Department of Education, Training and Youth Affairs

Technical Standards for Online Education and Training: A Scoping Study

Attachment B: Details of organisations, projects and standards

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Report to the EdNA Reference Committee

This report was commissioned by the Online Education & Training Section of the Commonwealth Department of Education, Training and Youth Affairs on behalf of the EdNA Reference Committee. The views expressed here do not necessarily represent the views of the Commonwealth Department of Education, Training and Youth Affairs.

NB: This attachment contains descriptions of organisations, projects and standards. All this material is available from the Reference section of the standards website http://standards.edna.edu.au site where it will be kept up to date. It is provided here in PDF format for completeness but will not be updated.

Attachment B: Details of organisations, projects and standards

Contents

1. Organisations, groups and projects

This attachment lists relevant organisations, groups and projects not described in the body of the report or the Glossary.

Dublin Core Education Working Group

The objectives of the working group are to discuss and develop a proposal for the use of Dublin Core metadata in the description of educational resources. The scope includes educational resources applicable for many national education communities and cross-sectoral communities (e.g., K-12, further and higher education and lifelong learning).

The working group will develop qualifiers and/or extensions to the Dublin Core element set that will describe educational material for the purpose of enhancing resource discovery. It is expected that the resulting metadata will include educational qualifiers that fall within the scope of existing Dublin Core elements and potentially some that are specific to the domain of education.

> http://purl.org/DC/groups/education.htm

Information on the Working Group's Mailing list is at:
> http://www.mailbase.ac.uk/lists/dc-education/

GEM: The Gateway to Educational Materials

"When teachers connect to The Gateway, they are able to access the Internet-based educational resources of participating GEM Consortium members. When they use The Gateway database, rather than an Internet search engine, teachers are able to locate resources they need quickly and efficiently."

"The Gateway currently includes resources from more than 100 collections, including the AskERIC Virtual Library, Math Forum, Microsoft Encarta, North Carolina Department of Public Instruction, and U.S. Department of Education."

> Project information: http://www.geminfo.org

> Search The Gateway: http://www.thegateway.org

PROMETEUS

PROmoting Multimedia access to Education and Training in EUropean Society.

With a clear underlying ideal of promoting the access to knowledge, education and training for all European citizens - regardless of their age, their work situation, their geographical location or their social status, the PROMETEUS initiative,

which has already brought together hundreds of public and private sector key players will seek, as a permanently open forum, to build, express and voice consensus views on any relevant issue that may be presented for its consideration.

In particular, the following issues will be addressed:

- optimal strategies for multicultural, multilingual learning solutions,

- new instructional and training approaches and new learning environments,

- affordable solutions & platforms based on open standards and best practices,

- publicly accessible and interoperable knowledge repositories,

    http://prometeus.org/

National Training Information Service (NTIS)

The National Training Information Service (NTIS) is a database on vocational education and training in Australia. It contains detailed information on courses, qualifications, training packages, competency standards and training organisations.

    http://www.anta.gov.au/ntis/

OZJAC - The Australian Course and Careers Database

"OZJAC is an easy-to-use computer program that can help young people and adults find the answers to their job, course and career questions. It brings together information on all accredited courses in Australia, links courses to jobs, and jobs to industry, with explanations of new concepts used in education, training and the labour market."

    http://www.curriculum.edu.au/ozjac/index.htm

Subject Gateways

The National Library homepage on Subject Gateways is at:
    http://www.nla.gov.au/initiatives/sg/

A number of Clearinghouses were established in Australia under the "Univserve" initiative but these are longer centrally supported. Clearinghouses being maintained by their host institutions are listed at: http://www.anu.edu.au/uniserve This includes Clearinghouses for Engineering, Health, Humanities & Social Science, Law and Science

Other Australian Subject Gateways include:

Metachem: a catalogue of chemistry resources which uses metadata technology from the DSTC.

    http://metachem.ch.adfa.edu.au

Agrigate: An Agriculture Information Gateway for Australian Researchers

http://www.agrigate.edu.au/

Australasian Virtual Engineering Library - AVEL: A gateway to Australasian engineering & IT resources.

http://avel.library.uq.edu.au/

The **Resource Discovery Network** in the UK provides access to a range of UK based Subject Gateways.

http://www.rdn.ac.uk/

IMESH toolkit

An architecture and toolkit for distributed subject gateways. The project will build on existing subject gateway software to develop a configurable, reusable and extensible toolkit for subject gateway providers.

http://www.imesh.org/toolkit/

The National Library of Australia recently hosted a working meeting of the Australian subject gateways. It was the first time all gateway owners were able to come together to discuss issues and intentions in common. A full report of the meeting is available at:

http://www.nla.gov.au/initiatives/sg/

Victorian Education Channel

The Victorian Education Channel is being developed to integrate the range of educational online initiatives, including the provision of online quality educational content to schools, TAFE Institutes, and the vocational education and training sector. A metadata standard compatible with EdNA is being developed.

http://www.sofweb.vic.edu.au/itb/inits/drc.htm

Business Entry Point

The Business Entry Point (BEP) is an initiative of the Australian Federal Government, and all States and Territories. It provides a service to Australian businesses to make it easier to deal with government.

