Technical Requirements and Recommendations for the Development of Virtual Museum of Canada (VMC) Exhibits and Games

January 2006
v. 1.4

Canadian Heritage Patrimoine canadien

Canada

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Acknowledgements

This document draws significantly from **Technical Standards and Guidelines for CCO-Funded Initiatives**, prepared by the **Canadian Culture Online (CCO)** branch of the **Department of Canadian Heritage**.

Introduction

This document contains the technical requirements, but also additional recommendations and best practices, for the development of **Virtual Museum of Canada (VMC)** virtual exhibits and interactive games approved by the **Canadian Heritage Information Network (CHIN)** through its **VMC Investment Program**.

A virtual exhibit or interactive game's conformance with the requirements addressed in this document is, as outlined in the **Agreement**, mandatory and part of the contractual obligations established between CHIN and the institution(s) producing the exhibit or game.

Please note that the requirements and recommendations contained in this document concern technical issues only, and not the creation of actual exhibit content. For example, a Web page should contain properly formatted text implemented following the specific technical requirements outlined in this document. However, the actual content of such text and standards against which to evaluate its quality are beyond the scope of this document.

As technologies and standards are continually evolving, this document will be updated regularly.

If you have any comments about particular requirements or recommendations, a particular technology not discussed in this document, or any other related matter, please contact CHIN at **service@chin.gc.ca** or toll-free at 1-800-520-2446.

Document Conventions

Requirements versus Recommendations

Any instruction listed as "**Required**" and located within a grey box is mandatory. The completed virtual exhibit or interactive game must demonstrate adherence to these instructions.

Instructions listed as "**Recommended**" and located outside any grey box are only suggested as best practices.

Terminology

Within this document,

- "**the product**" refers to the virtual exhibit or interactive game approved by CHIN's VMC Investment Program for development;
- "**the institution**" refers to the heritage institution (or group of heritage institutions) that is contractually responsible to CHIN for the creation of a virtual exhibit or interactive game, and that is generally understood to have the relevant expertise regarding the product's content;
- "**the developer**" refers to the Web or multimedia developer, or whoever is responsible for the technical development of the product itself; and,
- "**(X)HTML**" refers to both HTML and XHTML.

Document Links

Links to other sections of the document, external documents, and relevant Web sites and resources, are in blue and bold type. The inclusion of links to external Web sites and resources does not imply endorsement by CHIN, nor does their omission indicate censure.

Institutional Participation

In some cases, the institution will develop the product in-house. In others, the institution will contract the services of a third-party multimedia or Web developer. In either situation, it is important to note that certain technical requirements and recommendations listed in this document expressly advise the direct participation of the institution, as they involve the technical implementation of product content or components that should be created by content experts, i.e., the institution. For example, **metadata content** should be created by people with expertise in the product's subject area and its likely users, whereas the actual implementation of the metadata in the product itself is a procedure for the developer or whoever is responsible for the product's technical development.

Wherever the institution's involvement is advised, the requirement or recommendation is accompanied by the words "**INSTITUTIONAL PARTICIPATION**" in red and bold type. It is strongly advised that the institution take a proactive role where these specific requirements and recommendations are concerned, and equally, that the developer request it. The specific requirements and recommendations here concerned are the following:

4.0 File Directory Names and Structure
- **File and Directory Names**

5.0 Navigation and Layout
- **Copyright**
- **Credits**

6.0 Accessiblity
- **W3C Web Content Accessibility Guidelines**

7.0 Search Engine Optimization (SEO)
- **<Title> Element**
- **<Meta> "Keywords" and "Description" Elements**
- **Indexable Text and Text Links**
- **Heading Elements**

8.0 Metadata (Dublin Core)
- **Creating Metadata Content**

A Note Regarding Non-CHIN Hosted Products

For products that will **NOT** be hosted on CHIN's server, it is strongly recommended that the system administrator of the hosting server be contacted for information on that server's environment and other technical requirements.

Technical Requirements and Recommendations

Please note that certain of the following technical requirements and recommendations advise the active participation of the product's content experts, i.e., the institution. See **Institutional Participation** for more information.

1.0 Markup Languages and Scripts

Note: If the product is to be hosted on CHIN's server, see **9.0 Technical Requirements for CHIN-Hosted Content**, which includes more information concerning the requirements of CHIN's server environment and additional technologies it makes available.

