

1: Wi-Fi IEEE Standards

Each computer, mobile, portable or fixed, is referred to as a station in [Wireless Local Area Networks]. The difference between a portable and mobile station is that a portable station moves from point to point but is only used at a fixed point.

These services, which the MAC layer implements, fall into two categories: The following sections define the station and distribution system services.

Station Services The A station may be within any wireless element on the network, such as a handheld PC or handheld scanner. In addition, all access points implement station services. To provide necessary functionality, these stations need to send and receive MSDUs and implement adequate levels of security.

Authentication Because wireless LANs have limited physical security to prevent unauthorized access, Stations performing authentication send a unicast management authentication frame to the corresponding station.

Open system authentication This is the It is a very simple two-step process. The receiving station then sends back a frame indicating whether it recognizes the identity of the authenticating station.

Shared key authentication This type of authentication assumes that each station has received a secret shared key through a secure channel independent from the Stations authenticate through shared knowledge of the secret key.

Deauthentication When a station wants to disassociate from another station, it invokes the deauthentication service. Deauthentication is a notification and cannot be refused. A station performs deauthentication by sending an authentication management frame or group of frames to multiple stations to advise of the termination of authentication.

Privacy With a wireless network, all stations and other devices can hear data traffic taking place within range on the network, seriously affecting the security level of a wireless link. The privacy service, applying to all data frames and some authentication management frames, is based on the This algorithm performs encryption of messages, as shown in Figure 3. With WEP, all stations initially start unencrypted. When enabled, WEC protects only the data packet information. Physical layer headers are left unencrypted so that all stations can properly receive control information for managing the network. Some companies today are offering bit encryption.

Distribution System Services Distribution system services, as defined by Access points provide distribution system services. The following sections provide an overview of the services that distribution systems need to provide proper transfer of MSDUs.

Association Each station must initially invoke the association service with an access point before it can send information through a distribution system. The association maps a station to the distribution system via an access point. Each station can associate with only a single access point, but each access point can associate with multiple stations. Association is also a first step to providing the capability for a station to be mobile between BSSs.

Disassociation A station or access point may invoke the disassociation service to terminate an existing association. This service is a notification; therefore, neither party may refuse termination. Stations should disassociate when leaving the network. An access point, for example, may disassociate all its stations if being removed for maintenance.

Distribution A station uses the distribution service every time it sends MAC frames across a distribution system. The distribution service provides the distribution system with only enough information to determine the proper destination BSS.

Integration The integration service enables the delivery of MAC frames through a portal between a distribution system and a non The integration function performs all required media or address space translations. The details of an integration function depend on the distribution system implementation and are beyond the scope of the

Reassociation The reassociation service enables a station to change its current state of association. Reassociation provides additional functionality to support BSS-transition mobility for associated stations. The reassociation service enables a station to change its association from one access point to another. This keeps the distribution system informed of the current mapping between access point and station as the station moves from one BSS to another within an ESS. Reassociation also enables changing association attributes of an established association while the station remains associated with the same access point. The mobile station always initiates the reassociation service. To support the roaming function, each access point typically transmits a beacon signal every ms. Roaming stations use the beacon to gauge the strength of their existing access point connection. If the station senses a

weak signal, the roaming station can implement the reassociation service to connect to an access point emitting a stronger signal. The store has a multiple-cell In the frozen meat section at one end of the store, a clerk using a handheld device may associate with access point A. As he walks with the device to the beer and wine section on the other end of the store, the mobile scanner that is, the As the signal from B becomes stronger, the station will then reassociate with access point B, offering a much better signal for transmitting MSDUs. Point Coordination Function PCF Implemented in the access point and in addition to the mandatory DCF provides delivery of time-bounded data via synchronous communications using station-polling mechanisms. Contention-Free Pollable Implemented in an independent station to enable time-bounded data transfers defined in the PCF. Wired Equivalent Privacy WEP Provides frame transmission privacy similar to a wired network by generating secret shared encryption keys for source and destination stations. This problem becomes more significant as propagation delay or data rate increases because of the capability to have a greater number of outstanding MSDUs. Because of the higher potential data rates of NOTE Most end users of However, the transmission of unprotected data outdoors offers a greater risk than within a closed facility such as an office building. It is very likely that the high demand today for implementing wireless metropolitan networks will drive a significant need for information security mechanisms. Station States and Corresponding Frame Types The state existing between a source and destination station see Figure 3. The following types of functions can occur within each class of frame:

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IEEE Architecture The components of an IEEE architecture are as follows 1) Stations (STA): Stations comprise all devices and equipments that are connected to the wireless LAN.