Main site: http://www.business.gov.au/

For information about the use of metadata in the Business Entry Point, go to http://about.business.gov.au/ and select "Technical Issues".

ARIADNE

The Alliance of Remote Instructional Authoring and Distribution Networks for Europe (ARIADNE) is a project funded by the European Union Commission. It focuses of "the development of tools and methodologies for producing, managing and reusing computer-based pedagogical elements and telematics supported training curricula."

> http://ariadne.unil.ch/

World Standards Services Network

"WSSN is a network of publicly accessible World Wide Web servers of standards organizations around the world. Through the Web sites of its members, WSSN provides information on international, regional and national standardization and related activities and services."

> http://www.wssn.net/WSSN/

2. Resources related to intellectual property management

Propagate Project

"The Propagate research project as originally envisaged has now been completed. … The Propagate Project was established in late 1996 by two Australian Cooperative Multimedia Centres (Access CMC and Impart Corporation) with a grant from DETYA to work on ways to solve the many issues surrounding copyright and multimedia. Propagate liaised closely with the Imprimatur Project, supported by the European Union, which had done pioneering work in developing consensus based abstract classifications for the various roles involved in trading intellectual property. They had also developed a number of business and process models for various markets using these classifications.

Propagate aimed to solve the rights management problems of multiple media types in a digital environment and the reuse issues that will soon dominate sectors such as education, science and research. Propagate built on the Imprimatur project's abstract language and market business models, and in a coordinated effort, developed a truly innovative architecture for managing and trading rights and the assets to which such rights are attached."

> http://propagate.net

OpenRights Initiative

The MetaTrust Utility announces the OpenRights Initiative

> http://www.openrights.com/index.html

InterTrust The metatrust utility

> http://www.intertrust.com/

IMAGO Multimedia Law

This site is designed to provide multimedia producers with instructive information on copyright. It will examine the categories of multimedia content which qualify for copyright protection in Australia. It will also tell you how to find copyright owners and negotiate licences to use their material.

> http://wwwlaw.murdoch.edu.au/imago/

<indecs>

<indecs> (interoperability of data in e-commerce systems) is an international initiative of rights owners creating metadata standards for e-commerce. It is

supported under the European Commission info2000 programme embracing multimedia rights clearance systems (MMRCS).

http://www.indecs.org/

See also Bearman D, Miller E, Rust G, Trant J, Weibel S, "A Common Model to Support Interoperable Metadata: Progress report on reconciling metadata requirements from the Dublin Core and INDECS/DOI Communities" in D-Lib Magazine, January 1999

http://www.dlib.org/dlib/january99/bearman/01bearman.html

3. Standards areas

This section provides references and further descriptions of some of the technical standards referenced in Section 6 (Standards Areas) of the main body of this report.

Note: in this section "Internet standards" refers to those RFCs (Request for Comment) that are listed as standards in the master list of Standards at: ftp://ftp.isi.edu/in-notes/std/std1.txt

Network Infrastructure

What is it? This section covers general network infrastructure for transmission of data and standards for transfer of particular types of media.

General data transmission

What is it? Transmission of digital data independent of particular applications.

Examples of Standards

TCP/IP - Transmission Control Protocol / Internet Protocol

Broadly, the packet switching standards used by the Internet. TCP/IP can also be used on isolated LANs and LANs connected to the Internet. It may refer to the lowest level protocols, of IP packets, and the primary types of Internet packets and protocols for communication: TCP or UDP (User Datagram Protocol). Typically also means many other related protocols such as those for the Domain Name System (DNS).

    ftp://ftp.isi.edu/in-notes/std/std1.txt

IPV6 - Internet Protocol Version 6

Current TCP/IP addressing, low-level packet transport (TCP and UDP) and related protocols are Version 4, and have been relatively stable since the mid 1980s. IPV6 is a plan to extend the address space well beyond the current four billion 32 bit system, and to provide for higher data-rates, multicasting and Quality Of Service capabilities, to improve on the current Internet's inability to operate at broadband rates, multicast efficiently or guarantee bandwidth. IPV6 packets will run over the same links as today's IPV4 Internet traffic, but software in routers

and host computers will need to be upgraded to work with them. IPV6 is being experimentally deployed, but no-one knows when it will be widely adopted.