Markup Language

Required

A. The product must be developed for delivery to a Web browser in either the "Strict" or "Transitional" variant of either **HyperText Markup Language (HTML)** or **Extensible HyperText Markup Language (XHTML)** as recommended by the **World Wide Web Consortium (W3C)**. Currently, these are **HTML 4.01** and **XHTML 1.0**.

Note: Use of the "Frameset" variant of either markup language is not permitted. Also, if using XHTML 1.0, it is important to understand the issues involved in serving XHTML as XML (MIME type "application/xhtml+xml") as opposed to HTML (MIME type "text/html"). For more on these issues, see the W3C's document, **XHTML Media Types**, as well as the W3C tutorial, **Character sets & encodings in XHTML, HTML and CSS**.

B. The product and all of its pages must validate against a **W3C-published Document Type Definition (DTD)** for either the "Strict" or "Transitional" variant of either **HTML 4.01** or **XHTML 1.0**, whichever markup language is used. The **W3C Markup Validation Service** will check both HTML and XHTML files for conformance to W3C recommendations and standards based on a specified DTD.

Note: Validating against approved grammars as defined by formal DTDs also addresses **checkpoint 3.2** of the **W3C's Web Content Accessibility Guidelines 1.0**, a checkpoint to which the product must conform. See **6.0 Accessibility**.

C. **Cascading Style Sheets (CSS)** used by the product must not be embedded or inline, but must be referenced as external files using the following code format:

```
<link rel="stylesheet" type="text/css" href="Css/styles.css">
```

Note: Replace "Css/styles.css" in the above example with the actual name and location of your CSS file. If using XHTML, make sure to properly close the <link> element, which is an **empty element**, by adding a space and trailing forward slash (/) before the closing angle bracket (>) in the <link> element, i.e.,

```
<link rel="stylesheet" type="text/css" href="Css/styles.css" />
```

Recommended

It is strongly suggested that Web pages separate their overall content and structure from their presentation. Use (X)HTML to determine the structure of the page content and **Cascading Style Sheets, level 1**, to determine its visual presentation. Separating the structure of a document from its presentational aspects reduces the cost of serving a wide range of platforms, media, etc., and facilitates document revisions, search engine optimization, and conformance with accessibility requirements.

All CSS should be validated with the assistance of validators before the product is published or submitted. The W3C provides an **online CSS validator**.

The use of Web authoring tools and technologies that will produce (X)HTML documents that can be properly displayed in multiple Web browsers is encouraged, as is the application of the principles of Web site interoperability across browsers and platforms.

Client-Side Scripts

Required

D. Client-side scripts used by the product must be compliant with **ECMAScript, version 3**, also known as ECMA-262.

E. Client-side scripts used by the product must be tested and functional using the Web browsers listed under **2.0 Browsers and Plug-Ins**.

Note: The key features of the product should function even when scripting is disabled in a browser. See **6.0 Accessibility**, especially **checkpoint 6.3**.

F. Client-side scripts used by the product must not be embedded within any page or object from which they are invoked. They must be placed in one or more external files that are referenced in the <head> section of the page, using the following code format:

```
<script language="javascript" type="text/javascript"
src="Scripts/script.js">
</script>
```

Note: Replace "Scripts/script.js" in the above example with the correct file name and path.

Recommended

It is recommended that client-side scripts be developed using either **JavaScript, version 1.5**, or **JScript, version 5.6**, which comply most closely with ECMAScript.

Character Encoding and Special Characters

Required

G. The product must use either **UTF-8** or **ISO-8859-1** character encoding. The encoding used must be declared within each of the product's Web pages.

For **HTML** documents, and **XHTML** documents served as HTML (MIME type "text/html"), the encoding must be established through a <meta> element "charset" declaration placed as near as possible to the top of the <head> section of the Web page, for example,

```
<meta http-equiv="Content-Type" content="text/html;charset=utf-8">
```

For **XHTML** documents served as XML (MIME type "application/xhtml+xml"), the <meta> "charset" declaration should not be used. Instead, declare the character encoding in the XML declaration that must appear as the first line of every Web page served as XML:

```
<?xml version="1.0" encoding="utf-8"?>
```

Note: For a discussion of the issues with character encoding and serving (X)HTML documents, see the W3C tutorial, **Character sets & encodings in XHTML, HTML and CSS**.

