Canterbury Institute of Management (CIM)

ASSESSMENT COVER SHEET

1. Personal Details			
Student ID	**Given Name(s)**	**Surname**	**Email Address**
1. CIM12137	Ayesh Chathuranga	Jayasekara	cim12137@ciom.edu.au
Campus	Darwin Campus		
Course Title and Code	MBIS404 Networks and Communications		
Assessment Title	Assesment Task - *Week 6*		
Due Date & Time	10/11/2024		
Course Lecturer/Tutor Name: Sharad Neupane		Assessment Word Count (if applicable): 419	

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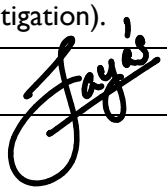
Signature:		Date:	07/11/24

Canterbury Institute of Management
63 Oxford Street, DARLINGHURST NSW 2010 | 21 Regent Street, REDFERN NSW 2016 | 2 Printers Place, DARWIN CITY NT 0800 | 399 Lonsdale Street, MELBOURNE VIC 3000
Phone: +61 2 8007 5846 | Website: https://ciom.edu.au/
TEQSA Provider ID: PRV14258 | CRICOS Provider Code: 03809A

MBIS404 Networks and Communications

Assesment Task - *Week 6*

Ayesh Jayasekara - CIM12137

Domain Name Server

Domain Name Server (DNS) is the translator between machine understood IP address to human readable domain name of a web resource. **The phone-book of the internet** is used to explain what a DNS would do in short.

According to (Dooley & Rooney, 2017) in real world application, there are four types of DNS involved in fulfilling a search query request as listed below.

- DNS Resolver
- Root Name Server
- Top Level Domain Server (TLD)
- Authoritative Name Server

Below is an illustration of the steps involved in looking up **example.com**.

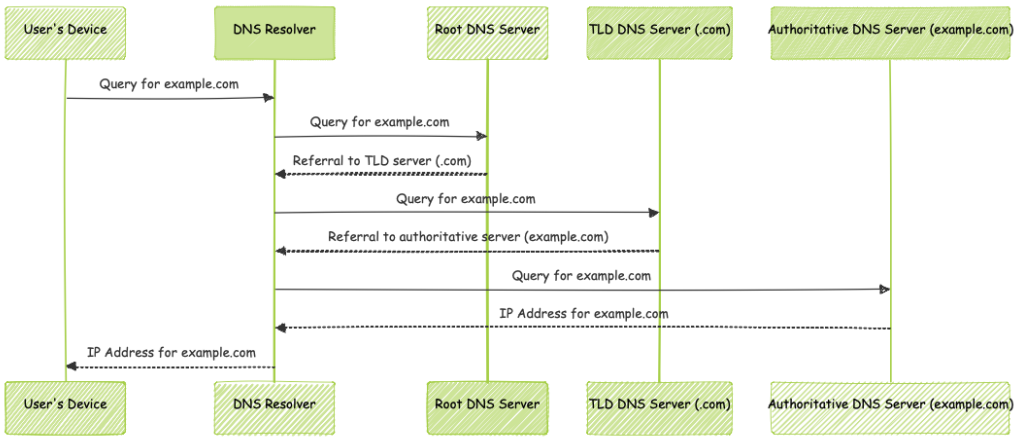


Figure 1: DNS Lookup Process

It must be noted that DNS Resolver or often referred as Recursive DNS Server do cache the requests and responses such that any subsequent requests are responded instantaniously instead of contacting TLD or Root Name Severs etc.

Address Resolution Protocol

The primary protocol that defines procedure to map a MAC (Media Access Control) address to IP (Internet Protocol) address.

According to (Trabelsi et al., 2012), ARP resolution procedure can be illustrated as below.