DOCSIS - Data over Cable Service Interface Specification

Standard for HFC (Hybrid Fibre-Coaxial cable) cable modems developed in the USA.

> http://www.catv.org/modem/standards/index.html

WAP

Wireless Application Protocol. A series of protocols to enable mobile devices, such as cellular phones, with limited user interface and bandwidth, to communicate with standard web sites and with sites specifically written for WAP devices using WML (Wireless Markup Language).

> http://www.wapforum.org

DSL

Digital Subscriber Line. Overall term for various methods of high-speed, bi-directional, communication over twisted pair cable initially installed for analogue telephones. "DSL" is a synonym for "xDSL" and covers technologies such as ADSL (Asymmetrical Digital Subscriber Line), HDSL (High-rate Digital Subscriber Line) VDSL (Very-high-rate Digital Subscriber Line) and their variants.

Text transfer

What is it? Standards for transmission of mainly text data for applications such as web pages, email and chat.

Examples of Standards

HTTP - Hyper-Text Transport Protocol

Provides communication between web browsers, servers and proxy servers. (Version 1.0 has been around since the early 1990s.)

> http://www.w3.org/Protocols/

NNTP - Network News Transport Protocol

Provides communication between readers and servers for Usenet "newsgroups" – a global, distributed discussion forum system which began in 1986.

> http://www.ietf.org/rfc/rfc0977.txt

IRC - Internet Relay Chat

Provides communication between IRC client and servers so that users may exchange line-at-a-time text "chat" in real-time, between individuals or as part of a group.

> http://www.ietf.org/rfc/rfc1459.txt

SMTP - Simple Mail Transport Protocol

Provides communication between email servers, and email clients sending mail to a server.

> http://www.ietf.org/rfc/rfc0821.txt

FTP - File Transfer Protocol

Provides communication between an FTP client and server, for sending and receiving files. Similar and earlier to HTTP, FTP servers are often considered part of the World Wide Web, since Web browsers support both FTP and HTTP. HTTP provides extra functionality. (1985, based on earlier work.)

> http://www.ietf.org/rfc/rfc0959.txt

Streamed media

What is it? Transmission and control of live and stored audio and video material which is viewed while being transferred as opposed to file transfer of audio and video material.

Examples of Standards

Mbone - Multicast backbone

A multicast backbone using the public Internet. It was initiated in 1992 on an experimental basis and made operational in 1996. The Internet is a point-to-point packet switching network, analogous to the postal system. Multicasting involves sending streams of packets to computers or routers which replicate the streams and send them to destination computers or to further points of replication – so that one source can serve and arbitrary number of client computers without having to send packets to each one.

The Mbone is not a protocol or Internet standard, but it is based on Internet standard IGMP, Host extensions for IP multicasting:

> http://www.ietf.org/rfc/rfc1112.txt

> ftp://venera.isi.edu/mbone/faq.txt

A 1995 history with technical explanation:

> http://ils.unc.edu/regan/cyber/mbone.html

SDP - Session Description Protocol

April 1998 Internet standard for describing multimedia sessions for the purposes of session announcement, session invitation, and other forms of multimedia session initiation.

http://www.ietf.org/rfc/rfc2327.txt

SDP is from the Multiparty Multimedia Session Control (mmusic) working group which is concerned with teleconferencing.

http://www.ietf.org/html.charters/mmusic-charter.html

RTP - Realtime Transport Protocol

1996 Internet standard: provides end-to-end network transport functions suitable for applications transmitting real-time data, such as audio, video or simulation data, over multicast or unicast network services. RTP does not address resource reservation and does not guarantee quality-of-service for real-time services.

http://www.ietf.org/rfc/rfc1889.txt
http://www.ietf.org/rfc/rfc1890.txt

Some history of this protocol, from 1996 is at:

http://www.cs.columbia.edu/~hgs/rtp/status.html

RTP was created by the Audio-Video Transport Working Group of the IETF, which no longer exists. It uses UDP packets, rather than TCP sessions.

RTCP - Real Time Control Protocol

Management protocol for RTP. Also known as the "RTP Control Protocol". Defined within RFC1889.

A good description of RTCP functionality is at:
http://www.mmrg.ecs.soton.ac.uk/publications/archive/ridgway1998/html/node28.html

RTSP - Real Time Streaming Protocol

Internet standard application-level protocol for control over the delivery of data with real-time properties. RTSP provides an extensible framework to enable controlled, on-demand delivery of real-time data, such as audio and video. Sources of data can include both live data feeds and stored clips. This protocol is intended to control multiple data delivery sessions, provide a means for choosing delivery channels such as UDP, multicast UDP and TCP, and provide a means for choosing delivery mechanisms based upon RTP.

http://www.ietf.org/rfc/rfc2326.txt

Client terminals

What is it? Description of standard configuration(s) and capabilities of end-user terminals for education and training.

