



MONASH University

**FIT2019**  
**Network standards and specifications**

**Unit guide**

**Semester 2, 2008**

*Last updated : 17 Jul 2008*

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# **FIT2019 Network standards and specifications - Semester 2 , 2008**

## **Unit leader :**

Jefferson Tan

## **Lecturer(s) :**

### **Caulfield**

- Jefferson Tan

### **Malaysia**

- Tham Weng Kee

## **Tutors(s) :**

### **Caulfield**

- Osama Dandash

## Introduction

Welcome to FIT2019 Network Standards and Specifications. This unit examines the use of standards for data communication and networking protocols and the software environments that form the basis of modern computer networks. Methods by which these standards are developed and promulgated are studied as well. This unit will also enhance the choice of network specialisation study within the undergraduate degrees offered by the Faculty of Information Technology.

## Unit synopsis

This unit introduces standards and the standardisation process within the networking and data communications area. It follows on from the core unit FIT1005 Networks and Data Communications with a focus on:

- types of standards commonly found in information technology;
- the creation, application and maintenance of networking standards;
- network protocol families, their interdependencies and sequence of development methods used to define and maintain standards;
- composition and operation of the various national and international standards organisations;
- some key networking protocol standards and implementation issues.

ASCED Discipline Group Classification: 020113 Networks and communications.

## Learning outcomes

Upon completion of this unit, students will:

- have detailed understanding of families of network protocols and their interdependencies, and developed skills in their application
- understand the historical development of key internet protocols
- be familiar with the source documents and specifications used to define key internet protocols, and developed skills in their usage
- be familiar with the common methods used to define and promulgate network protocols
- be able to identify the national and international organisations whose roles involve the formation of standards in this area
- be able to comprehend the notation used in network standard definitions including formal data and structure definition languages such as EBNF, ASN.1, SGML or XML, and developed skills in using this notation
- have practical experience of methods used to capture and analyse network protocol packets

## Workload

For on campus students, workload commitments are:

- two-hour lecture and
- two-hour tutorial (or laboratory) requiring advance preparation
- a minimum of 2-3 hours of personal study per one hour of contact time in order to satisfy the reading and assignment expectations.
- You may need to allocate up to 5 hours per week in some weeks for use of a computer, including time for newsgroups/discussion groups.

Off-campus students generally do not attend lecture and tutorial sessions, however, you should plan to spend equivalent time working through the relevant resources and participating in discussion groups each week.

## **Unit relationships**

### **Prerequisites**

Before attempting this unit you must have satisfactorily completed FIT1005 Networks and Data Communications or equivalent.

### **Relationships**

FIT2019 is a core unit in the net-centric major of the Bachelor of Information Technology and Systems.

## Continuous improvement

Monash is committed to 'Excellence in education' and strives for the highest possible quality in teaching and learning. To monitor how successful we are in providing quality teaching and learning Monash regularly seeks feedback from students, employers and staff. Two of the formal ways that you are invited to provide feedback are through Unit Evaluations and through Monquest Teaching Evaluations.

One of the key formal ways students have to provide feedback is through Unit Evaluation Surveys. It is Monash policy for every unit offered to be evaluated each year. Students are strongly encouraged to complete the surveys as they are an important avenue for students to "have their say". The feedback is anonymous and provides the Faculty with evidence of aspects that students are satisfied and areas for improvement.

## Student Evaluations

The Faculty of IT administers the Unit Evaluation surveys online through the my.monash portal, although for some smaller classes there may be alternative evaluations conducted in class.

If you wish to view how previous students rated this unit, please go to <http://www.monash.edu.au/unit-evaluation-reports/>

Over the past few years the Faculty of Information Technology has made a number of improvements to its courses as a result of unit evaluation feedback. Some of these include systematic analysis and planning of unit improvements, and consistent assignment return guidelines.