In the previous section we examined how LAN segments can be connected together via hubs, bridges and routers to form larger LANs. The standard defines three different physical layers for the In this section we focus on the architecture of The fundamental building block of the A BSS typically contains one or more wireless stations and a central base station, known as an access point AP in The stations, which may be either fixed or mobile, and the central base station communicate amongst themselves using the IEEE Multiple APs may be connected together e. The DS appears to upper level protocols e. An ad hoc network might be formed, for example, when people with laptops meet together e. There has been a tremendous recent increase in interest in ad hoc networking, as communicating portable devices continue to proliferate. Within the IETF, activity in ad hoc networking is centered around the mobile ad hoc networks manet working group. Once again, this is the job of the media access control MAC protocol. Recall from our study of Ethernet in section 5. If the channel is sensed idle for an amount of time equal to or greater than the Distributed Inter Frame Space DIFS , a station is then allowed to transmit. As with any random access protocol. When a receiving station has correctly and completely received a frame for which it was the addressed recipient, it waits a short period of time known as the Short Inter Frame Spacing - SIFS and then sends an explicit acknowledgment frame back to the sender. We will see shortly that this explicit acknowledgment is needed because, unlike the case of wired Ethernet, a wireless sender can not itself determine whether or not its frame transmission was successfully received at the destination. The transmission of a frame by a sending station and its subsequent acknowledgment by the destination station is shown in Figure 5. What happens if the sender senses the channel busy? In this case, the station performs a backoff procedure that is similar to that of Ethernet. More specifically, a station that senses the channel busy will defer its access until the channel is later sensed idle. Once the channel is sensed idle for an amount of time equal to DIFS, the station then computes an additional random backoff time and counts down this time as the channel is sensed idle. When the random backoff timer reaches zero, the station transmits its frame. As in the case of Ethernet, the random backoff timer serves to avoid having multiple stations immediately begin transmission and thus collide after a DIFS idle period. As in the case of Ethernet, the interval over which the backoff timer is randomizes is doubled each time a transmitted frame experiences a collision. We noted above that unlike the There are a couple of reasons for this: This can be costly. More importantly, even if one had collision detection and sensed no collision when sending, a collision could still occur at the receiver. This situation results from the particular characteristics of the wireless channel. Suppose that station A is transmitting to station B. Suppose also that station C is transmitting to station B. With the so-called hidden terminal problem, physical obstructions in the environment e. This is shown in Figure 5. First, the IEEE This value allows other stations to determine the minimum amount of time the so-called network allocation vector, NAV for which they should defer their access, as shown in Figure 5. When a sender wants to send a frame, it can first send a RTS frame to the receiver, indicating the duration of the data packet and the ACK packet. All other stations hearing the RTS or CTS then know about the pending data transmission and can avoid interfering with those transmissions. In our discussion above, we have only highlighted some of the key aspects of the Additional protocol capabilities such as time synchronization, power management, joining and leaving a network i.

802.11n The high rate WiFi is an extension to that pertains to wireless LANs and yields a connection as fast as 11 Mbps transmission (with a fallback to 5.5, 2, and 1 Mbps depending on strength of signal) in the 2.4 GHz band. The 802.11n specification uses only DSSS.

Users connected by WLANs can move around within the area of network coverage. Stations comprise all devices and equipments that are connected to the wireless LAN. A station can be of two types: WAPs or simply access points AP are generally wireless routers that form the base stations or access. Clients are workstations, computers, laptops, printers, smartphones, etc. Each station has a wireless network interface controller. A basic service set is a group of stations communicating at physical layer level. BSS can be of two categories depending upon mode of operation: Here, the devices communicate with other devices through access points. Here, the devices communicate in peer-to-peer basis in an ad hoc manner. It is a set of all connected BSS. It connects access points in ESS. The LANs are scalable in nature, i. The system is portable within the network coverage and access to the network is not bounded by the length of the cables. Installation and setup is much easier than wired counterparts. The equipment and setup costs are reduced. Disadvantages of WLANs Since radio waves are used for communications, the signals are noisier with more interference from nearby systems. Greater care is needed for encrypting information. Also, they are more prone to errors. So, they require greater bandwidth than the wired LANs.

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An LAN is based on a cellular architecture where the system is subdivided into cells. Each cell (called Basic Service Set, or BSS, in the nomenclature) is controlled by a Base Station (called Access.