Examples of Standards

ANTA CEOs Preferred Standard on PCs

> http://home.vicnet.net.au/~neptune/guidea.htm#Personal%20Computers

Directory Services

What is it? Standards for storing and accessing contact information about people and the relationship to their right to access electronic resources.

Examples of Standards

LDAP - Lightweight Directory Access Protocol

An Internet standard client-server protocol for accessing directory servers based on the X.500 or other directory structures. Directories are highly structured bodies of data, accessible with a global addressing scheme via a server, which may work with a network of other servers.

> http://www.ietf.org/rfc/rfc2589.txt
> http://www.ietf.org/rfc/rfc1959.txt
> http://www.kingsmountain.com/ldapRoadmap.shtml
> http://www.linux.org/help/ldp/howto/LDAP-HOWTO-1.html
> http://www.openldap.org/
> http://www.innosoft.com/ldapworld/

X.500

A directory structure first developed as part of the OSI networking architecture in the early 1990s.

> http://www.nexor.com/info/directory.htm

X.400

A largely obsolete email system, developed as part of OSI. While X.400 systems may interoperate with the ubiquitous Internet SMTP RFC821 based systems, the X.400 addressing format is incompatible with SMTP.

> http://www.itu.int//itudoc/itu-t/rec/f/index.html

> http://www.alvestrand.no/domen/x400/standards.html

Security and authentication

What is it? Standards and guidelines to ensure that networks are secure, that content can only be accessed by those authorised to do so, and that the identity of users is authenticated.

Examples of Standards

HTTPS - Secure Hyper Text Transport Protocol

HTTP operating over an encrypted SSL link rather than with the usual unencrypted TCP link. HTTPS generates fresh session keys and encrypts communications between the client and server (web browser and web server) so that interception of the communications are impossible, and so that an attacker cannot disrupt or alter the communication without being detected. HTTPS enables the server to authenticate itself, using digital signatures, digital certificates and an external Public Key Authentication Framework (PKAF). Standard web browsers support this and also enable the user to authenticate themselves in a similar fashion – although this is not widely used at present due to poor development of PKAF and consumer adoption of digital signatures.

> http://www.apache-ssl.org/

SSL - Secure Sockets Layer

Originally a Netscape specification, now universally adopted to provide secure two-way communications and authentication of client and server. SSL can be used for many protocols. Its most common application is for HTTPS. The cryptographic strength of SSL and therefore HTTPS is potentially more than enough to thwart all known attempts at brute force cracking. Recent relaxation of US export rules has made full-strength SSL software widely available.

> http://www.openssl.org/
> http://home.netscape.com/eng/ssl3/ssl-toc.html

The SSL protocol is being developed as the Internet Standard TLS – Transport Layer Security.

> ftp://ftp.isi.edu/in-notes/rfc2246.txt

PGP - Pretty Good Privacy

Originally written by Phil Zimmerman, a widely used program for encryption of email and files, using public-key encryption with key lengths which provide security against any known attack. PGP also provides digital signatures and has been adopted as an Internet standard.

> http://www.pgpi.org/
> http://www.openpgp.net/pgp.html
> http://www.pgp.com/
> ftp://ftp.isi.edu/in-notes/rfc2015.txt

ftp://ftp.isi.edu/in-notes/rfc2440.txt

Content filtering

What is it? Standards and systems for blocking access to undesirable or illegal resources.

Examples of Standards

PICS - Platform for Internet Content Selection

Developed by W3C (World Wide Web Consortium) to enable web and other content and resources to be labelled for the purpose of rating its content, such as for suitability for minors. Labels may be embedded in HTML files or be served by remote PICS servers. No particular scheme of rating content is proposed – PICS supports any number of user-defined value systems. PICS is not a filtering system, but could be used as the basis for same.

http://www.w3.org/PICS/

RSACi

RSAC on the Internet. RSAC was the US based Recreational Software Advisory Council, which transformed into the UK-based Internet Content Rating Association. RSACi is a ratings system, using PICS labels in HTML files, with which 120,000 sites have reportedly registered (August 1999.) Internet Explorer may be configured to filter content according to a site or page's RSACi rating.

http://www.icra.org/

Content Formats

What is it? Standards for components of online content.

Markup

What is it? Standards for markup for display and presentation of text and multimedia content.

Examples of Standards

SGML - Structured General Markup Language

A broad language for defining other markup languages, such as HTML. ISO 8879: Information processing –Text and office systems –Standard Generalized Markup Language.

