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Wireless Signal Obstacles

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ABSTRACT
This research analyzed the case studies of corporates in the communication industry, focusing on wireless signal obstacles. The pertaining issues majorly lay on wireless LANs. The research highlights that the emerging technology of wireless signal keeps locating users and linking them to communication without tether connectivity. In another way, it facilitates human-to-human communication. Furthermore, the research directly focused on signal issues underlined by security constituents. Nevertheless, the research analyzed wireless connections in Asia and discovered that many networks were not secured. The critical issue facing this firm in place of the signal is the aspect of short-range wireless technologies, which has made the firm experience poor performance metrics because of non-quality constituents impacting the signal strength of the company. For instance, dynamics, other interference, and certain environmental metrics on communication range and effectiveness compared to Wi-Fi and WiMAX wireless systems. The study offered a few control measures to this problem, such as implementing *High-Speed Wireless Local Area Networks (WLANs), Wide Area Wireless Data Systems, and Satellite-based Mobile Systems*. It concluded that further proposed an enhanced cognition cycle that involves proficiency base to see that wireless systems are controlled by incorporating aspects of machine learning and big data applications.

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I. INTRODUCTION

Global Communication Technology Case studies

As the contemporary aspects of the technology keep increasing, smaller and large potential computer connectivity keep expanding by far much margin on mobility and constituents of wireless networks (Chen et al., 2009). Usually, the outdated networks are physically interlinked with wires and offer localities signal connectivity. The merging technology of wireless signals keeps locating users and linking them to communicate without tether connectivity. In another way, it facilitates human-to-human communication, as detailed by Vela et al. (2018)

The communication industry dealing with wireless connectivity is increasing annually due to the low cost of installation, which paves a way to operate in a mobile way efficiently. The establishment of access areas for wireless connectivity is somewhat uneconomical, although the time cost applicable for expanding alternative nodes is too minimal (Zhang et al., 2014). Wireless connections are somehow economical compared to traditional wired connections in the surfacing of hardware since wireless networks need no cable resources.

The more the wireless network keeps rising, the more signal connectivity issues keep increasing and reported on particular aspects. The foremost emerging trend of the signal problem is security stance, which deals with methods of protecting data and guaranteeing authentic transmissions (Zoubir, 2013). The safety of data is well acknowledged, and research has been conducted thereto about this. The research has been directly focused upon the signal issues underlined by security constituents; nevertheless, the research, which analyzed wireless connections, discovered many networks that were not secured. These issues might be visible daily due to corporate priorities.

In reference to research conducted in major industries Cavanagh, (2009) pin-pointed that 40% of these companies utilize 3% or less of their IT resources on signal maintenance. Insufficient information and proficiency might be the contributing factors for these firms' failure to implement the ideal measures that will see this corporate's signal operating in a free obstacle zone. To sensitize on signal issues, firms must first examine or instead establish the risks associated with the network in their operation and implement the security policy (Poursheikhali and Zamiri-Jafarian, 2019).

The emerging mobile devices with wireless signals, as noted in the article "Seamless mobility management for wireless network" (2018), have necessitated the installation of infrastructures that are in support of wireless LAN access points (APs) for domestic and abroad users, inclusive of the development of internet network environments in all aspects. In conjunction with this phenomenon, the NTT EAST, for instance, has achieved its 5^{th} – generation domestic gateway conforming with the ideal first time IEEE802.11 ac*1 wireless signal where it has progressively and drastically expanded its network operations through wireless LAN, to mention launching FLET'S HIKARI (optical broadband) processions with the strength of supporting gigabit communication devices (Corte-Real and Gouvela, 2007).

Wi-Fi and WiMAX are advancing the technologies by interlinking the data in the communication globe. Cellular technology has ideally taken over the wired technology in global space. Another profound type of technology experience to be taking over the landline equipment is that of short-range wireless technology, which by far range is overtaking the wired equipment. These systems, Bluetooth, 802.15.4 LR-WPANs for minimal size packages, are impacting the real globe. Nevertheless, they are replacing the wired devices in the forms of robustness, reliability, and speed to be specific for enhancement of signal problems experienced throughout (Luo and Zheng, 2006).