With operating speeds of systems using the IEEE As a result of the flexibility and performance of the system, Wi-Fi "hotpots" are widespread and in common use. These enable people to use their laptop computers as they wait in hotels, airport lounges, cafes, and many other places using a wire-less link rather than needing to use a cable. In addition to the Here the use of WLAN equipment enables offices to be set up without the need for permanent wiring, and this can provide a considerable cost saving. The use of WLAN equipment allows changes to be made around the office without the need to re-wiring. Of these even These cover everything from the wireless standards themselves, to standards for security aspects, quality of service and the like: Read more about These are shared by a variety of other users, but no license is required for operation within these frequencies. This makes them ideal for a general system for widespread use. There are a number of bearer standards that are in common use. These are the Each of the different standards has different features and they were launched at different times. The first accepted This used frequencies in the 2. Almost in parallel with this a second standard was defined. Of the two standards it was the This was primarily because the chips for the lower 2. Looking to increase the speeds, another standard, Using the more popular 2. In addition to this, it offered backward compatibility to Even before the standard was ratified, many vendors were offering chipsets for the new standard, and today the vast majority of computer networking that is shipped uses Then in January , the IEEE announced it had formed a new committee to develop an even higher speed standard. With much of the work now complete, The industry came to a substantive agreement about the features for This gave many chip manufacturers sufficient information to get their developments under way. As a result it is anticipated that before long, with ratification of

5: What is Wireless LAN Standards? Webopedia Definition

IEEE Architecture and Services In , IEEE Committee formed a new working group, IEEE , specifically devoted to wireless LANs, with a charter to develop a MAC protocol and physical medium specification.

Bluetooth is a wireless LAN technology used to connect devices of different functions such as telephones, computers laptop or desktop , notebooks, cameras, printer s and so on. Bluetooth is an example of personal area network. It is used for providing communication between peripheral devices like wireless mouse or keyboard with the computer. It is used by modern healthcare devices to send signals to monitors. It is used by modern communicating devices like mobile phone, PDAs, palmtops etc to transfer data rapidly. It is used for dial up networking. Thus allowing a notebook computer to call via a mobile phone. It is used for cordless telephoning to connect a handset and its local base station. It also allows hands-free voice communication with headset. It also enables a mobile computer to connect to a fixed LAN. It can also be used for file transfer operations from one mobile phone to another. Bluetooth uses omnidirectional radio waves that can through walls or other non-metal barriers. Bluetooth devices have a built-in short range radio transmitter. The rate provided is 1Mbps and uses 2. Bluetooth Architecture Bluetooth architecture defines two types of networks: Salve-slave communication is not possible. These parked nodes are secondary or slave stations and cannot take part in communication until it is moved from parked state to active state. This node is also called bridge slave. FSK with Gaussian bandwidth filtering. Both master and slave communicate in half duplex mode. The slave sends in the next odd-numbered slot if the packet in the previous slot was addressed to it. It is used where fast delivery is preferred over accurate delivery. Bluetooth Frame Format The various fields of blue tooth frame format are: It is 72 bit field that contains synchronization bits. It identifies the master. This is bit field. It contain 18 bit pattern that is repeated for 3 time. The header field contains following subfields: This 3 bit field can define upto seven slaves 1 to 7. If the address is zero, it is used for broadcast communication from primary to all secondaries. This 4 bit field identifies the type of data coming from upper layers. This flow bit is used for flow control. When set to 1, it means the device is unable to receive more frames. This bit is used for acknowledgement. This bit contains a sequence number of the frame to detect retransmission. As stop and wait protocol is used, one bit is sufficient. This 8 bit field contains checksum to detect errors in header. This field can be 0 to bits long. Dinesh authors the hugely popular Computer Notes blog. Where he writes how-to guides around Computer fundamental , computer software, Computer programming, and web apps. For any type of query or something that you think is missing, please feel free to Contact us.

6: IEEE Wireless LANs

The specification [IEEE Std (ISO/IEC)] as a standard for wireless LANS was ratified by the Institute of Electrical and Electronics Engineers (IEEE) in the year This version of provides for 1 Mbps and 2 Mbps data rates and a set of fundamental signaling methods and other services.

7: IEEE Services | Overview of the IEEE Standard | InformIT

IEEE Architecture A Technical Tutorial on the IEEE Standard 18 July, â€¢ PIFS - Point Coordination IFS, is used by the Access Point (or.

8: IEEE WIRELESS LAN

The fundamental building block of the architecture is the cell, known as the basic service set (BSS) in parlance. A BSS typically contains one or more wireless stations and a central base station, known as an access point (AP) in terminology.

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11 Architect. 2 IEEE Terminology Station (STA) Architecture: Device that contains IEEE conformant MAC and PHY interface to the wireless.

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