> http://www.iso.ch/cate/d16387.html
> http://etext.virginia.edu/bin/tei-tocs?div=DIV1&id=SG

XML - Extensible Markup Language

W3C's standard intended to be a "universal format for structured documents and data on the Web."

> http://www.w3.org/XML/

WML - Wireless Markup Language

For defining pages to be displayed on WAP (Wireless Application Protocol browsers. For instance, the mobile equivalents of a web browser (Netscape or Internet Explorer), transport protocol (HTTP) and page description language (HTML) are a WAP mobile phone or other device, working with phone-company-hosted browser software, to interpret pages written in the WML language, rather than HTML. WAP/WML documents and applications can be served from standard web servers and transported over the Internet via HTTP.

> http://www.wapforum.org

HTML - HyperText Markup Language

A page description language which features the ability to define type font, size, colour, style, include graphics and to provide links to other resources, including other HTML files and to locations within those files. HTML was developed in the early 1990s and is currently being developed by the W3C, with varying compliance by major browser companies. The latest W3C recommendation is XHTML, a development from the late 1990s versions, but specified using XML.

> http://www.w3.org/MarkUp/

DHTML - Dynamic HTML

The W3C says: "DHTML is the marketing term applied to a mixture of standards including HTML, style sheets, the Document Object Model [DOM1] and scripting. However, there is no W3C specification that formally defines DHTML."

> http://www.w3.org/WAI/GL/WD-WCAG10-TECHS-20000211/#glossary

XHTML - Extensible HyperText Markup Language

W3C's reformulation of HTML 4 using XML. "XHTML is a family of current and future document types and modules that reproduce, subset, and extend HTML 4. XHTML family document types are XML based, and ultimately are designed to work in conjunction with XML-based user agents.

> http://www.w3.org/MarkUp/
> http://www.w3.org/TR/xhtml1/

SMIL - Synchronized Multimedia Integration Language

An HTML-like language for specifying a presentation composed of streaming audio, streaming video, images, text or any other media type.

http://www.w3.org/AudioVideo/

PDF - Portable Document Format

Adobe Inc's Postscript-based standard for specifying text, graphics and some other information such as indexes and links, with far greater precision and flexibility than HTML/XHTML including with Cascading Style Sheets (CSS).   Major browsers have PDF readers built in, for transparent viewing and printing of .PDF files. Acrobat software from Adobe creates the .PDF files. PDF is most suitable for documents with complex layout, including those designed for print, where it is not practical to manually convert the design to HTML and graphic images.

http://www.adobe.com/products/acrobat/main.html

Postscript

A printer control language developed by Adobe in the 1980s. Postscript has become the standard for high quality printers and all pre-press equipment. Virtually every offset printed book or magazine is defined at the printing plate making stage in Postscript.

http://partners.adobe.com/asn/developer/technotes.html

Graphics

What is it? Standards for graphic components of online content.

Examples of Standards

General technical references for graphics file formats are:

http://www.cica.indiana.edu/graphics/image.formats.html (1994, but still useful).
http://www.wotsit.org/ (Up-to-date encyclopaedic file format resource.)

GIF - Graphics Interchange Format

GIF images are composed of between two and 256 colours and are losslessly compressed. For hard-edge graphics, with a small number of colours, GIF provides exact reproduction, without the blurring and loss of detail which would typically occur with JPEG. Images can also be animated and have transparent areas. Unsuitable for quality photographic images, due to the restricted number of colours. GIF was developed by Compuserve and subject to a patent dispute, which lead to the development of alternative approaches, such as PNG.

http://www.geocities.co.jp/SiliconValley/3453/gif_info/index_en.html

JPEG - Joint Photographic Experts Group

JPEG files typically have names ending in ".jgp". A lossy compression algorithm for greyscale or full colour images. No absolute limit on number of colours. Higher compression ratios provide smaller file sizes, at the expense of smaller number of colours, less detail and greater distortion.

> http://www.faqs.org/faqs/jpeg-faq/

GIF and JPEG files are ubiquitous in the World Wide Web.

PNG - Portable Network Graphics

A loss-less non-animated compressed graphic format, intended to provide a patent free replacement for GIF and in some ways the full-quality TIFF file format. Variable transparency, full-quality (48 bit colour) and two dimensional interlacing are supported.

> http://www.cdrom.com/pub/png/
> http://www.libpng.org/pub/png/

SVG - Scalable Vector Graphics

SVG is a language for describing two-dimensional graphics in XML. SVG allows for three types of graphic objects: vector graphic shapes (e.g., paths consisting of straight lines and curves), images and text. Graphical objects can be grouped, styled, transformed and composited into previously rendered objects. SVG drawings can be dynamic and interactive. A rich set of event handlers such as onmouseover and onclick can be assigned to any SVG graphical object.

