3.   The application layer

3.1   Introduction

The application layer is the layer that is enabling the human user to interact with the network. Classically this interaction is realised by software also called applications. Every type of software accessing the network uses its own protocols.

Examples:

Application	Protocol
Web browser	HTTP or HTTPS
Web server	HTTP or HTTPS
Email client	IMAP or POP3 to receive messages SMTP to send messages
File transfer client	FTP or SFTP
ping	ICMP

It's the applications that create the data that is segmented and encapsulated afterwards. When entering for example the URL "www.lte.lu" in a web browser, this application will generate a message starting with the following text that will be transmitted over the network to the web server.

Example of the first two lines of an HTTP-request:

```
GET / HTTP/1.1

Host: www.lte.lu
```

Some applications are less visible than those mentioned above as they run in the background.

Examples:

Application	Protocol
DNS resolver	DNS
DHCP client or server	DHCP

3.2   DNS

DNS = Domain Name System or Domain Name Service

The aim of the domain name system is to replace the IP-addresses by a textual replacement called *domain name*. Human brains can remember names more easily than numbers.

Example:

www.lte.lu replaces 158.64.42.135

A domain name is structured in different parts:

www.lte.lu

3rd-level-label   2nd-level-label   Top-Level-Domain

In the header of a packet must figure an IP-address and not a domain name. Thus we need an application that delivers the IP that matches a certain domain name. This application is called DNS resolver. The DNS resolver is a client software that questions a DNS server for the IP address of a certain domain name using the DNS-protocol.

The simplest way of launching the DNS resolver is to use the CLI command *nslookup*.

Example:

C:\> nslookup www.lte.lu

C:\> nslookup 158.64.42.135

3.3   FTP (File Transfer Protocol)

FTP protocol was developed to allow file transfers between a client and a server.

3.4   DHCP (Dynamic Host Configuration Protocol)

source: Network Fundamentals; CCNA Exploration Companion Guide

DHCP allows a host to obtain an IP address dynamically when it connects to the network. The DHCP server is contacted by sending a request, and an IP address is requested. The DHCP server chooses an address from a configured range of addresses called a pool and assigns it to the host client for a set period.