Monquest Teaching Evaluation surveys may be used by some of your academic staff this semester. They are administered by the Centre for Higher Education Quality (CHEQ) and may be completed in class with a facilitator or on-line through the my.monash portal. The data provided to lecturers is completely anonymous. Monquest surveys provide academic staff with evidence of the effectiveness of their teaching and identify areas for improvement. Individual Monquest reports are confidential, however, you can see the summary results of Monquest evaluations for 2006 at <http://www.adm.monash.edu.au/cheq/evaluations/monquest/profiles/index.html>

## **Unit staff - contact details**

### **Unit leader**

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#### **Tutor(s) :**

#### **Mr Osama Dandash**

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## Teaching and learning method

FIT2019 uses a lecture-tutorial teaching approach.

Each lecture will discuss the week's theoretical concepts and will also go through specific examples and demonstrations.

In tutorials, students will discuss in-depth fundamental aspects about networks and data communications and apply their understanding to practical examples. The tutorials are critical in helping student consolidate concepts and practise their problem solving skills.

Some tutorials will also contain a hands-on laboratory element. Some tutorials will also involve assessments.

## Communication, participation and feedback

Monash aims to provide a learning environment in which students receive a range of ongoing feedback throughout their studies. You will receive feedback on your work and progress in this unit. This may take the form of group feedback, individual feedback, peer feedback, self-comparison, verbal and written feedback, discussions (on line and in class) as well as more formal feedback related to assignment marks and grades. You are encouraged to draw on a variety of feedback to enhance your learning.

It is essential that you take action immediately if you realise that you have a problem that is affecting your study. Semesters are short, so we can help you best if you let us know as soon as problems arise. Regardless of whether the problem is related directly to your progress in the unit, if it is likely to interfere with your progress you should discuss it with your lecturer or a Community Service counsellor as soon as possible.

## Unit Schedule

Week	Topic	Key dates
1	Introduction to Network Standards	No Tutorial in Week 1
2	Network Packet Analysis	
3	Network Protocols	
4	Data Notation Standards	Tutorial Quiz
5	State Transitions and State Machines	
6	History of the Internet and Evolution of Standards	Tutorial Quiz
7	Standards Organisations	Select project
8	Physical and Data Link Layer Standards.	
9	Network Layer Standards	Tutorial Quiz
10	Transport Layer Standards	Project review
11	Application Layer Standards	
Mid semester break		
12	Application Layer Standards	Project Assignment Due
13	Revision	



## Unit Resources

### Prescribed text(s) and readings

Douglas E. Comer, *Internetworking with TCP/IP: Principles, Protocols and Architecture*, Vol. 1, 5E, Pearson Prentice Hall, 2006, ISBN 0-13-198069-6.

### Recommended text(s) and readings

The following are additional references for particular topics that will also be covered beyond the prescribed textbook above:

William Stallings. "Data and Computer Communications" 8E, Prentice Hall (2007).

Uyless Black. "Computer Networks: Protocols, Standards and Interface" 2E, Prentice Hall (1993).

William Stallings. "Wireless Communications & Networks" 2E, Prentice Hall (2004).

Cisco Systems Inc. "Internetworking Technologies Handbook" 4E, Cisco Systems (2004).

P.Loshin. "Essential Ethernet standards: RFCs and protocols made practical", Wiley (2000)

P.Loshin. "Big Book of Lightweight Directory protocol", Morgan-Kaufmann (2000)..

M.C.Libicki. "Information Technology Standards: Quest for the Common Byte". Butterworth-Heinemann (1995).

M.C.Libicki, J.Schneider, D.R.Frelinger, A.Slomovic. "Scaffolding the New Web: Standards and Standards Policy for the Digital Economy" Rand MR-1215-OSTP (2000). <http://www.rand.org/publications/MR/MR1215> .

S.Bradner. "The Internet Standards Process - Revision 3", Internet Engineering Task Force, RFC 2026, October 1996. <http://ftp.monash.edu.au/pub/rfc/rfc/rfc2026.txt> .

J.B.Postel and J.F.Reynolds. "Internet Official Protocol Standards", Internet Engineering Task Force, RFC 2300, May 1998. <http://ftp.monash.edu.au/pub/rfc/rfc/rfc2300.txt> .

