NA

1. Internet Protocol Stack: 5-layer Model

(a).

<https://en.wikipedia.org/wiki/Internet_protocol_suite>

In Transport layer, it uses UDP header to identify the packet source and destination. In Network layer, it uses IP header to identify the packet source and destination. In Link layer, it uses Frame header to identify the packet source and destination.

(b).

<https://en.wikipedia.org/wiki/Internet_protocol_suite>

<https://en.wikipedia.org/wiki/Transmission_Control_Protocol>

<https://en.wikipedia.org/wiki/Medium_access_control>

<https://www.techopedia.com/definition/8866/physical-layer>

Application layer: HTTP

HTTP is the foundation of data communication for the [World Wide Web](https://en.wikipedia.org/wiki/World_Wide_Web) by exchanging and transferring hypertext which is structured text that uses logical links between [nodes](https://en.wikipedia.org/wiki/Node_(networking)) containing text.

Transport layer: TCP

TCP provides [reliable](https://en.wikipedia.org/wiki/Reliability_(computer_networking)), ordered, and [error-checked](https://en.wikipedia.org/wiki/Error_detection_and_correction) delivery between applications running on hosts communicating by an IP network.  It provides host-to-host connectivity at the [Transport Layer](https://en.wikipedia.org/wiki/Transport_Layer) of the Internet model.

Network layer: IP

IP has the task of delivering packets from the source [host](https://en.wikipedia.org/wiki/Host_(network)) to the destination host based on the [IP addresses](https://en.wikipedia.org/wiki/IP_address)in the [packet headers](https://en.wikipedia.org/wiki/Packet_header). IP defines packet structures that [encapsulate](https://en.wikipedia.org/wiki/Encapsulation_(networking)) the data to be delivered. It also defines addressing methods that are used to label the datagram with source and destination information.

Link layer: MAC

MAC adds a [frame check sequence](https://en.wikipedia.org/wiki/Frame_check_sequence) to identify transmission errors, and forwards the data to the physical layer. Control when data is sent and when to wait to [avoid congestion and collisions](https://en.wikipedia.org/wiki/Network_congestion). When receiving data from the physical layer, MAC ensures data integrity before passing the data up to the higher layers.

Physical layer: Bluetooth

Bluetooth is a [wireless](https://en.wikipedia.org/wiki/Wireless) technology standard for exchanging data over short distances and building [personal area networks](https://en.wikipedia.org/wiki/Personal_area_network) and is classified into Physical layer.

1. IP

(a).

<https://www.ithome.com.tw/tech/92046>

Theoretically, IPv4 provides 2^32 addresses and IPv6 provides 2^128 addresses.

(b).

<http://dns-learning.twnic.net.tw/bind/intro6.html>

AAAA should be added.

(c).

<https://www.networkworld.com/article/2208835/lan-wan/ipv6-tunnel-basics.html>

Tunneling uses relay routers to forward encapsulated IPv6 packets over IPv4 links. It uses unicast to create point-to-point links over the IPv4 backbone for transmission.

1. Wireshark
2. dns 192.168.0.1
3. dns.qry.name == "headhunt.com.tw". 202.153.190.77
4. ip.dst==202.153.190.77. TCP, HTTP
5. ip.dst==202.153.190.77 && frame contains "wireshark"

Yes, I can. The protocol is HTTP

1. TLSv1.2 should be used to protect sensitive data.