International Academic Institute for Science and Technology

International Academic Journal of Science and Engineering
Vol. 2, No. 1, 2015, pp. 39-44.

ISSN 2454-3896

International Academic Journal of Science and Engineering

www.iaiest.com

Technical and structural analysis of the wireless networks, safety and security analysis of wireless and cable networks

Roohollah Ofoghi[a]

[a] *Sama technical and vocational training college , Islamic Azad University , Saveh Branch , Saveh , Iran*.

Abstract

The paper first reviews the fundamentals of wireless and wired networks will be discussed and analyzed a variety of wireless networks in terms of the side the use of these networks, from other parts of the technical review of this article Now the focus will be safety and security of wireless networks sensitive issue in today's world of computers which evaluated different methods compared to wired and wireless networks and the necessary research excellence in the field of wired and wireless network or vice versa discussed Analysis of other types of wireless systems used to manufacture computers today are things that can be analyzed.

Keywords: wireless network, cable, security, reliability, noise

Introduction:

In general, data transfer systems for the transmission of information, requires special equipment and transmission is known as transfer medium. Transmission media are the physical components that are used in the transmission of information and a variety of different types including twisted pair, coaxial cable, fiber optic and wireless telecommunications. Natural resources such as heights and altitudes, forest, swamp, the high cost of cabling, in some areas, difficult and sometimes impossible cabling and cabling in remote areas, time-consuming setting up a wired network, the need for high bandwidth and wireless transmission of information to specific sectors require. Another key issue in this case, the installation and troubleshooting of these networks and their security while fully considered.

Foundations network-based Cable &Wireless

So far, local area networks (LAN) in residential and office spaces can be both cable (Wire) or wireless (Wireless) are designed. At first the network cable by using Ethernet technology in design but now with the increasing use of wireless Network WiFi technology are faced with.
Cable network (currently more star topology used) must be the location of each workstation to distributors) hub or switch (independent cabling done (CAT5 cable length should not be 100 meter at Otherwise, the fiber is used) the facilities used for the two types of passive components (Passive) such as cable outlet duct, patch panels and equipment and active (Active) we such as hubs, switches, routers, network cards and are

Categories dimensional wireless network

(Wireless Personal Area Networks): WPAN
These wireless networks cover a small range of standard IEEE802.15)) Bluetooth IR (Infra Red) is used. Parts (Device) is allowed to communicate with each other in small area. The best example of WPAN, Bluetooth is. However, the need for direct communication with IR distance limitations and there after.
(Wireless Local Area Networks): WLAN
The group of wireless networks, the ability to share data between different devices that are limited to provide each other with a small range of covers and uses WiFi technology. The examples of wireless networks for local users, including academic environments or laboratories that require the use of the Internet is useful. In this case, users are limited if it can be established without using Access Point this relationship. Otherwise it is necessary to use the Access Point. It can be operated using appropriate communication distance users if no longer a barrier to some extent.
(Wireless Wide Area Networks): WWAN
This group of wireless networks for large distances, such as between cities or countries, is used. This communication is done through a wireless antenna or satellite long The distance covered Features networks.
(Wireless Metropolitan Area Networks): WMAN
It is a special technique to transfer data between multiple networks communication technology or building in a city is established. fybr optical or copper cables for Backup can be used. In addition, the Wimax technology to connect large areas) in urban area) is used in the network.
WGAN: (Wireless Global Area Networks)
This network, which is a wireless network can connect all parts of the world together network such as cable modem service, with sufficient bandwidth to access the Internet.

Components and parts and peripherals in wireless networks

The wireless network of special tools that are used to transfer information include:
1-: Repeater or repeater that a signal amplifier is weak. To strengthen the signal sent from the device to transmit over long distances is used. OSI physical layer repeater usually are the weak signal from one part

