

Higher National Unit Specification

General information for centres

Unit title: Internetworking Concepts 1: Development and Delivery Concepts

Unit code: DF9T 34

Unit purpose: This Unit is designed to introduce candidates to the issues involved in developing and delivering Internet or Intranet content. It is intended for candidates undertaking an HNC or HND in Computing, Computer Networking or a related area who require a broad knowledge of internetworking concepts.

On completion of the Unit candidates should be able to:

1. Describe Internet concepts and client software.
2. Describe tools used for development of Internet/Intranet content.
3. Describe tools used for delivery of Internet/Intranet content.

Credit value: 1 HN Credit at SCQF level 7 (8 SCQF credit points at SCQF level 7)

**SCQF credit points are used to allocate credit to qualifications in the Scottish Credit and Qualifications Framework (SCQF). Each qualification in the Framework is allocated a number of SCQF credit points at an SCQF level. There are 12 SCQF levels, ranging from Access 1 to Doctorates.*

Recommended prior knowledge and skills: Access to this Unit will be at the discretion of the Centre. There are no specific requirements but candidates would benefit from knowledge of computer hardware and software. This may be demonstrated by the possession of HN Units such as DG0K 33 Hardware Concepts, DF9L 33 Operating System Concepts and DF9P 34 Network Concepts.

Core skills: There may be opportunities to gather evidence towards core skills in this Unit, although there is no automatic certification of core skills or core skills components.

Context for delivery: This Unit is included in the framework of a number of HNC and HND group awards. It is recommended that it should be taught and assessed within the context of the particular group award to which it contributes.

Assessment: Evidence for the knowledge and/or skills for the entire Unit must be produced using a set of 30 restricted-response questions to assess candidates' knowledge and understanding. This may be administered as a single end-of unit test, or as several subtests, each covering one or more outcomes.

Candidates must answer at least 70% of the questions correctly in order to obtain a pass. If subtests are used, they must also score at least 70% in each subtest.

General information for centres (cont)

Testing must take place in a closed-book environment where candidates have no access to books, handouts, notes or other learning material. Testing can be done in either a machine-based or paper-based format and must be invigilated by a tutor or mentor. There must be no communication between candidates and communication with the invigilator must be restricted to matters relating to the administration of the test.

If a candidate requires to be reassessed, a different selection of questions must be used. At least half the questions in the reassessment must be different from those used in the original test.

If an outcome has a practical component, this must be assessed by having the candidate use a logbook to record the practical tasks successfully completed. The logbook can be in paper or electronic form and must be authenticated by the tutor or mentor.

For some outcomes only a sample of the practical tasks needs to be completed and recorded for assessment purposes, e.g. three out of five. This is clearly indicated in the logbook instructions for the outcomes involved. Where this occurs, tutors must inform candidates of the tasks to be completed.

An Assessment Exemplar and Guidelines on the Delivery of the Unit have been produced to indicate the national standard of achievement required at SCQF level 7.

Higher National Unit specification: statement of standards

Unit title: Internetworking Concepts 1: Development and Delivery Concepts

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The sections of the Unit stating the Outcomes, knowledge and/or skills, and evidence requirements are mandatory.

Where evidence for Outcomes is assessed on a sample basis, the whole of the content listed in the knowledge and/or skills section must be taught and available for assessment. Candidates should not know in advance the items on which they will be assessed and different items should be sampled on each assessment occasion.

Outcome 1

Describe Internet concepts and client software

Knowledge and/or skills

- ◆ Issues affecting Internet site functionality.
- ◆ Caching and its implications.
- ◆ Search indexes.
- ◆ Infrastructure needed to support an Internet client.
- ◆ Web browsers and other Internet/intranet clients
- ◆ Administration of Internet/intranet sites.

Evidence requirements

Restricted response test

The knowledge and skills component of Outcome 1 must be examined by eighteen questions, derived from the six items listed below. Three questions must be derived from each item. Each question must be derived from a single item.

1. Issues affecting Internet site functionality.

Performance issues, security issues.

2. Caching and its implications.

Web caching, file caching, proxy caching and client side vs. server side caching.

3. Search indexes

Static index/site map, keyword index, full text index, site indexing, search engines and directories.

Higher National Unit specification: statement of standards (cont)

Unit title: Internetworking Concepts 1: Development and Delivery Concepts

4. Infrastructure needed to support an Internet client.

Client OS, web server platforms, network connection, client software, hardware platform.

5. Web browsers and other Internet/intranet clients

Web browsers, FTP, Telnet, E-mail clients, basic commands, updating client software.