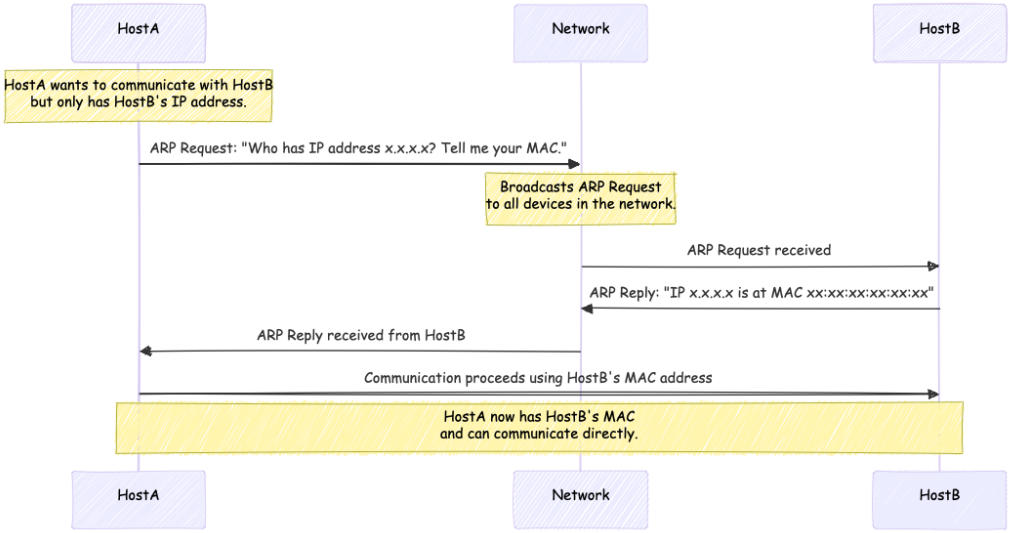


Figure 2: ARP Lookup Process

Host A is establishing one to one connection with Host B using ARP by resolving physical address enables Host A to communicate directly with Host B over the network. However, further reading suggest this protocol is prone to man-in-middle attacks as ARP protocol does not enforce validation of correlation between IP and MAC addresses.

Three-way Handshake - TCP

TCP (Transport Control Layer) is a part of Transport Layer (Layer 4) of OSI (Open System Interconnection) Model. This protocol is primarly used for,

- Establishing point-to-point connections
- Slice and deliver data in smaller packets with ability to track and trace erroneous transmissions and request retransmission

The 3 phase handshake can be illustrated as below.

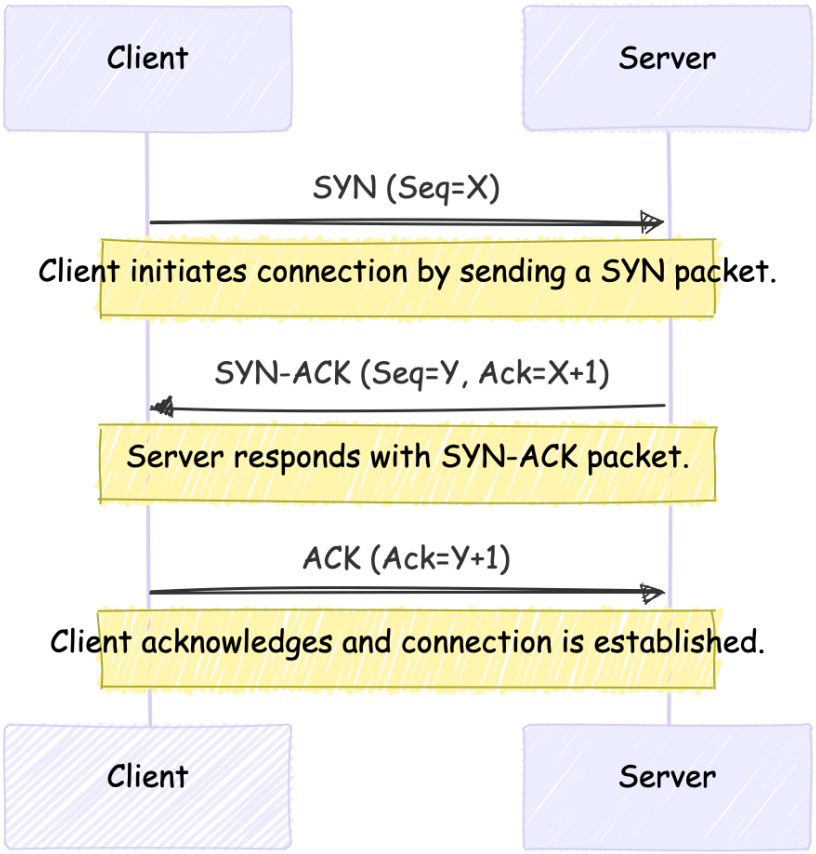


Figure 3: TCP - 3 way handshake

Dynamic Host Configuration Protocol (DHCP)

This protocol defines algorithms to assign IP addresses to the hosts connected to a network automatically and avoid IP address collisions where applicable. Without DHCP server in place within a network, all joining hosts should have an IP address manually assigned which is prone to collision and inefficient in case if the network is substantially larger with hosts joining and disconnecting at all times (for example public networks in cafes, schools etc.)

DHCP servers can also be configured to track hosts with their MAC addresses and assign same IP address as if the host is configured with a static IP address instead of dynamic one. This means DHCP is flexible enough to extend its usecase to beyond just assign IP addresses to hosts.

Bibliography

Dooley, M., & Rooney, T. (2017). *Dns security management [first edition]* [https://www.perlego.com/book/991215(visited 2024-11-07)]. Wiley-IEEE Press.

Trabelsi, Z., Braiki, K. H. A., & Mathew, S. S. (2012). *Network attacks and defenses [first edition]* [https://www.perlego.com/book/1506260(visited 2024-11-07)]. Auerbach Publications.

Evaluation Comments