H. Use character entity references (e.g., “<” for “<”) or numerical character references (e.g., “<” for “<”) to express all special characters.

2.0 Browsers and Plug-Ins

Browsers

Required

A. The product must be viewable and fully functional in the following browsers for the Windows and Macintosh platforms:

Windows
- Microsoft Internet Explorer 5.01 and above;
- Netscape Navigator 7.0 and above; and,
- Firefox 1.0 and above.

Macintosh
- Microsoft Internet Explorer 5.1.7 and above;
- Netscape Navigator 7.0 and above;
- Firefox 1.0 and above; and,
- Safari 1.0 and above.

Note: The above list of browsers is current as of July 2005, but continually evolving and updated. Also please note that, in accordance with the requirements under **6.0 Accessibility**, the product must be accessible over slow or dial-up Internet connections using browsers that do not display graphics or images, and thus should be **tested and validated with a text-only browser or emulator**.

B. The use of browser-specific elements and/or technologies (e.g., Internet Explorer's <marquee> or Netscape Navigator's <blink> elements) is not permitted.

Plug-In and Media Playing Software

Required

C. Plug-in technologies must be platform-independent and supported by the Web browsers listed above under **Browsers**.

D. If, in order to be viewed, the product requires a plug-in or special media playing software such as Apple's **QuickTime Player**, Microsoft's **Windows Media Player**, Macromedia's **Flash Player**, or Real's **RealPlayer**, a link to the source of the plug-in or software must be provided and be accessible from each of the product's unilingual main pages and/or from the page(s) on which the plug-in or software is needed to access the content.

Secure Sockets Layer (SSL)

Required

E. The product must use the **Secure Sockets Layer (SSL)** protocol when any personal information (including, but not limited to, name, address, age, email address, telephone number, and credit card

number) is solicited from a user.

Note: It is not necessary to use SSL when soliciting a user's nickname only, for example, to store a high score in an online game.

3.0 Content Types and Format Standards

The following requirements and recommendations concern different types of content that can be used in the product and their permitted formats. It should be noted that many of the requirements listed in **6.0 Accessibility** also address the product's use of these content types and formats, and complement the requirements and recommendations listed below.

Text

Required

A. Text-based content must be developed for delivery to a Web browser in either the "Strict" or "Transitional" variant of either **HyperText Markup Language (HTML)** or **Extensible HyperText Markup Language (XHTML)** as recommended by the **World Wide Web Consortium (W3C)**. Currently, these are **HTML 4.01** and **XHTML 1.0**.

While all text-based content must be displayed as (X)HTML, such content can additionally be developed in a proprietary format for viewing or printing with the use of plug-in software freely available over the Internet. An example of this type of format is Adobe's **PDF**, which requires the use of the Adobe PDF viewer, **Adobe Reader**.

Text-based content can also be delivered in formats such as RTF or ASCII, or as a delimited text file. Content produced in such formats is acceptable if the files are intended for download, storage or manipulation by users outside of the browser environment, and if they are not meant to be a substitute to content created in (X)HTML.

Recommended

To promote the long-term viability of text-based content, it is recommended that product content be created and managed in a structured format suitable for delivery as (X)HTML documents. In most cases, storing text-based content as HTML, XHTML, **XML** or ASCII text will be the most appropriate option. This will reduce its dependence on any content creation or management software, or on the server environment in which it is stored. This, in turn, will extend the lifespan of the content.

Text-based content can also be developed and managed in a database or content management system. It is recommended that the product employ a system that will allow content to be exported in a standardized format such as a delimited text file. This will ensure that content in such environments is not completely dependent on a single application or platform and, at a minimum, that it can be migrated to new environments with greater ease.

It is strongly advised that machine translation be avoided, and that all of the product's text be double-checked for spelling and grammar. Further, to improve on-screen legibility, it is suggested that the use of italic text be avoided or limited to the emphasis of short words or phrases, and not longer passages or blocks of text.

Still Images

Note: See **6.0 Accessibility**, especially **checkpoint 1.1**, for additional requirements regarding still images, e.g., the use of the "alt" attribute.

Required

B. All graphics must be optimized and enhanced for the Web to reduce file size and download time:

- In the case of line-drawn graphics, the use of GIF or PNG formats is required.
- In the case of photographs, high resolution, and continuous tone images, the use of the JPEG (24-bit) format is required.