S.Dawkins, Charles.E.Perkins, and D.H.Crocker, "Two Stage Standardization Approach", Internet Engineering Task Force. <http://tools.ietf.org/html/?draft=draft-dawkins-pstmt-twostage>

### Required software and/or hardware

You will need access to:

- Knoppix live Linux (boots from CD). The ISO image may be downloaded from <http://www.knopper.net/knoppix/index-en.html> and then burned into a CDROM. [Warning: improper use of Knoppix may damage the contents of your hard drive.]
- Wireshark, a protocol analyzer, which may be used to capture packets for analysis. It may be downloaded from <http://www.wireshark.org/download.html>.
- PDFCreator, or some equivalent, to be used to generate a soft copy of the assignment for submission. PDFCreator may be downloaded free of charge from <http://sourceforge.net/projects/pdfcreator/>

All the above may be obtained from home and used on the home computer -- but be careful with Knoppix (as indicated above). Wireshark and other packet sniffers must never be used for malicious purposes in capturing data

in transit.

On-campus students will find and use Knoppix and Wireshark only in the designated Data Communications lab for the tutorials. They should never be used in the other labs without authorization from academic staff. PDFCreator may be available on PC labs of your campus.

## Equipment and consumables required or provided

On-campus students may use the facilities available in the computing labs. Information about computer use for students is available from the ITS Student Resource Guide in the Monash University Handbook. You will need to allocate up to 8 hours per week for reading and private study, including computer time for email and online discussion groups.

Apart from the general computing labs referred to above, students will be provided with ample time to experiment with protocols during tutorials in the Data Communications lab.

## Study resources

Study resources we will provide for your study are:

- This Unit Information guide outlining the administrative information for the unit
- The FIT2019 web site on MUSO, where lecture slides, weekly tutorial requirements, assignment specifications, sample solutions and supplementary material will be posted.
- Web-based discussion groups that can be accessed from the FIT2019 unit Homepage

## Library access

The Monash University Library site contains details about borrowing rights and catalogue searching. To learn more about the library and the various resources available, please go to <http://www.lib.monash.edu.au>. Be sure to obtain a copy of the Library Guide, and if necessary, the instructions for remote access from the library website.

## Monash University Studies Online (MUSO)

All unit and lecture materials are available through MUSO (Monash University Studies Online). Blackboard is the primary application used to deliver your unit resources. Some units will be piloted in Moodle. If your unit is piloted in Moodle, you will see a link from your Blackboard unit to Moodle (<http://moodle.monash.edu.au>) and can bookmark this link to access directly. In Moodle, from the Faculty of Information Technology category, click on the link for your unit.

You can access MUSO and Blackboard via the portal: <http://my.monash.edu.au>

Click on the Study and enrolment tab, then Blackboard under the MUSO learning systems.

In order for your Blackboard unit(s) to function correctly, your computer needs to be correctly configured.

For example:

- Blackboard supported browser
- Supported Java runtime environment

For more information, please visit: <http://www.monash.edu.au/muso/support/students/downloadables-student.html>

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**You can contact the MUSO Support by: Phone: (+61 3) 9903 1268**

For further contact information including operational hours, please visit:  
<http://www.monash.edu.au/muso/support/students/contact.html>

Further information can be obtained from the MUSO support site:  
<http://www.monash.edu.au/muso/support/index.html>

## Assessment

### Unit assessment policy

To pass a unit which includes an examination as part of the assessment, a student must obtain:

- 40% or more in the examination, and
- 40% or more in the unit's non-examination assessment, and
- an overall unit mark of 50% or more.

If a student does not achieve 40% or more in the unit examination or the unit non-examination assessment, then a mark of no greater than 44-N will be recorded for the unit.

### Assignment tasks

#### • Assignment Task

**Title :** Assessable Tutorial Exercise 1: Layered protocols and data structures used in ICMP packets

**Description :**

This assessment is carried out during the tutorial in Week 4. The aims of this assessment are:

- ◆ to examine in detail some of the data structures used in network protocols such as
  - o Ethernet
  - o Internet Protocol (IP)
  - o Internet Control and Management Protocol (ICMP)
- ◆ to use a protocol analyser package such as Ethereal to examine these data structures

**Weighting :** 5%

**Criteria for assessment :**

Correct answers to the questions and compliance with exercise tasks to be assessed.