The ideal aspects of wireless connectivity are taking over wired technology in a very drastic motion. Some underlining benefits of these is that; it is economical, easy to install, maintain, and easy to use. These aspects are suitable for domestic networks in physically enclosed places such as smart homes, industrial technology networks, and distinctive purpose embedded device technologies. Applicability of plethora on short frequencies wireless signals has enlightened the society and corporates not to superintend wireless networks for those other networks.

The first issue mounting up the signal problems are the critical virtual and physical obstacles in the industrial and commercial area operations. This has been necessitated by insufficiency in standard connectivity or protocols that will ultimately pave ways for end-users to thrive on wireless networks. Commercial teams like the wireless industrial networking alliance (WINA), wireless HART from HART communication foundation (HCF), as well as ISA100 have in other ways derived and relinquished technology wireless-systems standard for operations with diversity aspects (Qian and Liu, 2020). More certain groups operating on equivalent short stances wireless communication channels as detailed by Wang and Garcia-Luna-Aceves, (2004) are Bluetooth, UWB, ZigBee, IEEE 802.15.4a, WiBree, and Rubee. They entail multiple decisions on certain short-range wireless operations. These associates are working with a focus to improve or enhance the long-term experienced problems in signal efficiency.

Across the globe, there has been an increasing rate of Wi-Fi- network providers such as in the apartment buildings and network connections for corporate consumption. Nevertheless, wireless network obstacles may arise due to inefficiency of signal strength, signal interference, ineffective network protocols, in line with other arising insignificant issues. Devising means to overcome these issues of signal obstacle has become a challenge to many firms and other commercial sectors. By the end of this study, the research will have highlighted the reasons behind the slow wireless network connectivity based on the US firms. The research further elaborates on certain techniques that these organizations can adopt in remedying the underlined crisis. The kind of encryption to be applied will aid in resolving the experienced overhaul signal obstacles in the identified state. This research, therefore, presents a case study of wireless signal problems undertaken by Technical Agents and Support teams within these corporates.

II. CASE STUDIES ON WIRELESS SIGNAL OBSTACLES

The primary issue facing this firm in place of signals is the aspect of short-range wireless technologies, which has made the firm experience poor performance metrics because of non-quality constituents impacting the signal strength of the company. For instance, dynamics, other interference, and certain environmental metrics on communication range and effectiveness compared to Wi-Fi and WiMAX wireless systems (Kim et al., 2011). The following parts present particular aspects obstructing the wireless signal of global Internet Providers.

Irregularity of Radio Communication: in this perspective, in radio and remedies for signal connectivity, there are specific settings with maximum effect on short-range wireless signal system; Anisotropy, progressive variation in regards to heterogeneity (Corte-Real and Gouvela, 2007). However, these signals portray some diversified paths in different ranges, and the wireless signal connectivity is never spherical, as presumed by personnel.

Consequently, the signal pathways differ concurrently with rising diversions in propagation

unit right off the transmitter and non-uniformity in hardware devices and energy status resulting in heterogeneous signal transmitting powers, therefore different acquired signal stance by Vela et al. (2018). Moreover, with practical research in the acknowledgment of packet transmission performance, these short-range ground radios extremely result in poor signal on wireless networks.

This aspect becomes critical for short-range signals as the rate of irregularity gets too severe compared to its connectivity degree. Empirical research in these case studies shows that the min for LQI values offered by WSN radio waves constituents are relatively correlated with PRR, which could be applied as a dependable metric for wireless signal examination at deployment times of the detailed WSN scheme. LQI is a unit for packet grade has been applied and found that LQI is somewhat an ultimate indicator of packet yield, as there is a vibrant co-existence between LQI and packet unit for an equivalent experiment (Vela et al., 2018).

The analysis of this firm in the case study determined and established that packet yield as a unit of distance relies significantly on the frequency of the recipient and the sender of information. In most scenarios, the company has been situating sensor nodes on walls and floors, a place where they don't meet their full signal range. The application of intra-car sensor connection has registered two crises that contributed to signal obstacles, and the aspects are; low LQI values, channel fading, and other interferences like signal hopping interference (Chen et al., 2009).

