## Higher National Unit specification

## General information for centres

## Unit title: Developing Rich Internet Applications

## Unit code: F6BN 35

**Unit purpose:** Rich Internet Applications (RIA) combine the capabilities of desktop applications with online internet applications and services. In conjunction with server technologies rich internet applications (RIA) include real-time communication, real-time data transfer, real-time audio and video streaming. Rich internet applications (RIA) enable direct manipulation of data providing instant user feedback without latency or page re-loads.

This Unit is designed to provide candidates with the knowledge and an understanding that will enable candidates to engage in in-depth research, conceptualisation and critical analysis of the capabilities of rich internet applications (RIA).

Candidates will gain practical experience developing a rich client interface with visual embellishments that enhance the user experience and functionality such as drag and drop, animated tool tips, data formatting and keyboard shortcuts.

Candidates will gain practical experience of developing a rich internet application which utilises server side technologies and existing internet protocols to combine disparate data, communicate with shared software services.

On completion of the Unit the candidate should be able to:

1 Discuss technology options for implementing Rich Internet Application.
2 Design and implement a Rich Internet Application.
3 Test the application.

**Credit points and level:** 2 HN credits at SCQF level 8: (16 SCQF credit points at SCQF level 8*)

**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 and the following recommendations are for guidance only.

**Core Skills:** There are opportunities to develop the Core Skill(s) of *Communication* Written Communication (Writing) and *Problem Solving* at SCQF level 6 in this Unit, although there is no automatic certification of Core Skills or Core Skills components.

## General Information for Centres

**Context for delivery:** If this Unit is delivered as part of a Group Award, it is recommended that it should be taught and assessed within the subject area of the Group Award to which it contributes.

**Assessment:** Evidence is required that candidates have achieved all Outcomes.

It is possible to assess candidates either on an individual Outcome basis, or by combinations of Outcomes. The assessment papers should be composed of the appropriate combination of practical exercises and illustrated reports.

Candidates are encouraged to use the internet in any research etc, however, the evidence produced must be the candidate's own words. Assessors should assure themselves of the authenticity of candidate's evidence.

Assessments should be conducted under supervised conditions. Sufficient time should be allowed within the teaching and learning process to allow assessments to be carried out. It should be noted that candidates must achieve all minimum evidence specified for each Outcome in order to pass the Unit.

All assessments are open book.

# Higher National Unit specification: statement of standards

## Unit title: Developing Rich Internet Applications

## Unit code: F6BN 35

## Outcome 1

Discuss technology options for implementing Rich Internet Application

### Knowledge and/or Skills

- Analyse various technologies used to develop Rich Internet applications
- Evaluate the limitations of HTML web based applications
- Discuss Service Orientated Architecture (SOA)

### Evidence Requirements

To achieve this Outcome the candidate will need to demonstrate his/her knowledge by producing an illustrated report. The report should include the following broad points:

- RIA development technologies and tools
- SOA concepts
- Shared software services
- Platform independence
- HTML limitations of the page centric model

### Assessment Guidelines

Assessment will be open book. The Outcome should be completed individually. The candidate should complete the report with the minimum of assistance. The idea behind the report is to enhance the candidate's research skills. The candidate should be directed towards the main areas of the knowledge and skills section mentioned above but left to draw his/her own conclusions. The candidate should include diagrams to visually represent the architecture of the application being discussed.

Assessors must assure themselves of the authenticity of each candidate's submission.

## Higher National Unit specification: statement of standards (cont)

## Unit title: Developing Rich Internet Applications

## Outcome 2

Design and implement a Rich Internet Application

### Knowledge and/or Skills

- Create a rich internet application from a given design brief
- Create rich client-side interactions
- Incorporate with third party content providers
- Implement asynchronous data retrieval

### Evidence Requirements

Candidates will need to provide evidence to demonstrate their Knowledge and/or Skills by showing that they can implement distinct features of rich internet applications (RIA):

- Design Specification:
  - design the visual interface
  - create a prototype
  - document client interaction

- Create rich client-side interactions:
  - user defined content
  - instant feedback without latency or page re-loads
  - drag-and-drop interactivity
  - animated tool tips
  - keyboard shortcut

- Incorporate data supplied by third party content providers:
  - RSS feeds (Really Simple Syndication)
  - web services

- Implement asynchronous data retrieval:
  - data validation
  - users authentication authorisation, and personalisation
  - local database connectivity

The given design brief must be accompanied by the intended content. Content must consist of the following media elements: text, image, video and audio. A database containing data required to meet the design brief must be supplied in advance. The application is required to achieve typical RIA architecture where the client performs presentation logic, business logic, and executes in a secure 'sandbox' in a browser.