6. Administration of Internet/Intranet sites.

Reset passwords, configure permissions, post content to server.

The test may be administered on its own as a subtest or be combined with other outcome subtests in the Unit.

Alternatively, the 18 questions for this outcome may contribute towards a single end-of-unit test of 30 questions.

Logbook

The logbook for Outcome 1 must record successful completion by the candidate of **both** the tasks listed below:

- Web browsers and other Internet/intranet clients

A record to the steps taken by the candidate to install and configure a web browser, an e-mail client and an FTP client.

- Administration of Internet/Intranet sites.

A record of the tasks carried out by the candidate to administer an Internet/Intranet site including resetting passwords, configuring permissions and posting content to a server.

Assessment guidelines

It is suggested that all the above concepts be presented and explained within the context of current real-world practice and applications.

The suggested time allocation for a restricted response test is 2 minutes for each question plus 5 minutes starting-up time and 5 minutes finishing-off time, thus a total of 70 minutes should be allocated for a 30-question end-of-unit test.

Although individual outcome tests are permissible, it is suggested that if subtests are to be used, outcomes should be combined to produce tests of no fewer than 10 questions. A 10-question test would therefore have a time allocation of 30 minutes.

Higher National Unit specification: statement of standards (cont)

Unit title: Internetworking Concepts 1: Development and Delivery Concepts

Outcome 2

Describe tools used for development and delivery of Internet/Intranet content.

Knowledge and/or skills

- ◆ Programming-related terms.
- ◆ Client-side and server-side programming languages
- ◆ HTML pages.

Evidence requirements

Restricted response test

The knowledge and skills component of Outcome 2 must be examined by six questions, derived from the three items listed below. Two questions must be derived from each item. Each question must be derived from a single item.

1. Programming-related terms.

Client side and server-side scripting.

2. Client-side and server-side programming languages.

When to use languages, when they are executed.

3. HTML pages.

Style Sheets, HTML variants, page layout, tables, headings, forms, browser compatibility.

The test may be administered on its own as a subtest or be combined with other outcome subtests in the Unit.

Alternatively, the 6 questions for this outcome may contribute towards a single end-of-unit test of 30 questions.

Higher National Unit specification: statement of standards (cont)

Unit title: Internetworking Concepts 1: Development and Delivery Concepts

Logbook

The logbook for Outcome 2 must record successful completion by the candidate of the task listed below:

- HTML pages

Documentary evidence that the candidate can use HTML to create a simple home page (3 – 5 screens) and upload it to a web server. The page must contain text, graphics and internal and external links.

Assessment guidelines

It is suggested that all the above concepts be presented and explained within the context of current real-world practice and applications.

The suggested time allocation for a restricted response test is 2 minutes for each question plus 5 minutes starting-up time and 5 minutes finishing-off time, thus a total of 70 minutes should be allocated for a 30-question end-of-unit test.

Although individual outcome tests are permissible, it is suggested that if subtests are to be used, outcomes should be combined to produce tests of no fewer than 10 questions. A 10-question test would therefore have a time allocation of 30 minutes.

Outcome 3

Describe tools used for development and delivery of Internet/Intranet content.

Knowledge and/or skills

- ◆ Multimedia extensions and plug-ins
- ◆ Image and multimedia file formats.
- ◆ Connecting a Web server to a database.
- ◆ Testing pre-production servers.

Evidence requirements

Restricted response test

The knowledge and skills component of Outcome 3 must be examined by six questions, derived from the four items listed below. Two questions must be derived from any two of the items and one question derived from each of the remaining items. Each question must be derived from a single item.

Higher National Unit specification: statement of standards (cont)

Unit title: Internetworking Concepts 1: Development and Delivery Concepts

1. Multimedia extensions and plug-ins.

As in current use

2. Image and multimedia file formats.

As in current use

3. Connecting a Web server to a database.

As in current use.

4. Testing pre-production servers.

Web servers, E-commerce servers, stress testing.

The test may be administered on its own as a subtest or be combined with other outcome subtests in the Unit.

Alternatively, the 6 questions for this outcome may contribute towards a single end-of-unit test of 30 questions.

Logbook

The logbook for Outcome 3 must record successful completion by the candidate of the task listed below:

- Testing pre-production servers

Documentary evidence that the candidate has carried out content testing and stress testing.

Assessment guidelines

It is suggested that all the above concepts be presented and explained within the context of current real-world practice and applications.

The suggested time allocation for a restricted response test is 2 minutes for each question plus 5 minutes starting-up time and 5 minutes finishing-off time, thus a total of 70 minutes should be allocated for a 30-question end-of-unit test.