Software and Hardware Issues for Transitioning to Wireless Communication: Another critical crisis contributing to signal obstacle as studies herein is switching these devices to the wireless connection on active wired connectivity and other profound applications (Chen et al., 2009). The study discovered that there had been so much hardware and operations diversity while not considering if the devices were fully compatible. The study also found that particular software development and operation is too expensive. This is accompanied by poor strategy for incorporating the standard framework.

The communication industry is experiencing a poor data network architecture. Non-uniformity, complexity, and vigorous nature are the three ideal aspects of upcoming technology users. The communication design and the internet connectivity were not correctly installed, and so signal issue keeps rising. The rising counts of new technology like multicore designs and other new designs have led to complexity and experienced certain signal obstacles.

The study also shows some rising QoS bar in operations to reach the QoE of consumers. A situation which resulted to bound on a closed-loop system of the wireless signal transmitter. The above effects have been pioneered by a mix of trade-offs and restrictions that limit network quality performance, as stated by Luo and Zheng (2006).

Field of view of protocols: wireless connectivity and the internet nodes used in this company applies critical assumptions in interlinking the communication between recipient and the sender is not fully compatible with the hardware embedded technology for internet connectivity. These internet nodes are identified to have some deficiencies in their field of view and limited data transcription to enable the signal control software to operate without any interference or instead configure complete signal connectivity (Qian and Liu, 2020).

Usually, whenever a firm needs to integrate a new network system, it must first affix a protocol in the installed software and a software command to update the affixed protocols that are not identified in the termed industry, thus experiencing progressive obstacles when it comes to the wireless signal. Furthermore, although the company employs QoE's other signal protocols to refute an overhaul experienced signal backyard, the firm still lags in user QoE and applications QoS signal strength.

The above case is due to the problem that earlier installed features did not meet the standards of signal protocols. Instead, it lies in the limited network booster, which could enhance the operation of signal transmitters. Because of these shortcomings, therefore, the installed protocols do not hinder some factors that could otherwise compromise signal strength.

III. CONTROL MEASURES OF WIRELESS SIGNAL OBSTACLES

After presenting the underlined aspects contributing to poor signal in global Internet Providers, it is fundamental to highlight the class of wireless networks that the communication industry can adopt to resolve these issues. There is a collection of scales of wireless communication technology the research presents in table 1 below a number of wireless networks and their performance degree in a diversified scale that can be considered.

Type of Network	Bandwidth	Latency	Mobility	Typical Video Performance	Typical Audio Performance
In-Building	>> 1Mbps	<10 ms	Pedestrian	2-way interactive Full frame rate	High quality 15-bit samples 22 KHz rate
Campus-Area Packet Relay Network	~ 64 Kbps	~ 100 ms	Pedestrian	Med. Quality Slow scan	Med. Quality Reduced rate
Wide-Area	19.2 Kbps	> 100 ms	Vehicular	Freeze Frame	Asynchronous voice mail
Reginal-Area	4.8 kbps - 10+ Mbps (asymmetric)	> 100 ms	Vehicular Stationary	Seconds/Frame Freeze Frame	Asynchronous voice mail

Figure 1. Profound wireless connectivity performance parameters. Source: **(Qian and Liu, 2020)**

The research established that communication and internet corporations should establish the following in operations to eradicate the signal as mentioned above obstacles:

High-Speed Wireless Local Area Networks (WLANs): this network is grouped among the connections which minimal mobility-high speed-data connection within a configured location. The coverage range is between 10 to 100's feet. There are so many packages of WLAN provided by internet developers firms with rates ranging from 100's of kb/s to 10Mb/s (Zoubir, 2013). An IEEE standards board, 802.11, has been trying to align this aspect in the communication industry but to no avail, since the resources are limited.

In summary, there are two general connectivity architectures undertaken by WLAN developers in the communication industry. The foremost one is centrally incorporated and monitored signal, with the situated based agencies in these networks ensuring total control over signal strength. The other connectivity here is the self-organizing and installed controlled signal, where each connection has the CS395T Network Efficiency Wireless signal equivalent to other network operations by ad-hoc communication agencies (Zoubir, 2013).