C. Exemptions to the above requirement (3B) may be granted by CHIN in certain situations where the use of proprietary solutions is needed to meet project objectives. These solutions must allow the relevant content to be viewed or experienced at no charge, e.g., through the use of a freely-available plug-in or media player. A justification must be provided for the use of such technologies in the context of the project's objectives. This could be the case, for example, where geographic maps are being digitized. In such cases, specialized solutions could be chosen to provide users with greater flexibility in viewing the digitized objects.

D. All links to large image files (i.e., files greater than 80 Kb) must carry a label that identifies the file size in order to alert users.

Video/Moving Images

Note: See **6.0 Accessibility**, especially **checkpoint 1.1**, for additional requirements regarding the use of moving images or video files, including Macromedia Shockwave/Director and Flash files.

Required

E. Video and moving image files must be prepared in a format that can be played by a freely-available player such as Apple's **QuickTime Player**, Microsoft's **Windows Media Player**, Macromedia's **Flash Player**, or Real's **RealPlayer**. This includes the following commonly accepted formats:

- AVI (.avi)
- Flash (.swf, .flv)
- MPEG (.mpg, .mpeg)
- QuickTime (.mov)
- RealVideo (.ram, .rm)
- Shockwave/Director (.dcr)
- Windows Media Video (.wmv)

Please consult CHIN for approval if you intend to use another format.

F. Video can be streamed or delivered as a file to be downloaded prior to viewing. If a video file is prepared for delivery in a high-bandwidth environment, an alternate low-bandwidth version must also be prepared and provided to users.

Some streaming systems allow producers to prepare a single video file that can be played at various streaming speeds corresponding to multiple Internet access speeds. In cases where such systems are used, a single version of a video file is sufficient.

Note: CHIN regularly contracts media streaming services from **Akamai**. If the product is to use video, it may be possible for it to use this service. For more information, contact CHIN.

G. Streamed video files that are loaded into a browser-embedded player must **not** start automatically, and the player must include controls for starting and stopping the video. This is to prevent large

video files from being automatically streamed without the express permission or control of the user, especially in the case of slow or dial-up Internet connections.

H. All links to large, non-streamed video files (i.e., greater than 80 Kb) must be accompanied by a label indicating the file's size and duration. All links to streamed video files must be accompanied by a label indicating the streamed file's duration.

I. Where a codec is used to compress video file content, the codec must be included in a standard platform (such as the Apple, Real or Microsoft platforms) or be freely-available for installation by users. A link to the codec must be provided for users who need to download and install it.

Audio/Sound

Note: See **6.0 Accessibility**, especially **checkpoint 1.1**, for additional requirements regarding the use of audio files.

Required

J. Sound or audio files must be prepared in a format that can be played by a freely-available player such as Apple's **QuickTime Player**, Microsoft's **Windows Media Player**, Macromedia's **Flash Player**, or Real's **RealPlayer**. This includes the following commonly accepted formats:

- Flash (.swf)
- MP3 (.mp3)
- RealAudio (.ram, .rm)
- WAV (.wav)
- Windows Media Audio (.wma)

Please consult CHIN for approval if you intend to use another format.

K. Audio can be streamed or delivered as a file to download prior to listening. If an audio file is prepared for delivery in a high-bandwidth environment, an alternate low-bandwidth version must also be prepared and provided to users.

Some streaming systems allow producers to prepare a single audio file than can be played at various streaming speeds corresponding to multiple Internet access speeds. In cases where such systems are used, a single version of an audio file is sufficient.

Note: CHIN regularly contracts media streaming services from **Akamai**. If the product is to use audio, it may be possible for it to use this service. For more information, contact CHIN.

L. Streamed audio files that are loaded into a browser-embedded player must **not** start automatically, and the player must include controls for starting and stopping the audio. This is to prevent large audio files from being automatically streamed without the express permission or control of the user, especially in the case of slow or dial-up Internet connections.

M. All links to large, non-streamed audio files (i.e., files greater than 80 Kb) must be accompanied by a label indicating the file's size and duration. All links to streamed audio files must be accompanied by a label indicating the streamed file's duration.

N. Where a codec is used to compress audio file content, it must be included in a standard platform (such as the Apple, Real or Microsoft platforms) or freely-available for installation by users. A link to the codec must be provided for users who need to download and install it.

