.com/commscope-introduces-products-to-ease-installation/

PROBLEM TO SOLVE IN DEPLOYING IOT SOLUTIONS :

- Security
- Connectivity
- Compatibility

Examples of IoT devices can be implemented in school :

1. Environment Air Monitoring
2. Vape Detection
3. Window Sensors
4. Asset Tracking
5. Occupancy Management
6. Smart Thermostats
7. Smart Lighting
8. Staff Alert Tags
9. IP Video
10. Automated Locks



https://www.horiba.com/ru/process-environmental/products/system-engineering/air-quality-monitoring-system/

Reflection :

In this industrial talk, the speaker clearly explained the improvement brought by the technology Wi-Fi 6 and multigigabit infrastructure. These technologies bring a lot of benefits to us especially in deploying IoT solutions. It is undeniable that IoT solutions will increase our life quality such as building a Smart City or Smart Campus. Although Wi-Fi 6 technology is not implemented widely in Malaysia yet, but we believe that it is just around the corner.

https://www.lawyer-monthly.com/2021/04/lookalike-logos-chanel-loses-trademark-dispute-with-huawei/

Industrial Talk 6: 5G, Wi-Fi 6 and Emerging Network Technologies (HUAWEI)

5G is the next generation of wireless technology systems. It boosts the speeds faster than all previous generations which are delivered by fibre-optic cables. 5G already shows a real-world speed of 700 – 3025 Mbps at early testing. For example, movies that took minutes to download with 4G can be done with only a few seconds with 5G.

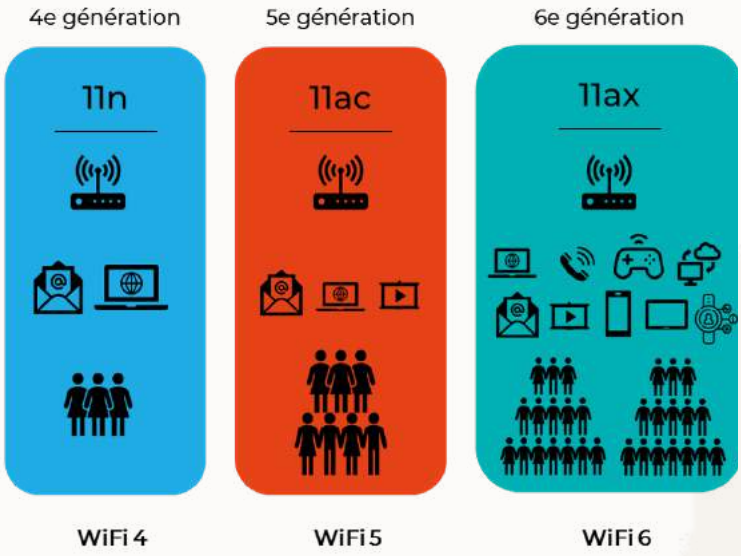
5G devices are lower latency, enabling faster transmission of larger data streams. 5G is more flexible than Wi-Fi and can support a wider range of devices, sensors, and wearables.
5G requirements will support more applications with index 1 (1ms of E2E latency), 10 (10Gbps peak data rate), 100 (1 million connections within $1km^2$)
5G also foster new opportunities and benefits for other industries like tourism, industrial and education.

ITU formally adopt the term " IMT-2020" as 5G which follows in the footsteps of IMT-2000 (3G) and IMT-Advanced (4G). ITU also defined the major application scenario of 5G which is Enhanced Mobile Broadband, Massive Machine-Type Communications and Ultra-reliable and Low-latency Communications..

There are some use cases that are prioritized by 5G which are Augmented Reality (AR), Virtual Reality (VR) and Automation and Entertainment in the Vehicle. because these case examples are having a high 5G essential and addressable market in the future.

Mark Zuckerberg once said " VR will be a Killer Application of 5G" in MWC 2016. As we knew VR already formed an industry chain before 5G arrive which is from chipset to VR terminal then content producer and finally broadcast platform. However, 5G will unlock the full potential of VR in the future by High Throughput for Retina Experience VR and Low Latency to avoid motion sickness.

Wi-Fi 6 has been verified for more than 3 years. Thus Wi-Fi 6 had developed a mature industry chain. Besides, a huge increase in performance has shown from Wi-Fi 5 to Wi-Fi 6 for example the max rate has increase from 1.73Gbps to 9.6Gbps, 2T2R also increase from 866Mbps to 2.4Gbps! The new Wi-Fi 6 (802.11ax) standards has empower enterprises' digital transformation.



https://wixalia.com/en/wifi-6-features-benefits-and-conditions-of-deployment/

DEVICES THAT USE 5G OR WI-FI 6 TECHNOLOGIES

- Huawei AirEngine Wi-Fi 6 (highest and most stable performance, most comprehensive IoT apps and most secure)
- Speed DEMO (World's First 10Gbps Wi-Fi)
- Smart Antenna (improves SNR expanding the coverage radius by 20%)
- SmartRadio (enables 10ms ultra-low latency and lossless roaming)

https://www.gizmochina.com/2020/03/03/wi-fi-6-explained-all-you-need-to-know-about-the-latest-802-11-ax-standard/

ADVANTAGES

- Wi-Fi 6 improve wide coverage (full-house 120m² of 5 GHz Signals).
- Wi-Fi 6 new video service (faster speed and zero packet loss for Multi-screen IPTV, Online Education, VR, eSports.
- Wi-Fi 6 supports a better multi-user experience (connect more than 100 terminals and reduce the power consumption of terminals).

Reflection

We have learnt a lot of details and advantages of 5G and Wi-Fi 6 from this talk. It is amazing to see the improvement of wireless technology in these years. Most industries are able to further develop because of the 5G and Wi-Fi 6 technologies. We are excited to see if 5G and Wi-Fi 6 can bring us more benefits in the future.