of the network and then relay it to another part of it.
2-: Hub responsible for sending signals to other parts of the network is responsible in both active and passive .hab used passive .hab only be used as fasteners and no action not the reproduction signal. In this case, when the signal is sent, all other computers will receive it. Kind of active, passive acts like a hub, with the difference that the active hub, and then sends the signal to be amplified now be. But there is a bug in the hub of the single signal amplification, noise signals are amplified and transmitted to the network.
3- Switch: The task of connecting the various parts of the network are responsible to each other.
4. Bridges: that all its properties and can be a repeater in certain parts of the network that use different access methods to connect.
5. routers: the task of selecting the best route for data packets in the network is responsible.
6. Gateway: in charge of connecting networks that are quite different in terms of architecture. Usually gates to be installed on a dedicated server computers.
Security in wireless networks
To provide adequate safety and security of wireless networks there are certain techniques and methods that briefly describes them.
(Wired Equivalent Privacy): WEP
In this method of surveillance is to prevent users who are not permitted on the network that is suitable for small networks because they require manual settings (KEY) is provided on each Client. WEP encryption based on the RC4 algorithm by RSA.
(Service Set Identifier): SSID
WLAN networks with several local networks, each of which has an ID (Identifier) is the unique and exclusive. These identifiers are placed in several Access Point. Each user accessing a desired network SSID, the setting should do.
(Media Access Control): MAC
A list of MAC addresses used in a network (Access Point) AP enter, so only computers with MAC addresses that are allowed to access. In other words, when a computer sends a request, MAC address with the MAC address list is compared in AP and access or lack of access it is evaluated. This security method is suitable for small networks because in large networks is very difficult to enter these addresses to the AP.

Wireless communication method for communicating between Isp and User

To do this you need to install the equipment on the Isp and User. This equipment is usually as follows:
Wireless radio - television - media
Wireless radio, raw data) and a zero (converted to radio signals and via cable, usually of the type Coaxial (coaxial cable). The data leads to the antenna.
The antenna should be on both sides, are completely up to each other and must not be an obstacle in front of the two. Radio has an antenna output port and a second port for connection to a computer or network equipment.
In wireless multi-factor in the quality and bandwidth status and influence as follows:
• interference from nearby wireless lines or stations will be created.
• saw two regions to one another and no barrier between the two antennas along the way.
• The ability of wireless radios and antennas send and receive signals and power.
Compare wireless and wired networks with each other
Now we are going to compare the two go together wireless and cable. To do this it is necessary to have good results in comparison to wired and wireless network parameters such as the following be considered:

•Installation
•reliability
•Efficiency
•Security
•Cost

Installation and commissioning

In cable networks, because each workstation must switch from the cable is pulled, with issues such as drilling, wiring duct, installation of sockets and face In addition, If the physical location of stations to be the cabling must be re-done but wireless networks use the waves and have high mobility, so changes in the physical workstations is easily possible.

Reliability

In terms of reliability, highly reliable cable equipment investment. The most important reason is also the makers of the past thirty years, it should be noted that at the time of installation or moving such connections are carefully controlled. Broadband Router's wireless devices such as problems such as disconnection decades-s, electromagnetic interference, interference with nearby wireless networks and have the trend of its development than in the past, improvements in reliability as well. Nowadays it is also fully network reliability is resolved.

Performance

In terms of technical efficiency, cable networks are the highest efficiency. The bandwidth Mbps10, then the width bands (Mbps100 and Mbps1000) increased and even now switches bandwidth Gbps1 also offering some wireless networks bandwidth Mbps 11 and some bandwidth Mbps54 support them. Even in the more advanced technology, this trend has been increasing slightly higher Mbps108 Moreover, WiFi performance is sensitive to distance, the maximum efficiency by increasing the distance to the Access Point will be low. The bandwidth was enough for sharing Internet or Files but for applications that require high data exchanged between servers and work stations are not enough.

Security

Because cable networks that are connected to the Internet, the firewall (Fire Wall) is required and equipment such as hubs or switches able to perform firewall will need to install a separate firewall in such networks be.

The wireless network equipment such as Broadband Router and firewall software on there and just have done the necessary settings. On the other hand Because wireless networks use the air as a transfer medium, without implementing specific techniques such as encryption, information security can not be fully funded. The use of encryption WEP (Wired Equivalent Privacy) increase Security has been in the equipment.

Costs

Equipment such as hubs, switches or network cable to the same wireless network is cheaper, but taking into account possible changes in environmental and installation costs are significant. It is noteworthy that the growth of wireless networks, its price is decreasing.

