

CNDS Project 1

Details

Module number CO32006
Module name: Computer Networks and Distributed Systems
Version: **UK** (requires localisation)
WWW reference: <http://www.dcs.napier.ac.uk/~bill/cnds.html>

ASSIGNMENT/COURSEWORK AIMS

The aims of the assignment are:

- ⊕ To investigate the connection of Napier University to the Internet.
- ⊕ To investigate the connection from SuperJANET onto the Internet.
- ⊕ To investigate how IP data packets are routed from Napier University 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 distributed over a large area (possibly in three different continents). For example Intel has a site in Australia (www.intel.com.au), in Brazil (www.intel.com.br) and in the USA (www.intel.com). 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 Napier 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.

Background

The Universities around the UK attach onto a common network, which is known as SuperJANET (Joint Academic NETwork). SuperJANET is mainly constructed using MANs (Metropolitan Area Networks), which connect to one of four main hubs (see Figure 1). The hub points are in Leeds, Bristol, London and Manchester. The universities in Edinburgh connect onto the EaStMAN (Edinburgh and Stirling MAN), as shown in Figure 2, and Table 1 outlines some of the currently developed MANs around

the UK. Normally after data is routed out of the SuperJANET network it will be routed onto one of the main Internet backbones, such as:

- ⊕ Teleglobe network. [teleglobe.net]
- ⊕ C&W backbone. [cw.net]
- ⊕ UUNET backbone.
- ⊕ BBNPlanet backbone [USA]. [bbnplanet.net]

JANET and SuperJANET

JANET is the UK’s academic and research network, which is funded by the JISC (Joint Information Systems Committee) of the Higher Education Funding Councils of England (HEFCE), SHEFC (Scotland), Wales (HEFCW) and the Department of Education for Northern Ireland (DENI). JANET is managed and developed by UKERNA.

The JANET network connects to many higher education and research institutes. It also provides a connection onto the Internet, other National Research Networks (NRNs) in Europe, the US and the rest of the world. Gateways out of the network to the rest of the world are located within SuperJANET.

SuperJANET was initiated in 1989 and provided a broadband fibre optic based network. It was envisaged as a network of networks formed by a national network complemented by a number of regional networks (MANs) serving areas where several HE institutions are located closely together. The SuperJANET project has transformed the JANET network from one primarily handling data to a network capable of simultaneously transporting video and audio as well as data.

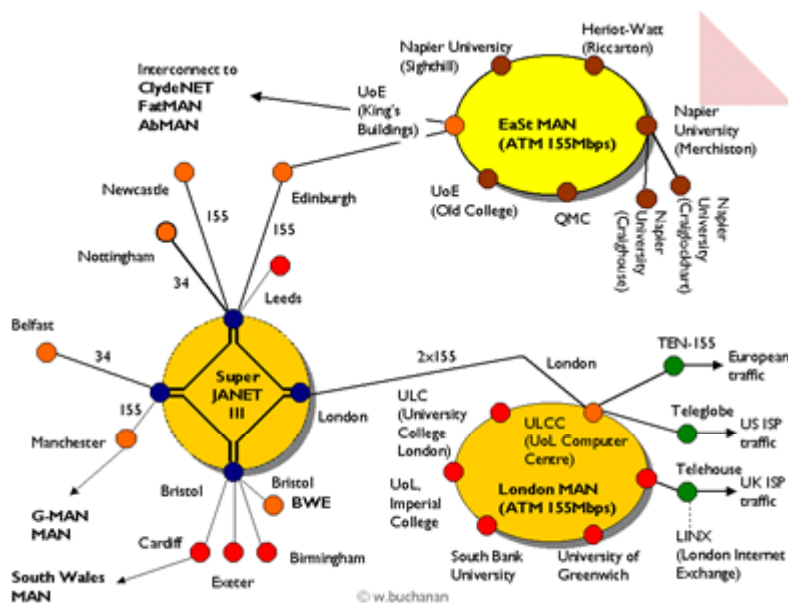


Figure 1: Connections onto SuperJANET

EaStMAN

The EaStMAN (Edinburgh and Stirling MAN) network connects all of the universities around Edinburgh (Figure 2). It consists of two rings on ATM and FDDI, which run around the Edinburgh sites. This also connects to the University of Stirling through a 155Mbps SDH connection. The main connection to the SuperJANET network is at the University of Edinburgh.

The 100Mbps FDDI dual rings link 10 Edinburgh city sites. This ring provides for IP traffic on SuperJANET and also for high-speed metropolitan connections. Initially a 155Mbps ATM network connected five Edinburgh sites and the University of Stirling. The main connected sites are:

- ⊕ University of Edinburgh (King’s Buildings/ Old College/ New College/ Pollock Halls).
- ⊕ Heriot Watt University (Riccarton Campus).
- ⊕ Napier University (Sighthill/Merchiston).
- ⊕ Edinburgh College of Art.
- ⊕ Moray House (Holyrood Campus).
- ⊕ Queen Margaret’s College (Corstorphine).

The network is now being expanded to connect the other Scottish MANs, such as FatMAN, AbMAN and ClydeNET. This will support a Virtual Campus around Scotland. With this, lectures can be transmitted from one of the sites, and viewed by students on other campuses and institutions.

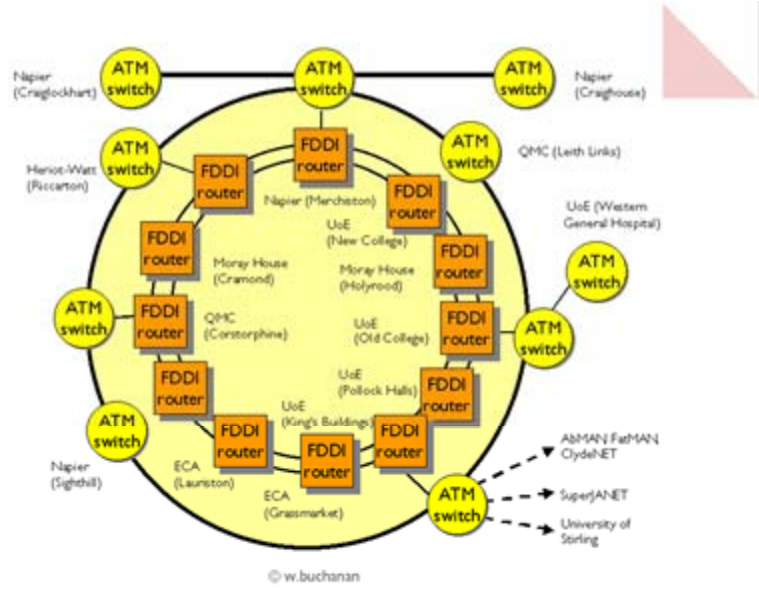


Figure 2: EaStMAN connections

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 your WWW site, or submitted on disk.

This report should investigate the connection of the Napier 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%]

SuperJANET backbone, Connections onto SuperJANET, External connections from SuperJANET. 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.