### Assessment Guidelines

See Outcome 3.

## Higher National Unit specification: statement of standards (cont)

## Unit title: Developing Rich Internet Applications

## Outcome 3

Test the application

### Knowledge and/or Skills

- Create a test plan, test log and test data
- Debug the application

### Evidence Requirements

Candidates will need to provide evidence to demonstrate their Knowledge and/or Skills by showing that they can:

- create a test plan to test the functional and technical requirements of the solution
- use this plan to test the solution thoroughly
- maintain a log of bugs
- show evidence of bug and error correction

### Assessment Guidelines

Outcomes 2 and 3 should be assessed by means of a project. The project should be given to the candidate in the form of a project brief from which the candidate produces the design and test documentation before implementing the project using the appropriate development tools and techniques as outlined in Outcome 1.

Test documentation must include a test strategy, test script, test data and a test log. A brief description of the chosen test methodology must be included.

## Administrative Information

**Unit code:** F6BN 35

**Unit title:** Developing Rich Internet Application

**Superclass category:** CE

**Original date of publication:** August 2008

**Version:** 01

**History of changes:**

| Version | Description of change | Date |
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**Source:** SQA



SQA acknowledges the valuable contribution that Scotland's colleges have made to the development of Higher National qualifications.

Additional copies of this Unit specification can be purchased from the Scottish Qualifications Authority. Please contact the Customer Contact Centre for further details, telephone 0845 279 1000.

## Higher National Unit specification: support notes

## Unit title: Developing Rich Internet Applications

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 80 hours.

## Guidance on the content and context for this Unit

**Outcome 1** is theory based and focuses on limitations of HTML and the emerging Web development technologies and architectures- examples include asynchronous data retrieval (AJAX), XML, REST, RSS and SOA/SAAS (Service Orientated Architecture/Software as a Service).

Candidates should gain an understanding of utilising third party content providers' application programming interfaces (APIs) and how to create loosely coupled services in a rich internet application. It is expected that the candidate will fully understand the differences between a web portal and loosely coupled services.

It is expected that the client will discuss current Web 2.0 service providers (eg Yahoo, Google and Facebook) and how these web services provide information to other software applications.

Candidates should gain an understanding of REST (Representational State Transfer) and evaluate this web service design model as an alternative to Web services implemented using SOAP and Web Services Description Language (WSDL).

Candidates should gain an understanding of the differences between XML and HTML and why XML is suited for data exchange. The candidate should realise the limitations of other text files such as comma separated files in relation to data exchange over the internet.

RSS (Really Simple Syndication) is the underlying technique that enables sharing of blog posts, podcasts, news headlines, and other content on the web. The candidate should be able to describe the data contained in an RSS feed, RSS feed aggregators and RSS consumption.

Candidates should gain an understanding of current RIA development frameworks. At the time of writing the Unit specification current frameworks included Adobe Flex, Adobe AIR, and Microsoft Silverlight). It is expected the candidate will discuss the use of plug-ins to enhance the capabilities of browsers hosting rich internet applications (RIA).

Candidates should evaluate current Presentation Servers to gain an understanding of xml based interface markup languages such as MXML and LZX. At the time of writing the Unit specification current presentation servers include Adobe Flex and OpenLaszlo.

Candidates should incorporate diagrams to visually enhance reports.

## Higher National Unit specification: support notes (cont)

## Unit title: Developing Rich Internet Applications

**Outcome 2 and 3:** are practical assessments, the result of which will be a rich internet application that utilises RIA development techniques as discussed in Outcome 1.

The candidate should be able to analyse the given design brief and identify aims and objectives. Sketched wireframes should be produced to indicate layout of content and controls. Due to the rich interactivity a prototype should be produced to demonstrate intended behaviour of the final application. Prototypes should be produced early in the delivery of the Unit. Prototypes may be produced using familiar tools such as Microsoft PowerPoint.