Animations

Note: See **6.0 Accessibility**, especially **checkpoint 1.1**, for additional requirements regarding the use of animation files.

Required

O. Animation files must be prepared in a format that can be played by all browsers listed under **2.0 Browsers and Plug-Ins** or with the use of freely-available plug-in software. This includes the following commonly accepted formats:

- Animated GIF (.gif)
- Flash (.swf)
- Shockwave/Director (.dcr)

Please consult CHIN for approval if you intend to use another format.

P. All links to large animation files (i.e., files greater than 80 Kb) must be accompanied by a label indicating the file's size.

Recommended

It is recommended that animations be created on a platform based as much as possible on open standards, such as the **W3C's Scalable Vector Graphics (SVG)**, **SMIL**, or **MPEG4**.

Databases

Required

Q. If the product employs a database and is to be hosted on CHIN's server, the database must use the **MySQL Database Server** database management system (DBMS).

Note: See "Database" under **9.0 Technical Requirements for CHIN-Hosted Content**, for the latest version of MySQL in use on CHIN's server.

R. If the product employs a database and is to be hosted on CHIN's server, the database must be documented in a data dictionary that includes a list of all database files, and the name, type, and description of each field. The documentation must also include a graphical schema of the database, as well as explanations of the major decisions behind the database's design and structure, normalization, etc. This documentation will serve several purposes, including the facilitation of possible migrations, data recovery and preservation, and allow others to better understand the database in the case of future maintenance and software updates.

S. If the product employs a database and is to be hosted on CHIN's server, any information that is stored in the database and that indicates product usage must have an associated timestamp value for tracking and verification purposes.

Recommended

Databases used to store metadata should follow the **Open Archives Initiative Protocol for Metadata Harvesting**. This will allow access to data by harvesters such as those of cultural information gateways and metadata repositories. See **8.0 Metadata (Dublin Core)**.

It is recommended that any information that is stored in a database and that indicates product usage have an associated timestamp value for tracking and verification purposes, whether or not the product is to be hosted on CHIN's server.

4.0 File and Directory Names and Structure

Note: An institution whose product is to be hosted on CHIN's server may request special subdomains for each language version of the product (e.g., **english-exhibit-title.virtualmuseum.ca** and **french-exhibit-title.museevirtuel.ca**). As the use of subdomains impacts the product's file and directory structure, an institution's request for subdomains must be made to CHIN at the beginning of the product's development.

File and Directory Structure

Required

A. The product's top or root level directory, as well as all directories containing one or more Web page, must include a default page (e.g., index.html, default.html, index.php) that acts as the main page for that directory. See **5.0 Navigation and Layout** for the navigational structure that these pages must incorporate.

B. The product must include, within its top or root level directory, separate directories for each language version of the product. See **5.0 Navigation and Layout** for the navigational structure that these pages must incorporate.

C. Product files containing important content that is common to all language versions of the product (e.g., images, CSS, JavaScript) must be placed in unique directories located in the product's top or root level directory, and not be duplicated.

D. Product files specific to a particular language version of the product must be located within that language version's directory.

Recommended
The product's directory structure should include as few directory levels as possible, and four at the most.

Digital objects and resource files (e.g., image files, video or audio files, special text files, etc.) used in the product should be identified with a persistent (i.e., not dynamic) URL for the purposes of citation, cross-linking and integrated access. Objects retrieved from a database should not have dynamically-assigned identifiers (e.g., session keys) embedded within the URL as this defeats persistence. Additionally, internal URLs used in the product should be relative, and not absolute, to increase the ease with which product pages and files can be reorganized, for example, in the case of a redesign or a move to another server.

File and Directory Names

INSTITUTIONAL PARTICIPATION: The institution should work closely with the developer in establishing meaningful file and directory names that relate to the product content.

A well-considered set of file- and directory-naming practices offers multiple benefits in both the immediate and long terms. It will help manage digitization workflows, enable the portability of objects, offer better discovery by search engines, and increase visibility to users.

Consistent file and directory name conventions can also provide users with some information about where an object comes from. Some digital objects may be reused in places outside of the host institution and intelligent file naming can assist users in knowing where the object originated. It can also help ensure that objects are not overwritten where they are used for aggregation purposes (for example, collections of thumbnail images).