**Due date :** Week 4 tutorial

#### • Assignment Task

**Title :** Assessable Tutorial Exercise 2: State concepts in network standards

**Description :**

This assessment is carried out during the tutorial of Week 6. This aims to:

- ◆ review the state concepts in network protocols

**Weighting :** 5%

**Criteria for assessment :**

Correct answers to the questions and compliance with exercise tasks to be assessed.

**Due date :** Tutorial of Week 6

• **Assignment Task**

**Title :** Assessable Tutorial Exercise 3: Data and Network Layer Protocol standards

**Description :**

This assessment is carried out during tutorials of Week 9. The aims are:

- ◆ to review details of network protocols including addressing, packet header structure, fragmentation and reassembly and error management with ICMP.
- ◆ review knowledge of RFCs relevant to the above.

**Weighting :** 5%

**Criteria for assessment :**

Correct answers to the questions and compliance with exercise tasks to be assessed.

**Due date :** Tutorial in Week 9

• **Assignment Task**

**Title :** Project Assignment: Discussion and Analysis of a Standard Network Protocol

**Description :**

Students will conduct an in-depth study of a standard network protocol or family of protocols. The assignment is designed as a research paper, and encourages practical experimentation.

The study should involve extensive reading, testing of prototypes which are generally available for free under various platforms, and must involve packet analysis as a validation of expected behavior. Students will also be encouraged to practice protocol verification and critiquing.

**Weighting :** 25%

**Criteria for assessment :**

The papers will be assessed based on how well the student appears to have understood the protocol or family of protocols. This will be based on the extensiveness of the study as reported in the assignment.

**Due date :** Friday of Week 12, 5 pm

**Remarks ( optional - leave blank for none ) :**

Submission of the report is via Damocles:

<http://viper.infotech.monash.edu.au/damocles/submit/>

At the same time, filled in and signed cover sheets must be submitted via labelled boxes in Caulfield Building H, Level 6. Blank cover sheets may downloaded from <http://www.infotech.monash.edu.au/resources/student/assignments/>.

Students should also consult the general Faculty style guide:

<http://www.infotech.monash.edu.au/resources/student/assignments/caulfield-styleguide.pdf>

## **Examinations**

- **Examination**

**Weighting** : 60%

**Length** : 3 hours

**Type ( open/closed book )** : closed book

## **Assignment submission**

The one and only Assignment will be submitted as indicated using the Damocles submission method on or before the due date and time.

In addition, an assignment cover sheet -- filled out and signed -- must be dropped into the designated box for this unit at your school office.

## **Assignment coversheets**

The assignment cover sheets may be downloaded from  
<http://www.infotech.monash.edu.au/resources/student/assignments/>

## University and Faculty policy on assessment

### Due dates and extensions

The due dates for the submission of assignments are given in the previous section. Please make every effort to submit work by the due dates. It is your responsibility to structure your study program around assignment deadlines, family, work and other commitments. Factors such as normal work pressures, vacations, etc. are seldom regarded as appropriate reasons for granting extensions. Students are advised to NOT assume that granting of an extension is a matter of course.

The due dates for the submission of assignments are given in the previous section. Please make every effort to submit work by the due dates. It is your responsibility to structure your study program around assignment deadlines, family, work and other commitments. Factors such as normal work pressures, vacations, etc. are seldom regarded as appropriate reasons for granting extensions. Students are advised to NOT assume that granting of an extension is a matter of course.

Requests for extensions must be made to the unit lecturer at your campus at least two days before the due date. You will be asked to forward original medical certificates in cases of illness, and may be asked to provide other forms of documentation where necessary. A copy of the email or other written communication of an extension must be attached to the assignment submission.

### Late assignment

Assignments received after the due date will be subject to a penalty of 5% per day or part thereof including Saturday and Sunday.

Assignments received later than one week after the due date will not normally be accepted.

