

CNDS Project

▶ Module details

Module number	CO32006
Module name:	Computer Networks and Distributed Systems
Session:	Semester 1, 2001/2002
Version:	Generic

▶ Student workload

Lectures/Tutorials	24 hours
Practicals/Project Work	12 hours
Examination	2 hours

▶ Assessment

Examination	40%
Project	60%

▶ Module aims

The main learning outcomes are:

- ⊕ To provide an understanding of importance of the OSI model, and how standard protocols and networking types fit into this model.
- ⊕ To describe the advantages and disadvantages of differing network topology types, and how topology affects the performance of a network.
- ⊕ To outline the operation of typical networking technologies, especially Ethernet and ATM.
- ⊕ To describe methods of routing used on the Internet and with ATM networks.
- ⊕ To understand the architecture of the Internet, and how data is routed from one node to another, over interconnected networks.
- ⊕ To understand how data travels from one application to another, over a network

▶ Module content

The areas covered are:

- ⊕ **Network fundamentals.** OSI model. Data encapsulation. Network Topologies. Network elements: hubs, bridges, routers and switches. Peer-to-peer and client/server networks. Ethernet and ATM.
- ⊕ **LAN/WAN network types.** Practical network types, especially Ethernet and ATM.

- ⊕ **Network protocols.** TCP/IP. IP: Functions, IP addressing, IP routing, IP header, IP addressing, subnetting. TCP: Functions, TCP header, UDP header, three-way handshake. Network programming.
- ⊕ **Network security.** Security: IP spoofing, session hi-jacking, and so on. Firewalls/Proxy servers.
- ⊕ **High-level protocols.** WWW page delivery (HTML, VBScript, JavaScript, ASP/PHP, CGI).
- ⊕ **Mobile computing.** WAP.

▶ ASSIGNMENT/COURSEWORK AIMS

The aims of the assignment are:

- ⊕ To investigate the connection of institution to the Internet.
- ⊕ To investigate the connection of your institution onto the Internet.
- ⊕ To investigate how IP data packets are routed from your institution onto the Internet.
- ⊕ To investigate the main routes that data packets take around the global Internet.

▶ ASSIGNMENT/COURSEWORK BRIEF

Select a **single** organisation which has at least **three** WWW servers which are based in three different continents. For example Intel could have a site in Australia (www.intel.com.au), in Brazil (www.intel.com.br) and in the USA (www.intel.com). Care must be taken not to assume that the given server is actually in the country which is specified in the domain name (as servers for different countries can often lead to back to the same place).

Trace the route that data packets take to reach these three servers. If possible, identify:

- ⊕ The common route that all the data packets take after they leave a PC in your institution and go to their external destination.
- ⊕ How the data is routed out of the UK, and onto a destination.
- ⊕ The differences in the routes to the destination WWW servers.
- ⊕ The main routes the data packets take when they traverse across a country/continent (This may involve tracing the route to other servers, and/or WWW-based research).

▶ Background

The infrastructure of the global Internet is made up of a number of large communications companies, such as:

- ⊕ **Teleglobe network.**
[http://www.teleglobe.net/en/our_network/default.asp]
- ⊕ **C&W backbone.**
[<http://infopage.cary.cw.net/apachePerl/dcontrol.pl>]
- ⊕ **UUNET backbone.**
<http://www1.worldcom.com/global/about/network/>
- ⊕ **BBNPlanet backbone.**
[<http://www1.worldcom.com/global/about/network/>]

▶ RESOURCES

- ⊕ TCP/IP programs, such as ping, telnet, and so on.
- ⊕ Windows 95/NT network utilities (such as NetLab 1.4, Wsock, Ping Pro, and so on).
- ⊕ PC and a network connection.

▶ Marking Schedule

A report should be submitted which will normally have less than 20 pages of typed A4 (*quality is more important than quantity*), and additional material and appendices should be put on a WWW site, or submitted on disk (CD-ROM or floppy disk).

This report should investigate the connection of your institution's network to three remote WWW servers. The assignment will count for 60% of the final mark of the module. The marking schedule which will be used is:

Abstract	[10%]
Introduction	[10%]
Theory	[15%]
Research into network connections	[20%]
Test results	[20%]
Conclusions	[15%]
Report structure/ references/ research techniques	[10%]

Each of these sections will be given a grade:

Excellent.	A+ (100%),	A (92.5%),	A- (85%),
Good.	B+ (77.5%),	B (70%),	B- (62.5%),
Fair.	C+ (55%),	C (47.5%),	C- (40%),
Weak.	D+ (32.5%),	D (25%),	D- (17.5%),
Poor.	E (10%) or		
Extremely poor.	F (2.5%).		

The final mark will be generated using these grades and the weighting given above. For example:

<i>Abstract</i>	<i>Introduction</i>	<i>Theory</i>	<i>Research</i>	<i>Test results</i>	<i>Conclusions</i>	<i>Report structure</i>	<i>Final mark</i>
10%	10%	15%	20%	20%	15%	10%	100%
A+	B	B	A+	D	C-	B-	65%
C	C	C	C	C	C-	C	46%

▶ Report structure

A possible structure for the report could be:

- 1 Abstract [10%]**

A focus summary of the complete report.
- 2 Introduction [10%]**

Objectives, background, methods used.
- 3 Theory [15%]**

TCP/IP, TCP/IP commands (Ping, nslookup, tracer).
- 4 Network research [20%]**

Internet backbone (investigation of the large-scale connection of the Internet), Connections onto Internet. Outline of the routes taken to the remote WWW servers.
- 5 Test results [20%]**

Discussion of why you have chosen the destination WWW servers. Listing of your three traceroutes with an outline description of each of the routes.
- 6 Conclusions [15%]**

Strong conclusions which summarise your main findings.

