FIT5034
Quality of service and network management

Unit Guide

Semester 2, 2015
FIT5034 Quality of service and network management - Semester 2, 2015

Enterprise networks consists of several highly complex devices that interconnect in likewise complex configurations and modes of operation. While today's network technology has come a long way in terms of high-speed data transmission, secure management components, and software-driven administration, QoS targets have come to the fore as converged technologies have taken over both enterprise and home users of network technologies. This unit will provide students with fundamentals and theoretical foundations of Quality of Service and management aspects of modern network infrastructures. On the basis of industry best practices, research- and experience-driven standardisation, this unit will cover topics pertinent to delivering quality, security, manageability and other targets that are relevant in large-scale networks. Students will also acquire practical skills needed to plan, install, configure and manage networks through laboratory activities and projects.

Mode of Delivery

Caulfield (Day)

Workload Requirements

Minimum total expected workload equals 12 hours per week comprising:

(a.) Contact hours for on-campus students:

• Two hours of lectures
• One 2-hour laboratory

(b.) Additional requirements (all students):

• A minimum of 8 hours independent study per week for completing lab and project work, private study and revision.

See also Unit timetable information

Unit Relationships

Prerequisites

FIT9135 FIT5135 or FIT9020 or equivalent

Chief Examiner

Dr Phu Le

Campus Lecturer
Your feedback to Us

Monash is committed to excellence in education and regularly seeks feedback from students, employers and staff. One of the key formal ways students have to provide feedback is through the Student Evaluation of Teaching and Units (SETU) survey. The University’s student evaluation policy requires that every unit is evaluated each year. Students are strongly encouraged to complete the surveys. The feedback is anonymous and provides the Faculty with evidence of aspects that students are satisfied and areas for improvement.

For more information on Monash’s educational strategy, see:

www.monash.edu.au/about/monash-directions/ and on student evaluations, see:
www.policy.monash.edu/policy-bank/academic/education/quality/student-evaluation-policy.html

Previous Student Evaluations of this Unit

Based on previous student feedback this unit is considered to be appropriately structured and no changes have been made for this semester.

If you wish to view how previous students rated this unit, please go to https://emuapps.monash.edu.au/unitevaluations/index.jsp
Academic Overview

Learning Outcomes

On successful completion of this unit, students should be able to:

- explain key concepts of quality of service across a range of technologies, network protocols and standards;
- describe different management techniques;
- evaluate and use quality of service schemes and network management techniques.
Unit Schedule

<table>
<thead>
<tr>
<th>Week</th>
<th>Activities</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>No formal assessment or activities are undertaken in week 0</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Introduction to Network Management (NM) and Quality of Service (QS)</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Network Management - Roles, Protocols and Standards</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Network Management - Roles, Protocols and Standards (con't)</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Network Management in Practice</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Network Management in Practice (con't)</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Quality of Service Approaches and Measurements</td>
<td>Assessed tutorial work</td>
</tr>
<tr>
<td>7</td>
<td>QoS Models and Implementation</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>QoS in Circuit and Packet Switching Networks</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>QoS in IP networks</td>
<td>Assessed tutorial work</td>
</tr>
<tr>
<td>10</td>
<td>QoS in Cellular, Wireless, Satellite and AdHoc networks</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Network Management and QoS in Saturated Networks</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Current research and development in NM and QoS. Revision</td>
<td>Project demos during tutorials, and report due Friday</td>
</tr>
<tr>
<td></td>
<td>SWOT VAC</td>
<td>No formal assessment is undertaken SWOT VAC</td>
</tr>
</tbody>
</table>

*Unit Schedule details will be maintained and communicated to you via your learning system.

Teaching Approach

Lecture and tutorials or problem classes

Lectures will cover theories, standards and practices, which will be reinforced by tutorial/labs. Additionally, tutorial/labs will engage students in gaining practical skills and experience.

Assessment Summary

Examination (3 hours): 50%; In-semester assessment: 50%

<table>
<thead>
<tr>
<th>Assessment Task</th>
<th>Value</th>
<th>Due Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tutorial Assessments</td>
<td>20%</td>
<td>The assessments will be held during tutorials of Weeks 6 and 9.</td>
</tr>
<tr>
<td></td>
<td>30%</td>
<td></td>
</tr>
</tbody>
</table>
Network administration project
(Tentative Specifications)

Practical outcomes will be demonstrated during tutorials in Week 12. Reports will be due on the Friday of Week 12.

| Examination 1 | 50% | To be advised |
Assessment Requirements

Assessment Policy

Faculty Policy - Unit Assessment Hurdles

Academic Integrity - Please see resources and tutorials at
http://www.monash.edu/library/skills/resources/tutorials/academic-integrity/

Assessment Tasks

Participation

• Assessment task 1

  Title:  Tutorial Assessments

  Description:  Two assessments with marking weights of 10% each will be administered during tutorials in the laboratory, covering theoretical and practical topics covered in previous weeks.

  Please refer to the specs for detail.

  Weighting:  20%

  Criteria for assessment:  The assessment requires that exercises are correctly accomplished by individual students.

  Due date:  The assessments will be held during tutorials of Weeks 6 and 9.

• Assessment task 2

  Title:  Network administration project (Tentative Specifications)

  Description:  This project will entail both practical and theoretical aspects of the unit. Students in groups, of at most three members each, will be required to build a small network, configured with a few basic network services. Concise documentation will also be required for submission. More details will be made available to students in Moodle by Week 4, but will include the following:

  1. A practical demo of the installation, configuration and operation of the network and its services.
  2. Students will be expected to answer questions during the demo.
  3. A concise report that documents the network will be submitted on the Friday of Week 12.