Required

E. The product's file and directory name rules and conventions must be documented.

F. All product directory and file names must use, to the greatest degree possible, recognized words, separated by hyphens (-) where necessary. The words should be meaningful, descriptive, intuitive to the institution and intended users, and use the language of the product version under consideration. Directory and file names must not include any spaces.

For example, a directory name such as " ManitobaHistory " or "Manitoba_History" is not recognized as a word or phrase, but can be made so by separating the individual words with a hyphen, i.e., "Manitoba-History."

Note: For products that are hosted on CHIN's server, the individual words in directory names must each begin with an upper-case letter, while file names must all be in lower-case. For example, "Manitoba-History" is a valid directory name, while "manitoba-history.html" is a valid file name.

G. All of the product's (X)HTML files must use the ".html" extension, and not the ".htm" extension.

5.0 Navigation and Layout

Every individual page in the product should be considered a potential landing page for visitors, especially those arriving via search engines. As such, it is important that Web pages, in addition to fulfilling the requirements below, provide visitors with information and navigational links to help them identify the resource they are visiting and access its other main sections or pages.

VMC Logo

Required

A. The VMC logo, which will be provided by CHIN, must be present at the top right-hand corner of each product page, including pop-up windows. The VMC logo must be displayed without any image border. The following JavaScript references and (X)HTML code must be incorporated in the product.

First, the product file needs to contain the following references to a JavaScript source file:

English

```
<script type="text/javascript" language="javascript"
src="http://www.virtualmuseum.ca/Logo_Script/english.js">
</script>
```

French

```
<script type="text/javascript" language="javascript"
src="http://www.museevirtuel.ca/Logo_Script/francais.js">
</script>
```

Second, the following (X)HTML code must be used to load the logo with the proper target:

English

```
<a href="http://www.virtualmuseum.ca"
onclick="javascript:gotoVirtualMuseumofCanada(); return false;"><img
src="Images/vmc_animated.gif" width="147" height="42" alt="Virtual
Museum of Canada" title="See more of the Virtual Museum of Canada"
/></a>
```

French

```
<a href="http://www.museevirtuel.ca"
onclick="javascript:gotoVirtualMuseumofCanada(); return false;"><img
src="Images/vmc_animated.gif" width="147" height="42" alt="Musée
virtuel du Canada" title="Pour voir davantage du Musée virtuel du
Canada" /></a>
```

Note: Replace "Images/vmc_animated.gif," as well as the “width” and “height” attributes, in the above code with the proper name, location, and dimensions of the logo image file.

Language Version Navigation

Required

B. The default page (e.g., index.html, default.html, index.php) within the product’s top or root level directory must act as the product’s language selection “splash” or entrance page and include a link

to each language version of the product.

C. The main page for each language version of the product must have a link to the other language version(s). This link must be visible without scrolling the page.

D. The default page (e.g., index.html, default.html, index.php) within the main directory for each language version of the product must act as the main entrance page for that language version, and include a link to each particular format of the product, e.g., Flash or (X)HTML, should they exist.

Recommended
It is recommended that each product page provide a link to its corresponding page in the product's alternate language version(s). It is also recommended that each product page provide a link to the product's alternate format(s), e.g., Flash or (X)HTML, should they exist.

Secondary/Pop-Up Window Navigation

Note: See **6.0 Accessibility**, especially **checkpoint 10.1**, for additional requirements regarding secondary/pop-up windows.

Required

E. All secondary or pop-up windows must:

- identify the window content as part of the product; and,
- provide a link to the home or entrance page of the product's relevant language version.

Recommended
Each link (<a> element) that generates a secondary or pop-up window should include a "target" attribute that assigns a name to the window. Subsequent links to (similar) secondary or pop-up windows can use the same "target" value (i.e., window name) and thus reuse the same window. This helps prevent the proliferation of open browser windows.

In the case that a visitor arrives at a secondary or pop-up window through a search engine, it is recommended that the window include a link to the Web page from which that window is normally reached through browsing the site. The window should also include a link to the main page of the directory that exists one level higher than the page from which the window is normally generated.

Copyright

INSTITUTIONAL PARTICIPATION: The institution should prepare the product's full copyright statement that will then be implemented by the developer.

Required

F. The product must include, in the form of a separate Web page, a full copyright statement that identifies all rights holders.