SVG is currently under development by W3C and is not yet a W3C Recommendation. Web browsers are expected to be SVG-capable in the future.

> http://www.w3.org/Graphics/SVG/

Audio / video

What is it? Standards for downloadable (as opposed to streamed) audio and video content.

Examples of Standards

MP3, MPEG and MPG

MP3 is the popular term for MPEG Audio Layer 3. MPEG is the Motion Picture Experts Group (of ISO/IEC) who defined two video compression standards, MPEG-1 and MPEG-2. As part of this they also defined audio compression, the most common of which was MPEG audio layer 2, which was often known simply as MPEG or MPG. The terms MPEG and MPG are also used to refer to MPEG-1 or perhaps MPEG-2 compressed video files. MPEG Audio Layer 3 (MP3) is a

high performance algorithm optimised for low data rates. It is capable of achieving "near CD quality" compression of stereo audio signals at data rates of 128 k bits per second. MP3 has been widely adopted in the music industry.

> http://www.cselt.it/mpeg/

> http://www.mp3.com

Real Networks formats

A variety of audio and video compression and streaming technologies, based on technologies developed by others, such as MP3 and Dolby's AAC. These are widely used proprietary "standards" from Real Networks Inc. previously known as Progressive Networks.

Real Audio can provide reasonable quality mono music, comparable to AM radio, over a 56 kbps modem.

> http://www.real.com/

AU and WAV

A .WAV file is a mono or stereo audio file, typically without compression. WAV was developed by Microsoft. .AU files are functionally similar, but are more often found on Macintosh and Unix systems and in Java programming. CD quality stereo digital audio is 1.411 megabits per second, or 10.6 megabytes per minute. Neither .WAV or .AU support high levels of compression, so MP3 or Real Audio is preferred for Internet applications.

AVI

A Microsoft audio and video compression system playable with Windows Media Player.

> http://www.microsoft.com/windows/mediaplayer/en/

Programming

What is it? Programming languages, especially those commonly used on the World Wide Web.

Examples of Standards

Javascript

A scripting language for web pages, which is typically encoded inside HTML files. Performs functions such as mouse roll-over graphics effects and form contents checking. Javascript was developed by Netscape but is supported by Microsoft's browsers too. Microsoft refers to it as "Jscript". Javascript shares

some common elements with Java, but is a completely separate and much simpler language.

> http://developer.netscape.com/docs/manuals/communicator/jsguide4/index.htm

Java

Java is a full-featured object-oriented programming language, based on C++ but with restrictions and refinements to optimise robustness and security – at the expense of execution speed. Both Netscape and Microsoft web browsers include a Java interpreter, so that Java programs can be downloaded from web sites and executed on the browser machine. Subject to security restrictions, the Java application has access to the screen, keyboard, pointing device, hard discs and can communicate with Internet-connected computers.

Java was developed by Sun as a commercial "standard", because of the need for a hardware independent interpreted language which would run on any computer. This lead to a process of making Java an open standard, and then to Microsoft implementing it in a non-standard manner, and the ISO/IEC and Sun disputing whether it could become an open standard.

Java enables programs of almost any complexity to run stand-alone or within web browsers, without dependence on the hardware or operating system of the user's computer. Java is likely to be highly significant in instructional applications and in the creation of application programs of all types which are not tied to any particular operating system.

> http://java.sun.com
> http://webopedia.internet.com/TERM/J/Java.html

CGI - Common Gateway Interface

Within a web server computer, the web server program can transfer information to other programs using the CGI interface. The output of the programs becomes the HTML page which is sent to the browser. CGI programs can be written in any language whatsoever, such as C, C++, Perl or Java.

> http://webopedia.internet.com/TERM/C/CGI.html

Perl - Practical Extraction and Report Language

A language optimised for processing text and most often used to provide sophisticated web pages and data processing by working with the web server program via the CGI interface. Perl is an interpretive language with clearly defined security parameters. It is slower and less sophisticated than a compiled language such as C++ - but easier to debug.

> http://www.perl.org/
> http://webopedia.internet.com/TERM/P/Perl.html

Accessibility issues

What is it? Ensuring that online content is available to the greatest range of users, including users with disabilities and users with low bandwidth connections.

Examples of Standards

WAI - Web Accessibility Initiative

W3C's attempt to improve the accessibility of the Web to people with disabilities.

> http://www.w3.org/WAI/

Resource Description and Resource Discovery

Metadata

What is it? Systems for consistent description of resources to facilitate resource discovery across distributed systems on electronic networks.