  Students will be given time to work on their project during some tutorial hours using lab equipment.

  Note that the network to be built may consist of physical or virtual machines, or a
combination of both. There are obvious advantages to using virtual machines, and so that option is highly encouraged.

Please refer to the spec for detail.

**Weighting:**
30%

**Criteria for assessment:**
The outcome of practical work will be assessed during demos, while reports will be assessed separately. Demonstrations must show correct configuration, operation and, in some cases, customization of network components, both hardware and software. Students will also be asked to answer questions to show an understanding of the components being demonstrated. The report will be assessed based on reasonable correctness of network design, choice of services and policies.

Since this is a group assignment, students will receive equal marks, however every member of the group will be interviewed.

**Due date:**
Practical outcomes will be demonstrated during tutorials in Week 12. Reports will be due on the Friday of Week 12.

### Examinations

- **Examination 1**
  - **Weighting:**
    50%
  - **Length:**
    3 hours
  - **Type (open/closed book):**
    Closed book
  - **Electronic devices allowed in the exam:**
    None

### Learning resources

### Reading list

No particular textbook is required. Instead, several online and published materials are more than sufficient for this unit, including these primary references:

- **Subramanian, M.,** *Network management: Principles and Practice* Addison-Wesley (2000).
Feedback to you

Types of feedback you can expect to receive in this unit are:

- Informal feedback on progress in labs/tutes
- Graded assignments with comments

Extensions and penalties

Submission must be made by the due date otherwise penalties will be enforced.

You must negotiate any extensions formally with your campus unit leader via the in-semester special consideration process: http://www.monash.edu.au/exams/special-consideration.html

Returning assignments

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

Referencing requirements

Reference sources used in the project, particularly in preparing the report, should be properly paraphrased as well as cited in the body of the report as well as in a separate Bibliography. In rare cases, the actual text from the source may be quoted and likewise cited in the body and the Bibliography. Failure to do so may be grounds for a case of plagiarism being brought up. This may result in the exclusion of the submitted assignment and/or failure in this unit.

Assignment submission

It is a University requirement (http://www.policy.monash.edu/policy-bank/academic/education/conduct/student-academic-integrity-managing-plagiarism-collusion-procedures.html) for students to submit an assignment coversheet for each assessment item. Faculty Assignment coversheets can be found at http://www.infotech.monash.edu.au/resources/student/forms/. Please check with your Lecturer on the submission method for your assignment coversheet (e.g. attach a file to the online assignment submission, hand-in a hard copy, or use an electronic submission). Please note that it is your responsibility to retain copies of your assessments.

Online submission

If Electronic Submission has been approved for your unit, please submit your work via the learning system for this unit, which you can access via links in the my.monash portal.
Assessment Requirements

**Required Resources**

Please check with your lecturer before purchasing any Required Resources. Limited copies of prescribed texts are available for you to borrow in the library, and prescribed software is available in student labs.

Students will be required to use Linux virtual machines via virtualization software in the labs. VMware Player (for Windows and Linux) and VirtualBox are free to download and use. Additionally, Linux itself is free to download, and pre-installed Linux virtual machines can be downloaded from various sources, including VMware marketplace.

**Recommended Resources**

Students should have Linux virtual machines via virtualization software available for working with at home.

Students should also have external storage devices for virtual machines that can be used in the labs and at home. A 4 GB USB pendrive is sufficient at the minimum.

**Additional subject costs**

Desktops and networking equipment are provided for use during tutorial-labs in the Caulfield School of IT network laboratory for on-campus students. However, students will shoulder the cost of downloading documents and software from home. Students should own USB sticks and similar external storage media in order to store intermediate work, including configuration files and scripts, partial reports or entire virtual machine images, although the latter would typically require 2 to 4 GB of free space.

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 time for the use of a computer to access web-based discussion groups.
Other Information

Policies

Monash has educational policies, procedures and guidelines, which are designed to ensure that staff and students are aware of the University’s academic standards, and to provide advice on how they might uphold them. You can find Monash’s Education Policies at:  

Faculty resources and policies

Important student resources including Faculty policies are located at  
http://intranet.monash.edu.au/infotech/resources/students/

Graduate Attributes Policy

http://www.policy.monash.edu/policy-bank/academic/education/management/monash-graduate-attributes-policy.html

Student Charter


Student services

The University provides many different kinds of support services for you. Contact your tutor if you need advice and see the range of services available at http://www.monash.edu.au/students. For Malaysia see http://www.monash.edu.my/Student-services, and for South Africa see http://www.monash.ac.za/current/.

Monash University Library

The Monash University Library provides a range of services, resources and programs that enable you to save time and be more effective in your learning and research. Go to www.lib.monash.edu.au or the library tab in my.monash portal for more information. At Malaysia, visit the Library and Learning Commons at http://www.lib.monash.edu.my/. At South Africa visit http://www.lib.monash.ac.za/

Disability Liaison Unit

Students who have a disability or medical condition are welcome to contact the Disability Liaison Unit to discuss academic support services. Disability Liaison Officers (DLOs) visit all Victorian campuses on a regular basis.

- Website: http://www.monash.edu/equity-diversity/disability/index.html
- Telephone: 03 9905 5704 to book an appointment with a DLO; or contact the Student Advisor, Student Community Services at 03 55146018 at Malaysia
- Email: dlu@monash.edu
- Drop In: Equity and Diversity Centre, Level 1, Building 55, Clayton Campus, or Student Community Services Department, Level 2, Building 2, Monash University, Malaysia Campus