G. The copyright symbol, ©, the copyright holder and the year in which the product was launched, must appear on each product page and link to the full copyright statement (see **F** above), for example:

```
© Museum of History 2005. All Rights Reserved.
```

Note: If the institution holding the copyright is officially bilingual, use the institution's English name in the English version of the product, and the French institution name in the French version. If the institution is unilingual, use the same unilingual institution name in each language version.

Credits

INSTITUTIONAL PARTICIPATION: The institution should prepare the product's "Credits" section that will then be implemented by the developer.

Required

H. The product must have a "Credits" section that is linked to from the both the language selection "splash" page and each unilingual entrance page, and that acknowledges the financial participation of the Government of Canada as follows:

English

```
The [Name of Institution] gratefully acknowledges the financial
investment by the Department of Canadian Heritage in the creation of
this online presentation for the Virtual Museum of Canada.
```

French

```
Le [Nom de l'établissement] exprime sa reconnaissance au ministère du
Patrimoine canadien pour son investissement financier dans la création
de cette présentation en ligne dans le cadre du Musée virtuel du
Canada.
```

I. The "Credits" section must name and link to all institutional partners involved with the product.

Feedback Mechanism

Required

J. Each product page must include a link that allows for audience feedback. The feedback mechanism must be configured to also send an email to CHIN (**vmccc@virtualmuseum.ca** or **mvccc@museevirtuel.ca**) with a clear identification of the product in the subject line.

CHIN will provide, upon request, a PERL script that can be used to create the required email feedback mechanism.

Note: This does not alter the institution's responsibility for feedback as specified in clause 3.11 of the **Agreement**.

K. Users must be advised that their feedback messages are also being forwarded to CHIN, and be provided with a link to the CHIN Privacy Policy statement pop-up window (see the example below). Alternatively, information that identifies the user could be stripped from the feedback.

English Message Example

```
Your comments will also be forwarded to the Canadian Heritage
Information Network (CHIN), which has overall responsibility for the
Virtual Museum of Canada, to be used as part of its audience research.
```

```
Please see the CHIN Privacy Policy for more information.
```

French Message Example

```
Vos commentaires seront également acheminés au Réseau canadien
d'information sur le patrimoine (RCIP), qui a la responsabilité
globale du Musée virtuel du Canada. Ils seront utilisés à des fins de
recherche sur le public. Veuillez consulter la Politique du RCIP sur
la protection des renseignements personnels pour de plus amples
renseignements.
```

The following JavaScript references and (X)HTML code must be present to use the CHIN Privacy Policy statement pop-up window:

English JavaScript Reference

```
<script type="text/javascript" language="javascript"
src="http://www.virtualmuseum.ca/Logo_Script/english.js">
</script>
```

English (X)HTML

```
<a
href="http://www.virtualmuseum.ca/English/Common/copyright.html#privac
y" onclick="privPolicy(this.href,this.target,'...'); return
false;">Link Goes Here</a>
```

French JavaScript Reference

```
<script type="text/javascript" language="javascript"
src="http://www.museevirtuel.ca/Logo_Script/francais.js">
</script>
```

French (X)HTML

```
<a
href="http://www.museevirtuel.ca/Francais/Common/copyright.html#privac
y" onclick="privPolicy(this.href,this.target,'...'); return
false;">Link Goes Here</a>
```

Site Map

A site map is a hierarchically organized list of links to all of the major sections and pages of a Web site.

Note: A site map is not the same as a site index, which is an alphabetical listing of all pages in a site.

Required

L. Each language version of the product must include a Web page with a site map that uses text links, as opposed to graphical links or buttons.

M. Each page of the product must include a text link to the site map in the appropriate language to help ensure that human users and search engines can find every page of the product.

Navigational Headers and Footers

Required

N. The use of corporate or institutional Web site navigation, such as banners, headers or footers, is not permitted without CHIN's express approval.

Frames

Required

O. The use of frames, i.e., the "Frameset" variant of HTML or XHTML, is not permitted. (See **Markup Language** under **1.0 Markup Languages and Scripts**.)

6.0 Accessibility

For many people, accessing Web content is more complicated than clicking a mouse and operating an Internet connection. Some people rely on assistive technologies such as screen readers, Braille displays, audio browsers and voice-activated products to overcome the barriers presented by standard technologies. Assistive technologies, text-only browsers, and screen resolution should not stand in the way of people obtaining information.