Examples of Standards

EdNA Metadata Standard

> http://standards.edna.edu.au/metadata

IMS Metadata Specification

> http://www.imsproject.org/metadata/

AEShareNet data structure

The AEShareNet Local System User Guide describes the data structure and coding systems for AEShareNet records which are designed to be compatible with the EdNA Metadata Standard.

> http://www.dytech.com.au/aesharenet/#Documentation

Ariadne Metadata

"ARIADNE has now released its new Metadata recommendation (ARIADNE version 3 official Metadata) based on the LOM (Learning Objects Metadata) 3.8 specification. This is now being implemented in the ARIADNE Knowledge Pool and indexation tools. The new Metadata will become operational in February and

will be fully backward compatible with the ARIADNE 1.0 Metadata currently in use."

http://ariadne.unil.ch/Metadata/

Also: Agreement with IMS - http://ariadne.unil.ch/Metadata/agreement.html

Open Groups - standard for describing online discussion

"Open Groups will help people to search, locate, evaluate, and join ongoing interactive public groups across the Internet through the development of open standards to describe online groups."
http://www.opengroups.org

See also a recent feature interview in the Online Community Report
http://www.onlinecommunityreport.com/features/opengroups/

RDF - Resource Description Framework

W3C's Resource Description Framework integrates a variety of web-based metadata activities including sitemaps, content ratings, stream channel definitions, search engine data collection (web crawling), digital library collections, and distributed authoring, using XML as an interchange syntax.

> http://www.w3.org/Metadata/
> http://www.w3.org/RDF/

Search interfaces and distributed searching

What is it? Consistency and interoperability in the way resources are searched for across different systems.

Examples of Standards

Z39.50

Z39.50 is a national standard defining a protocol for computer-to-computer information retrieval. Z39.50 makes it possible for a user in one system to search and retrieve information from other computer systems (that have also implemented Z39.50) without knowing the search syntax that is used by those other systems. Z39.50 is an American National Standard that was originally approved by the National Information Standards Organization (NISO) in 1988.

> http://lcweb.loc.gov/z3950/gateway.html#about

Vocabularies

What is it? Vocabularies are standard terminology to describe resources within a particular domain.

General vocabularies

What is it? Vocabularies which relate to a domain broader than education and training.

Examples of Standards

AGIFT - Australian Governments Interactive Functions Thesaurus

AGIFT is an online thesaurus that links plain English words with terms used by governments developed by a consortium of government and educational institutions.   AGIFT matches everyday words such as 'school' or 'kindergarten' with the various terms that government might use, like 'early childhood education'. The thesaurus covers the functions of all three levels of government, so that government services can be described consistently across Australia.

The core set of 450 AGIFT terms can be found at the following URL together with some frequently asked question:

http://www.fed.gov.au/webmanager/initiatives.htm

See also:

> http://www.naa.gov.au/media_releases/agift.htm
> http://www.naa.gov.au/recordkeeping/gov_online/agls/summary.html

Education vocabularies

What is it? Vocabularies specifically related to education and training.

Examples of Standards: AEI-TED, ASCED, AVETMISS Discipline Groups, Ozjac Subject Thesaurus, SCIS, UNESCO Thesaurus, VOCED Thesaurus. The DC-Education Working Group is currently developing educational qualifiers for Dublin Core elements.

General Applications

Web publishing

What is it? Ensuring that online content meets acceptable quality standards.

Examples of Standards: There are many sources of information and guidance on quality web publishing. The EdNA VET Quality Assurance System is available at: http://www.otfe.vic.gov.au/edna/quality/quality.htm

EdNA Online lists a variety of resources in the category "Publishing Resources" http://www.edna.edu.au/go/browse/528:9090

The Best practice checklist for Australian subject gateways is at: http://www.nla.gov.au/meta/sg/criteria.html

Email

What is it? Standards and guidelines for electronic mail.

Examples of Standards

POP3 - Post Office Protocol 3

An Internet standard (RFC1939) that enables an email client to retrieve emails from an account on a mail server. (Mail is sent from the client to the server, and between servers, with SMTP.)

> http://www.ietf.org/rfc/rfc1939.txt

IMAP - Internet Message Access Protocol

An Internet standard (RFC2060) comparable to POP, but with added functionality, including the ability to create mailboxes on the server, move messages between mailboxes, search messages on the server and client authentication by a secure challenge-response protocol rather than POP's approach of sending the password to the server.

> http://www.ietf.org/rfc/rfc2060.txt
> http://www.washington.edu/imap/

MIME - Multipurpose Internet Mail Extensions

An IETF (Internet Engineering Task Force) specification for sending non-text messages and files via text-only email. MIME types are an extension of this, whereby a web server informs the client (the browser) in the HTTP stream the nature of the data it is sending, enabling the browser to display it appropriately.