Wireless systems

Wireless systems can be divided into three main categories:

Fixed Wireless Systems: These systems use radio waves to communicate to their line of sight. Unlike cell phones or other devices, Wireless, these systems use fixed antenna and, in general, can be a good substitute for cable networks and can be used for communications, high-speed internet or TV. There are

radio waves that can transmit more information and therefore reduce costs.
Portable Wireless System: A device, usually outside the home, office or used vehicles. Examples of these systems include mobile phones, notebooks, answering devices and PDA's. These systems use the microwave and radio waves to transmit information.
Infrared Wireless System: This system uses infrared waves to transmit signals of limited benefit. The system usually sets the remote control, motion detectors and wireless devices, personal computers are used. With the progress achieved in recent years, these systems can be connected to a notebook computer and an ordinary computer, and you can easily also by the type of system, Wireless, local networks set up.

Defects using radio waves in the transferindustry
Noise (Noise) in the order of environmental noise, interference and unwanted that has us concerned with radio waves and makes it difficult to find the desired wave.
Radio Interference: Since some electronic devices use radio waves, interference of waves can disrupt the performance of this equipment. Unfortunately frequency cordless phones and microwave ovens with the same frequency used by some wireless network equipment and phones and ovens can cause interference with radio waves for the first time, thereby reducing the data transfer rate.
Weaken radio: other forms of radio waves, weakening them to the transfer occurs in space. Attenuation of radio waves by atmospheric conditions increases.
The reflection of radio waves: the other radio waves, the waves reflected by the objects. When a radio wave hits an object that, along with the main wave radio receiver receives the reflected wave together. If many of the things he has to deal, loses its energy and intensity is diminished.

conclusion
The data transfer cable and wireless networks used in industry. Each of the two networks run with advantages and disadvantages facing Hstnd.vabsth the distance and the environment and other technical parameters, enabling network users to choose their appropriate action. Wireless technology in the network into three major parts, including fixed, portable and infrared are divided. Wireless network in terms of the WLAN, WPAN, WGAN, WMAN divided. The required bandwidth, throughput, user location, network owners and service providers to assign service are factors that WiFi or Wimax technology leads. Wimax ability to provide long distance bandwidth, quality of service, flexibility and capabilities has made this technology is growing. This technology supports distances of about 50 km. Considering the growing need to use networks, making the right choice in the type of network, you can transfer the data safe as possible. If the case does not accept the network properly, safety may have been flawed data transfer speeds and enormous losses suffered its users Grdnd.bnabrayn three basic concepts in this area include the selection of appropriate network, how to install and set up properly, enabling rapid fault detection and easy fix, that any use should they be considered as well.

References:

H. Qi, P. T. Kuruganti , Y. Xu “The Development of Localized Algorithms in Wireless Sensor Networks,” Sensors 2002, vol 2, pp 245-267

J. Hill, R. Szewczyk, A. Woo, S. Hollar, D. Culler, and K. Pister. “System architecture directions for network sensors. ” Proceedings

M. Chen, T. Kwon, Y. Choi, “Energy-efficient differentiated directed diffusion (EDDD) for realtime traffic in wireless sensor networks,” Computer Communications, May. 2008

P. Levis, S. Madden, D. Gay, J. Polastre, R. Szewczyk, A. Woo, E. Brewer, and D. Culler, "The Emergence of Networking Abstractions and Techniques in TinyOS," Proceedings of the First USENIX/ACM Symposium on Networked Systems Designand Implementation, 2008.

V. Handziski, A. K¨opke, H. Karl, C. Frank, W. Drytkiewicz, "Improving the Energy Efficiency of Directed Diffusion Using Passive Clustering," European Workshop on Wireless Sensor Networks 2004 (EWSN 2004), pp. 162–175, 2004.

W. R. Heinzelman, A. Chandrakasan, and H. Balakrishnan, "Energy-efficient communication protocols for wireless microsensor networks." Proceedings of the Hawaii International Conference on Systems Sciences, Jan. 2011.

W. R. Heinzelman, J. Kulik, H. Balakrishnan "Adaptive protocols for information dissemination in wireless sensor networks," Proc. of the ACM MobiCom99, p 174-185, Seattle ACM Press, 2010.

Yan Yu, Ramesh Govindan, and Deborah Estrin. "Geographical and energy aware routing: A recursive data dissemination rotocol for wireless sensor networks." Technical Report TR-01-0023, University of California, Los Angeles, Computer Science Department, 2009.