

## 14 Communication and internet technologies 通讯与互联网技术

### 14.1 Protocol 协议

a set of rules governing data transmission across a network, which are agreed by sender and receiver.

**protocol suite** 协议群

The protocols in a **stack** determine the interconnectivity rules for a **layered** network model such as the TCP/IP model.

**the four layers of TCP/IP protocol suite** TCP/IP 协议群的四个层次

the protocol suite underpinning Internet usage. It consists of four layers, from lowest to highest: Link, Internet, Transport and Application.

**Link Layer** 链路层

responsible for handling how data is physically transported within the network. It enables the upper layers to access the **physical medium** and ensure the correct network protocols are followed.

**Internet Layer** 网络层

also known as *Network Layer*. It identifies the intended network and host, addresses packets with their source and destination addresses by adding a further header, and transmit the packet to the Link Layer. It is also responsible for routing the packets independently through the optimum route.

## **Transport Layer 传输层**

responsible for delivery of data from the source host to the destination host. It receives data from the application layer, breaks it into packets, add a header to each packet, and send to the Internet layer, and establish end to end contact. It also automatically retransmit lost packets. Protocols in this layer include: TCP, UDP.

## **Transmission Control Protocol (TCP) 传输控制协议**

a transport layer protocol that is host-to-host (establish end-to-end connections between the two devices before transmitting).

## **Application Layer 应用层**

responsible for allowing applications to access the services used in other layers, and also defines the protocols that any app uses to allow the exchange of data. Examples include: HTTP/HTTPS, FTP, POP3, SMTP, IMAP, BitTorrent, etc.

## **HyperText Transfer Protocol (HTTP) 超文本传输协议**

the most important application layer protocol used to transmit HTML documents (web pages). It underpins the WWW.

## **HTTP Secure (HTTPS) 安全超文本传输协议**

the encrypted version of HTTP.

## **File Transport Protocol (FTP) 文件传输协议**

an application layer protocol for sending and receiving files over a network.

### **Simple Mail Transfer Protocol (SMTP) 简单邮件传输协议**

an application layer protocol used to send (push) email messages toward the intended destination, usually a mail server.

### **Post Office Protocol 3 (POP3) 邮局协议 3**

an application layer protocol used to retrieve (pull) email messages by downloading and then deleting messages from the mail server.

### **Internet Message Access Protocol (IMAP) 互联网消息访问协议**

an application layer protocol used by email clients that keeps it in sync with a mail server via retrieving a copy of email messages from the server over a TCP/IP connection.

### **BitTorrent**

an application layer protocol that provides peer-to-peer file sharing.

## **14.2 Circuit switching, packet switching 线路交换, 分组交换**

### **circuit switching 线路交换**

method of transmission in which a dedicated circuit/channel lasts throughout the duration of the communication.

### **Packet switching 分组交换**

method of transmission where a message is broken into packets which can be sent along paths independently from each other.

**routing table** 路由表

a data table that contains the information necessary to forward a package along the shortest or best route to allow it to reach its destination.