> http://webopedia.internet.com/TERM/M/MIME.html

Workgroup applications

What is it? Applications to allow people in dispersed locations to work together on tasks. Aspects of this include scheduling activities and working collaboratively on documents.

Examples of Standards

iCalendar - Internet Calendaring and Scheduling Core Object Specification

This document specifies an Internet standards track protocol to provide the definition of a common format for openly exchanging calendaring and scheduling information across the Internet.

> http://www.faqs.org/rfcs/rfc2445.html

ODMA - Open Document Management API

ODMA is the Open Document Management API. API stands for "Application Programming Interface" - a standardised set of data structures and methods which enable one computer program to use another. ODMA is a specification used by developers of Document Management Systems (DMS) rather than a communication protocol between two programs or computers. It enables multiple client programs (for users to read and modify documents) to be written to work with multiple "server" programs, each for a particular file type, such as MS Word, HTML, .PDF and .TIFF without having to write software specific to every combination of client and file type.

"Workflow" involves management of document creation when multiple authors are working simultaneously on a single document, or a project composed of many documents.

ODMA 2.0 was developed in September 1997 by the Association for Information & Image Management.

> http://www.aiim.org/odma/odma.htm

A protocol standard with some overlap with ODMA is the IETF WebDAV standard (HTTP Extensions for Distributed Authoring) of February 1999.

> http://www.ietf.org/rfc/rfc2518.txt

vCard and vCalendar

These two data-structure standards are intended to facilitate Personal Data Interchange (PDI). Originally developed by the "versit consortium", their development was taken over by the Internet Mail Consortium in late 1996.

http://www.imc.org/pdi/ lists the relevant Internet Standard RFCs which were developed by the IETF in late 1998 and 1999 and describes the two standards:

> vCard automates the exchange of personal information typically found on a traditional business card. vCard is used in applications such as Internet

mail, voice mail, Web browsers, telephony applications, call centers, video conferencing, PIMs (Personal Information Managers), PDAs (Personal Data Assistants), pagers, fax, office equipment, and smart cards. vCard information goes way beyond simple text, and includes elements like pictures, company logos, live Web addresses, and so on.

vCalendar defines a transport and platform-independent format for exchanging calendaring and scheduling information in an easy, automated, and consistent manner. It captures information about event and "to-do" items that are normally used by applications such as a personal information managers (PIMs) and group schedulers. Programs that use vCalendar can exchange important data about events so that you can schedule meetings with anyone who has a vCalendar-aware program.

Open Groups - standard for describing online discussion

"Open Groups will help people to search, locate, evaluate, and join ongoing interactive public groups across the Internet through the development of open standards to describe online groups."

http://www.opengroups.org

Videoconferencing

What is it? Synchronous two-way communication using audio and video. This can be enhanced by facilities such as graphic display, file sharing and application sharing.

Examples of Standards

A glossary of video conferencing terms, including standards is at:

http://www.tafe.sa.edu.au/video-conf/ppug/vc_gloss/glossary.htm

VET Preferred Standard on Videoconferencing

The VET Preferred Standards project has developed recommended standards and operating guidelines.

http://home.vicnet.net.au/~neptune/attvideo.htm

Delivery Platforms and Content Packaging

Delivery Platforms

What is it? Software systems used to manage the delivery of online content to students and to manage communications functions as part of the learning process.

Many delivery platforms also incorporate student management functions such as recording enrolments and student progress.

Examples of Standards

IMS Questions and Test Interoperability Specification

> http://www.imsproject.org/question/

IMS Enterprise Specification

"The objective of the IMS Enterprise specification documents is to define a standardised set of structures that can be used to exchange data between different systems. These structures provide the basis for standardised data bindings that allow software developers and implementers to create Instructional Management processes that interoperate across systems developed independently by various software developers."

> http://www.imsproject.org/enterprise/

Content Packaging

What is it? Data structures that are used to provide interoperability of Internet based content with content creation tools, learning management software, and run-time environments.

Examples of Standards

IMS Content Packaging specification

> http://www.imsproject.org/content/

Administration and Management

Student Records

What is it? Information about student enrolments and progress.

Examples of Standards: IMS Leaner Profile Specification, AICC component of IMS Enterprise Systems

Statistics

What is it? Collection of statistical information about education and training such as enrolments, educational delivery and course completions.

Examples of Standards

AVETMISS - The Australian Vocational Education & Training Management Information Statistical Standard

The AVETMIS Standard offers a nationally consistent standard for the collection and analysis of vocational education and training information throughout Australia.

http://www.ncver.edu.au/statistics/avetmiss30/