Although individual outcome tests are permissible, it is suggested that if subtests are to be used, outcomes should be combined to produce tests of no fewer than 10 questions. A 10-question test would therefore have a time allocation of 30 minutes.

Administrative Information

Unit code: DF9T 34

Unit title: Internetworking Concepts 1: Development and Delivery Concepts

Superclass category: CE

Date of publication: May 2004

Version 01

Source: SQA

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Higher National Unit specification: support notes

Unit title: Internetworking Concepts 1: Development and Delivery Concepts

This part of the Unit specification is offered as guidance. The support notes are not mandatory.

While the exact time allocated to this Unit is at the discretion of the centre, the notional design length is 40 hours.

The suggested time allocation for each outcome (including assessment) is as follows:

Outcome 1:	24 hours
Outcome 2:	8 hours
Outcome 3:	8 hours

Guidance on the content and context for this Unit

During the delivery of this unit it is important that every opportunity is taken to introduce real-world examples, opportunities for whole-class and group discussion and practical demonstrations wherever possible. Concepts and terminology should be presented in context throughout the Unit. Video presentations should be used where appropriate for providing an alternative explanation of a difficult topic, or as a focus for class discussion or group work.

Given the theoretical nature of this Unit, it is intended that a significant amount of time will be made available as a central part of the course for revision, tutorials and formative assessment exercises. Candidates should be strongly encouraged to undertake further reading, and opportunities for individual or group research should be provided.

The most important overall emphasis should be on the relevance and currency of content in such a rapidly-evolving field.

This Unit, along with Internetworking Concepts 2: Security and Business Concepts, may assist candidates in preparing for CompTIA examination IK0-001: I-Net+. Vendor certifications can change rapidly and candidates should be encouraged to check the current details at www.comptia.org to ensure that all objectives have been covered.

Outcome 1

This Outcome requires that candidates have knowledge of a wide range of Internet basics, including: site functionality, caching, indexes, searching, and Internet infrastructure. In addition candidates should have the knowledge and skills required to use and update client software, and to assist in the administration of Internet/intranet sites.

1 Issues affecting Internet site functionality

Candidates should be able to identify the issues that affect Internet site functionality. Content may include the following: performance, including: bandwidth (both client and server), Internet connection types (both client and server), pages taking too long to load, resolution and size of graphics; security, including: authentication, permissions and data encryption.

Higher National Unit specification: support notes (cont)

Unit title: Internetworking Concepts 1: Development and Delivery Concepts

2 Caching and its implications

Candidates should understand and be able to describe the concept of caching and its implications. Content may include the following: web caching, file caching, proxy caching, Client side caching versus server side caching.

3 Search indexes

Candidates should be able to describe and use different types of search indexes – static index/site map, keyword index, full text index. Content may include the following: index a site for a search, use of Internet and Intranet search engines, differences between search engines and directories, meta search engines, spider search engines

4 Infrastructure needed to support an Internet client

Candidates should also understand and be able to describe the infrastructure needed to support an Internet client. Content may include the following: knowledge of client operating systems; knowledge of web server platforms; operating system TCP/IP stack configuration; network connection; web browser; e-mail client; hardware platform; DHCP; client software configuration.

5 Web browsers and other Internet/intranet clients

Candidates should be able to use/configure Web browsers and other Internet/Intranet clients, and be able to describe their use to others. Content may include the following: Web browsers, FTP clients, Telnet clients, E-mail clients, All-in-one/universal clients; When to use each type of client; basic commands (e.g., get and put) for each type of client (e.g., FTP, Telnet, POP3); Update client software: performing routine maintenance on client applications (e.g. updating virus data files), applying service packs and maintenance patches, upgrading to newer versions of client software, or replacing existing client software with versions from a different software vendor.

6 Administration of Internet/intranet sites

Candidates should also be able to assist in the administration of Internet/Intranet sites, including resetting passwords, configuring permissions and posting content to a server.

Outcome 2

This Outcome requires that candidates have a knowledge of programming-related terms and the differences between popular client and server programming languages. They should also have the ability to create HTML pages.

Higher National Unit specification: support notes (cont)

Unit title: Internetworking Concepts 1: Development and Delivery Concepts

1 Programming-related terms

Candidates should understand and be able to describe programming-related terms. Content may include the following: API, CGI script, SQL, Client-side scripting, Server-side scripting, Server-side includes.