All WLANs in the US have probably tried using one of the ISM frequency nodes for operations that are not licensed under port 15 of the FCC rules. These frequencies are 903 to 930 MHz, 2500 to 2490.6 MHz, and calling upon users to give okay to the interference from any obstructing source that might be sharing an equivalent frequency. Therefore, if the signal strength is sufficient to reach more than limited feet, the WLAN must utilize either frequency hopping or on-spot frequency spread spectrum for better access connectivity. One concession to the ISM frequency establishment interlinked with this company is Motorola ALTAIR that functions in licensed frequency 18GHz.

Wide Area Wireless Data Systems: Communication firms can adopt this wide area system that is termed to facilitate its consumers with a high mobility wireless signal, wide-ranging, limited-data-rate new communication in mobile equipment such as cars and pedestrians. The foremost and ideal acknowledged systems are the ARDIS connectivity managed and maintained by Motorola and the RAM mobile connections in regards to the Ericsson Mobitex network. These signal connections are devised to introduce standard, two-way voice, land mobile radio signal frequencies, with 12.6kHz or 26kHz signal frequency.

The internet firm providers are advised to pioneer a new technical signal boosting system termed *Cellular Digital Packet Data (*CDPD). This is under the mandate of the communication industry principal cellular signal connection developers. CDPD shares the 30KHz interspaced with 900 MHz signals controlled by the analogy FM devised Mobile Phone connectivity software. Data reserve of almost 20.3 kbps. CS394T Wireless Network connection efficiency (Poursheikhali and Zamiri-Jafarian, 2019).

Another profound emerging trend in this is wireless signal coverage for *microcells*. The infrastructural base is targeted at cutting the costs by bringing in very economic base frequencies which can be linked to utility signals, the sections of infrastructures, and within the structures and can be significantly annulled throughout the place by the firms in the case study where ideal data rates range at 76kbps.

Satellite-based Mobile Systems: This is termed as the central of wide-area-connectivity, though un-economical, this system is considered a highly improved and with high signal spread, usually globally signal coverage efficient (Poursheikhali and Zamiri-Jafarian, 2019). Nevertheless, it is relatively expensive to manage,

especially on orbital base sites. This could be adopted by internet developer's organizations if there is a need to resolve the poor signal coverage obstacles. Trees are regarded as the primary obstacles, and Satellite-based Mobile Systems could be the only suitable system to install to cure this crisis.

Integration of Wireless Networks: it is highly recommendable that communication network corporate adopts these technologies as a single wireless connection is insufficient to meet users' requirements. It is far much likely that most wireless connectivity will be applicable, every unit operating in a diversified range, impart service over a collection of geographical coverage regions at a certain speed at a mixed degree of price, facilitate services to a wide number of regions at speculated speed, and with minimal signal obstacles.

The wired signal networks will serve the users, but not to the best limit recommended. Consequently, mobile computer consumers will have to utilize a number of networks to meet their demands. Consumers would generally demand for wireless network infrastructure which can facilitate seamless connectivity. The urge for mobile network users to keep using a wireless signaled network with robust connectivity will keep increasing from one region to another if the perfection of a strong signal stays up to date.

The communication degree between wireless services must be positioned vertically and horizontally to reach the potential seamless signal surfing, as noted in the article "Seamless mobility management for wireless network" (2018). By positioning vertically means the connectivity aptness to move either down or up a frequency terminal. For instance, whenever consumers travel from the office, where they can comfortably roam through WLAN, to their place, where they can roam through CDPD service; therefore, they need to carry their mobile technology device interlinked with the network at all times. By horizontal, we describe how roaming can partake right from the coverage center of an individual service provider to the other one.