It is expected that the application will execute on the client with limited interaction with the server. Interaction with the server should be asynchronous and based on HTML and JavaScript (AJAX). Example implementation of AJAX includes the following:

- Real time form data validation - Form data that requires server-side validation can be validated as the user types
- Auto completion — a specific portion of form data may be auto completed as the user types
- Master details operations — request detailed data without refreshing the page
- UI controls — controls such as tree controls, menus, and progress bars are implemented without refreshing the page

Subtle animation for presenting and dramatizing the interface should be evident in final application. Visual embellishments that provide luminosity and subtle transition effects should be encouraged. The candidate should appreciate the balance between subtle animation to enhance the user interface and animation which may distract the user.

A selection of RSS feeds should be provided as part of the design brief. Candidates are expected to display RSS feeds within the rich internet application. A selection of external Web Services should be provided as part of the design brief. The brief should detail methods exposed by the Web Service's API. Candidates are expected to display data received, as a result of the method call, within the rich internet application.

To achieve user defined content within the rich internet application the candidate should consider consuming third party data only on the request of the user at runtime.

Data should include information residing on a database. This database, including data tables, select queries and update queries, should be provided as part of the design brief. The database may be designed to hold user details gathered during a registration process. Database data may be used to personalise the user's experience. This may be implemented as user recognition and or details of previous interactions with the application.

All media content such as text, images, video and audio should be provided as part of the design brief.

## Higher National Unit specification: support notes (cont)

## Unit title: Developing Rich Internet Applications

## Guidance on the delivery and assessment of this Unit

This Unit is designed to provide candidates with the knowledge and an understanding that will enable candidates to engage in in-depth research, conceptualisation and critical analysis of the capabilities of rich internet applications (RIA).

The focus of the Unit should be on using a variety of technologies to create rich internet applications. It is recommended that centres provide the candidate with the media content, such as text, images, video and audio. The candidate should be provided with a database which contains the relevant data and queries to meet the given design brief.

The candidate should be provided with a selection of Web Services and RSS feeds to meet the given design brief. The candidate is not expected to create Web Services or RSS feeds.

To achieve user defined content within the rich internet application the candidate should consider consuming third party data only on the request of the user at runtime.

A suggested delivery sequence to this Unit would be the following:

- Outcome 1should is taught and assessed first so the candidate has the underpinning knowledge of rich internet applications, development tools and architecture. Recommended duration of Outcome 1 is 30 hours.

- Outcomes 2 and 3 should take the form of a small project. Recommended duration of Outcome 3 is 50 hours.

## Opportunities for developing Core Skills

There are opportunities to develop the Core Skill(s) of *Communication* Written Communication (Writing) and *Problem Solving* at SCQF level 6 in this Unit, although there is no automatic certification of Core Skills or Core Skills components.

## Open learning

This Unit could be delivered by distance learning that may incorporate some degree of on-line support.

However it would require planning be the centre to ensure the sufficiency and authenticity of candidate's evidence. Agreements would have to be made to ensure the assessment for Outcome one is delivered in a supervised environment under controlled conditions.

## Higher National Unit specification: support notes (cont)

**Unit title:** Developing Rich Internet Applications

## Disabled candidates and/or those with additional support needs

The additional support needs of individual candidates should be taken into account when planning learning experiences, selecting assessment instruments, or considering whether any reasonable adjustments may be required. Further advice can be found on our website **www.sqa.org.uk/assessmentarrangements**

## General information for candidates

## Unit title: Developing Rich Internet Applications

This Unit is designed to teach you the underpinning knowledge required for developing rich internet applications.

This Unit introduces the development tools and architecture of rich internet applications. You will learn how to receive XML data in the form of RSS feeds using aggregators or consuming data supplied by Web Services.

As the focus of this Unit is to implement a rich internet application, you will be given the content for the application such as text, graphics, audio and video. Animations will be subtle in nature and you will use the features of the development tool to achieve this.

This user interface will give the user a similar experience to using a desktop application, such as drag and drop and instant feedback without the need to refresh the 'page'. You will learn how to create an application that is described as rich and accessible via an online device.

On completion of the Unit you should be able to:

1 Discuss technology options for implementing Rich Internet Application.
2 Design and implement a Rich Internet Application.
3 Test the application.