2 Client-side and server-side programming languages

Candidates should also understand and be able to describe differences between popular client-side and server-side programming languages. Content may include the following: When to use the languages, When they are executed. Examples may include the following: Java, JavaScript, XML, ASP, Extensible Stylesheet Language—XSL, Document Type definitions—DTD, JSP, CGI script, Perl, Java Servlets, VBScript, PHP

3 HTML pages

Candidates should be able to create HTML pages. Content may include the following: Cascading Style Sheets — CSS, Extensible Stylesheet Language — XSL, DHTML, XHTML, HTML document structure, MetaTags, page layout principles; Coding simple tables, headings and forms; Compatibility between different browsers, Importance of creating cross-browser coding in HTML 3 tier models.

Outcome 3

This Outcome requires that candidates can identify when to use multimedia extensions and plug-ins and various image and multimedia file formats, identify the common formats used to deliver content to wireless devices and use popular tools to connect a Web server to a database and test pre-production Web and E-Commerce servers.

1 Multimedia extensions and plug-ins

Candidates should be able to identify when to use various multimedia extensions or plug-ins, including: QTVR (QuickTime), Flash, Shockwave, RealPlayer, Windows Media Player

2 Image and multimedia file formats

Candidates should be able to identify when to use various image and multimedia file formats including: GIF, GIF89a, JPEG, PNG, PDF, TIFF, BMP, MOV, MPEG, AVI and common formats used to deliver content to wireless devices (XML, WML)

3 Connecting a Web server to a database

Candidates should understand when to use popular tools to connect a Web server to a database, including PHP, PERL, ASP, ODBC and JDBC.

Higher National Unit specification: support notes (cont)

Unit title: Internetworking Concepts 1: Development and Delivery Concepts

4 Testing pre-production servers.

Candidates should be able to test pre-production Web and e-commerce servers, including: viewing web content in various browsers and at various screen resolutions, stress testing a server and its Internet connection and creating sample transactions with an e-commerce server.

Guidance on the delivery and assessment of this unit

This Unit is likely to form part of a group award which is primarily designed to provide candidates with technical or professional knowledge and skills related to a specific occupational area. It is highly technical in content and should not be adopted by group awards in other areas or delivered as a stand-alone Unit without careful consideration of its appropriateness. It is a Unit which candidates are likely to find accessible at an introductory level; it is suggested that it be delivered part of an HNC or first-year HND program in Computing or a related area, giving candidates experience of basic background topics involved in the hardware and software aspects of computer networks

To minimise assessment overhead, sets of multiple choice questions are used to provide evidence of candidates' knowledge for all Outcomes. It is suggested that multiple-choice questions can be used as the preferred assessment method – as well as reducing the time required for assessment and marking, these reduce the need for candidates to memorise details and encourage understanding. The numbers of questions which must be answered correctly in each assessment correspond to 70% of those set in each case.

Open learning

If this Unit is delivered by open or distance learning methods, additional planning and resources may be required for candidate support, assessment and quality assurance.

A combination of new and traditional authentication tools may have to be devised for assessment and re-assessment purposes.

For further information and advice, please see *Assessment and Quality Assurance for Open and Distance Learning* (SQA, February 2001 — publication code A1030).

Special needs

This Unit specification is intended to ensure that there are no artificial barriers to learning or assessment. Special needs of individual candidates should be taken into account when planning learning experiences, selecting assessment instruments or considering special alternative Outcomes for Units. For information on these, please refer to the SQA document *Guidance on Special Assessment Arrangements* (SQA, 2001).

General information for candidates

Unit title: Internetworking Concepts 1: Development and Delivery Concepts

This is a 1-credit Unit at Level 7 intended for candidates undertaking a Computing or IT-related qualification who require an understanding of Internetworking concepts. It is designed to develop an understanding of the issues involved using and constructing Internets and Intranets. On completion of the Unit you should be able to:

- Describe Internet concepts and client software
- Describe tools used for development of Internet/Intranet content
- Describe tools used for delivery of Internet/Intranet content

In the first section you will study the key issues that affect Internet site functionality such as the types of service provided, speed of operation and security issues. These issues include bandwidth and the resolution and size of graphic files. The concept of caching is introduced and its benefit to performance. You will also study the different types of site index and search engines and the key components of the Internet infrastructure including operating system concepts, and the client software components (browsers) used to access the content provided.

In the second section you will learn that much of the functionality observed on the Internet is due to the various programs used. In this section some of the programming languages are described, including server and client side scripts, along with web related mark-up languages.

In final section you will be introduced to methods of incorporating media elements, such as images, audio and video, into web pages.

This Unit, in conjunction with Internetworking Concepts 2: Security and Business Concepts, may assist you in preparing for CompTIA examination IK0-001: I-Net+. Vendor certifications can change rapidly, so you should check the current details at www.comptia.org to ensure that all objectives have been covered.