Mobile Internet: within the scope of the internet, the middle-aged IP is to date being face-lifted to accommodate a number of demands of the development of new technology (Luo and Zheng, 2006). *Mobile IP* was identified to operate in conjunction with wireless networks. It is redirected by location encryption and packet registration. Any mobile node with varying locality needs to be underlined by a certain dedicated IT assistant. This agency then connects the user with the domestic agent. Once registered, the mobile connectivity address is then bound to its domestic code. The welcoming datagrams are in first place routed to the mobile station's home signal, where the intended system condenses them.

IV. CONCLUSION

In this research, various signal obstacles have been highlighted in conjunction with wireless networks. The study has keenly incorporated a number of controlled measures to curb the mentioned wireless obstacles as studied in detailed case studies. The study has further proposed an enhanced cognition cycle involving a proficiency base to see that wireless systems are controlled by incorporating machine learning and big data aspects. Impending work should comprise of data of each enhanced experience on signal design and profound security of information thereto.

In this research, a case study of network developers, especially internet providers, was presented pertaining to the case of wireless signal obstacles that were argued to be under maintenance by the technical support team in the corporation. With the propagation of certain kinds of wireless LAN services, cases for signal obstacles are rising drastically. The firm is called upon to propose certain aid from the EMC Engineering Group of the Technical Assistance and Support Centre to see prompt remedies of signal problems on wireless networks and to enhance the surfing, communication, and other use of wireless network services. To this far, it is recommendable that firms employ advanced technology upon realizing potential network and ideal signal.

The detailed theme of the study analyzed in this has been critical, especially in the communication industry. The technicians in this firm were not fully prepared to meet users' expectations by resolving signal issues before the analysis of this case study of the *Internet Providers* because they had a small degree of proficiency concerning the signal strength on wireless networks. The technicians were somehow knowledgeable thereafter on fixing the underlined signal obstacles, which shows that they somewhat possess some medium degree of understanding on types of challenges the users undergo, as detailed by Luo and Zheng (2006).

It is probable to introduce these measures to the whole parts of network developers. They also manage much or a few sensitive data and fully accommodate wireless connections in most of their activities. Nevertheless, other subsequent authorities may apply this even though they are not facing the most equivalent challenges as that of Internet Providers. The degree of proficiency concerning signal obstructions in this firm is probably equivalent to what other global firms are facing; all the same, they need to incorporate specific measures

as highlighted in this research. Even though the aptness to employ the knowledge on wireless networks may be different, the risk associated with this might be too extreme. Most obstacles undermining network signals are such that;

- Personnel may access the IP's network radio signal far much than expected and misuse the set policies to undertake some intrusion, infect the systems with viruses and other kinds of attacks.
- When access localities are imparted against the firm's firewalls in the network nodes, this creates an easy point for attack.
- Wireless network signals are enormously susceptible to denial-of-service attacks and obstruction attempts.
- The labor force in the IT industry might create a wireless signal for people in the outside environment who may create some interruptions in network connections.

For instance, hackers and criminals might take advantage of wireless signals if no encryption is asserted when seeking the consumer's data, patients, public figure personnel, among others. The data for beneficial utility comprises performing attacks on network systems, burglary, and blackmailing individuals. Wireless signals can also interfere when hackers devise new viruses for obstructing the signals and direct to those who use the internet regularly to aid in distributing across the systems unknowingly. This issue once arose in the US, where they decided not to use the classified networks as it encourages the huge emergence of wireless signal obstacles in their systems. The defense agencies have implemented new policies with speculations and strict directives to curb the vulnerable insignificant constituents from obstructing the signals. The directives provide that wireless signals might necessitate remote eavesdropping and unwarranted access into Pentagon systems (Luo and Zheng, 2006).

A number of technical challenges must be attended to satisfy the stringent and contradictory agents for better future signals of wireless networks. Inclusive of very extreme spectral efficiency, minimal latency, extreme network equipment connections, huge achievable data rate, extreme-high reliability, more consumer fairness, more quality service, and low cost of data usage. Through this, users will be impressed by these firms' products, and the corporates will see breakthroughs in the future.

Cross-discipline decisions and critical discussions on signal obstacles will be significant potential factors for network industries. To initiate such discipline, the wireless communication firms must first install the necessary infrastructures to see that the world is fully interlinked with the network.

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