Networking
CM30078/CM50123

Russell Bradford

2019–2020

Introduction

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This Unit is about the technology that allow this to happen, in particular, the Internet

Unit Outline

Aims To understand the Internet, and associated background and theory, to a level sufficient for a competent domain manager.

Unit Outline

Learning Outcomes Students will be able to:

- Explain the acronyms and concepts of the Internet and how they relate;
- State and apply the steps required to connect a domain to the Internet and explain the issues involved to both technical and nontechnical audiences;
- Discuss the ethical issues involved with the internet, and have an "intelligent layman's" grasp of the legal issues and uncertainties.
- Be aware of the fundamental security issues;
- Be able to advise on the configuration issues surrounding a firewall.

Unit Outline

Syllabus:

- The ISO 7-layer model. The Internet: its history and evolution - Predictions for the future.
- The TCP/IP stack: IP, ICMP, TCP, UDP, DNS, XDR, NFS and SMTP. Berkeley. Introduction to packet layout: source routing etc.
- Various link levels: SLIP, 802.5 and Ethernet, satellites, the "fat pipe", ATM. versus carrying. Security and firewalls. Performance issues: bandwidth, MSS and RTT; caching at various layers.

Unit Outline

- Who 'owns' the Internet and who 'manages' it: RFCs, service Providers, domain managers, IANA, Jisc/UKERNA, MANs, commercial British activities. Routing protocols and default routers. HTML and Electronic publishing.
- Legal and ethical issues: slander/libel, copyright, pornography, Publishing

Unit Outline

We won't be covering the material in the above order, though,
but in a more coherent fashion instead!

Unit Outline

Structure of this unit: 3 hours lectures per week

- Thursday 14.15
- Thursday 15.15
- Friday 17.15

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The aim is to cover the necessary material early in the semester which will leave the last few weeks free for revision and problems classes

Unit Outline
Assessment

For the undergraduate CM30078:

- End of unit exam 100%

Unit Outline
Assessment

For postgraduate CM50123

- Coursework 25%
- End of unit exam 75%

Coursework timelines (subject to change):

1. set Thu 24 Oct
   due Wed 13 Nov
2. set Thu 14 Nov
   due Fri 6 Dec

Feedback on coursework will be provided via Moodle. There will be general feedback that applies to many people and some individual feedback

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No lectures, but only problems classes and labs as appropriate

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For the whole of Computer Science (CM Units)

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Presumably other Departments will carry on as usual

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Networking is now a mature subject (though still under development and change!) so there are many books available

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I recommend

- "TCP/IP Illustrated Volume 1" W R Stevens, Addison-Wesley
- "Computer Networks, 5th Ed" A Tanenbaum, Pearson (4th Ed OK)
- "The Art of Computer Networking" R Bradford, Pearson (Polish Edition: "Podstawy Sieci Komputerowych", WKŁ)

Stevens is available as an e-book in the library

You don't need me to tell you that there is a large amount of material out there on the Web?

Unit Outline
Resources

You don't need me to tell you that there is a large amount of material out there on the Web?

Wikipedia is fairly accurate in this area: but, as usual with Wikipedia, you should check with other sources

Unit Outline

There is a Unit Moodle page, but as Moodle is so horrible I tend to use my own Web pages:

```
https:
//people.bath.ac.uk/masrjb/CourseNotes/cm30078.html
```

Unit Outline
Content

We will revisit and expand on what you (may have) seen in CM10195 or other units

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But is much greater breadth and some detail

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It is very techy material: if you are not a techy person you should think very carefully about taking this Unit

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For example, there are many packet headers that contain lots of flags and fields

You should have a general idea of what the important fields are and what their purpose is, but precisely *where* they appear in the header is generally less important

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They are often abbreviated in style, and so are not the whole story and would not be suitable to be quoted verbatim in an exam

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Conversely, the slides may contain supplementary material that I shall not be using this year

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The exam will only be on material covered in lectures

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The exam will only be on material covered in lectures

Your lecture notes will tell you what was or was not covered in lectures

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Like every Unit, you are expected to read around the subject for yourself

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You need to take your own notes, read, and *participate*

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You don't expect to get fit simply by paying to joining a gym. . .

"If you have college courses in CS, buy the books and spend day and night the few days before class going through the books and taking notes and answering questions and programming examples before the first class even starts. If you really want to do this in your life, that's what you should do, not just wait for the education to be handed you. Those who finish at the top will always be in high demand. You can learn outside of school too but you have to put a lot of time into it. It doesn't come easily. Small steps, each improving on the other, is what to expect, not instant understanding and expertise."

Steve Wozniak, co-founder of Apple

Computer Science is not a spectator sport

Anon