### Return dates

Students can expect assignments to be returned within two weeks of the submission date or after receipt, whichever is later.

Assessment for the unit as a whole is in accordance with the provisions of the Monash University Education Policy at <http://www.policy.monash.edu/policy-bank/academic/education/assessment/>

We will aim to have assignment results made available to you within two weeks after assignment receipt.

### Plagiarism, cheating and collusion

Plagiarism and cheating are regarded as very serious offences. In cases where cheating has been confirmed, students have been severely penalised, from losing all marks for an assignment, to facing disciplinary action at the Faculty level. While we would wish that all our students adhere to sound ethical conduct and honesty, I will ask you to acquaint yourself with Student Rights and Responsibilities (<http://www.infotech.monash.edu.au/about/committees-groups/facboard/policies/studrights.html>) and the Faculty regulations that apply to students detected cheating as these will be applied in all detected cases.

In this University, cheating means seeking to obtain an unfair advantage in any examination or any other written or practical work to be submitted or completed by a student for assessment. It includes the use, or attempted use, of any means to gain an unfair advantage for any assessable work in the unit, where the means is contrary to the instructions for such work.

When you submit an individual assessment item, such as a program, a report, an essay, assignment or other piece of work, under your name you are understood to be stating that this is your own work. If a submission is identical with, or similar to, someone else's work, an assumption of cheating may arise. If you are planning on working with another student, it is acceptable to undertake research together, and discuss problems, but it is not acceptable to jointly develop or share solutions unless this is specified by your lecturer.

Intentionally providing students with your solutions to assignments is classified as "assisting to cheat" and students who do this may be subject to disciplinary action. You should take reasonable care that your solution is not accidentally or deliberately obtained by other students. For example, do not leave copies of your work in progress on the hard drives of shared computers, and do not show your work to other students. If you believe this may have happened, please be sure to contact your lecturer as soon as possible.

Cheating also includes taking into an examination any material contrary to the regulations, including any bilingual dictionary, whether or not with the intention of using it to obtain an advantage.

Plagiarism involves the false representation of another person's ideas, or findings, as your own by either copying material or paraphrasing without citing sources. It is both professional and ethical to reference clearly the ideas and information that you have used from another writer. If the source is not identified, then you have plagiarised work of the other author. Plagiarism is a form of dishonesty that is insulting to the reader and grossly unfair to your student colleagues.

## **Register of counselling about plagiarism**

The university requires faculties to keep a simple and confidential register to record counselling to students about plagiarism (e.g. warnings). The register is accessible to Associate Deans Teaching (or nominees) and, where requested, students concerned have access to their own details in the register. The register is to serve as a record of counselling about the nature of plagiarism, not as a record of allegations; and no provision of appeals in relation to the register is necessary or applicable.

## **Non-discriminatory language**

The Faculty of Information Technology is committed to the use of non-discriminatory language in all forms of communication. Discriminatory language is that which refers in abusive terms to gender, race, age, sexual orientation, citizenship or nationality, ethnic or language background, physical or mental ability, or political or religious views, or which stereotypes groups in an adverse manner. This is not meant to preclude or inhibit legitimate academic debate on any issue; however, the language used in such debate should be non-discriminatory and sensitive to these matters. It is important to avoid the use of discriminatory language in your communications and written work. The most common form of discriminatory language in academic work tends to be in the area of gender inclusiveness. You are, therefore, requested to check for this and to ensure your work and communications are non-discriminatory in all respects.

## **Students with disabilities**

Students with disabilities that may disadvantage them in assessment should seek advice from one of the following before completing assessment tasks and examinations:

- Faculty of Information Technology Student Service staff, and / or
- your Unit Coordinator, or
- Disabilities Liaison Unit



## **Deferred assessment and special consideration**

Deferred assessment (not to be confused with an extension for submission of an assignment) may be granted in cases of extenuating personal circumstances such as serious personal illness or bereavement. Information and forms for Special Consideration and deferred assessment applications are available at <http://www.monash.edu.au/exams/special-consideration.html>. Contact the Faculty's Student Services staff at your campus for further information and advice.