The Internet offers a convenient information and content delivery channel. However, designing Web sites that are compatible with older, adaptive or portable communication devices is key to addressing the broadest possible array of communication styles, and to ensuring that information about products, programs and services is equally available to everyone. As a result, accessible Web design has become a priority to governments and industry worldwide. It is also the case that with increased accessibility comes increased usability, another reason to create accessible Web products.

Please note that beside the general moral requirement to ensure equal access to Web content, it is also an established requirement of Web projects funded by the Government of Canada that they be accessible.

W3C Web Content Accessibility Guidelines

INSTITUTIONAL PARTICIPATION: The institution should prepare the content for any text equivalent (e.g., “alt” and “longdesc” attributes) needed for non-text elements as required by **checkpoint 1.1** of the W3C's **Web Content Accessibility Guidelines 1.0** listed below. The text equivalents will then be implemented by the developer.

The **World Wide Web Consortium (W3C)** is an international consortium dedicated to the development of Web standards. Its mission is to “lead the World Wide Web to its full potential by developing protocols and guidelines that ensure long-term growth for the Web.”

One of the W3C’s main goals is to make the Web available and accessible to everyone, independent of hardware, software, connection speed, language, culture, geography, physical or mental ability. In 1999, the W3C's **Web Accessibility Initiative (WAI)** established its **Web Content Accessibility Guidelines 1.0**. These have since been generally accepted among the Web community as the working standard.

Required

A. The product must conform to **Priority 1 and Priority 2 checkpoints** (conformance level “Double-A”) of the W3C's **Web Content Accessibility Guidelines 1.0**. If, for whatever reasons, compliance with the required checkpoints is not possible, a proposal for an alternate version of the product shall be submitted to CHIN for approval at its sole discretion.

Note: The following summary list of Priority 1 and Priority 2 checkpoints is reprinted from the **List of Checkpoints for Web Content Accessibility Guidelines 1.0**, and includes all accessibility checkpoints to which the product must conform. Each checkpoint is linked to its complete definition on the **W3C's Web site**, as well as, where applicable, related information from **CHIN’s Internet Accessibility Tip Sheet**.

Priority 1 Checkpoints

In General (Priority 1)

1.1 Provide a text equivalent for every non-text element (e.g., via "alt", "longdesc", or in element content). *This includes*: images, graphical representations of text (including symbols), image

map regions, animations (e.g., animated GIFs), applets and programmatic objects, ascii art, frames, scripts, images used as list bullets, spacers, graphical buttons, sounds (played with or without user interaction), stand-alone audio files, audio tracks of video, and video. [See **CHIN's Internet Accessibility Tip Sheet, #1**.]

2.1 Ensure that all information conveyed with color is also available without color, for example from context or markup. [See **CHIN's Internet Accessibility Tip Sheet, #6**.]

4.1 Clearly identify changes in the natural language of a document's text and any text equivalents (e.g., captions). [See **CHIN's Internet Accessibility Tip Sheet, #7**.]

6.1 Organize documents so they may be read without style sheets. For example, when an HTML document is rendered without associated style sheets, it must still be possible to read the document. [See **CHIN's Internet Accessibility Tip Sheet, #5**.]

6.2 Ensure that equivalents for dynamic content are updated when the dynamic content changes.

7.1 Until user agents allow users to control flickering, avoid causing the screen to flicker. [See **CHIN's Internet Accessibility Tip Sheet, #8**.]

14.1 Use the clearest and simplest language appropriate for a site's content.

And if you use images and image maps (Priority 1)
1.2 Provide redundant text links for each active region of a server-side image map.

9.1 Provide client-side image maps instead of server-side image maps except where the regions cannot be defined with an available geometric shape.

And if you use tables (Priority 1) [See **CHIN's Internet Accessibility Tip Sheet, #4**.]
5.1 For data tables, identify row and column headers.

5.2 For data tables that have two or more logical levels of row or column headers, use markup to associate data cells and header cells.

....

And if you use applets and scripts (Priority 1)
6.3 Ensure that pages are usable when scripts, applets, or other programmatic objects are turned off or not supported. If this is not possible, provide equivalent information on an alternative accessible page. [See **CHIN's Internet Accessibility Tip Sheet, #15**.]

And if you use multimedia (Priority 1)
1.3 Until user agents can automatically read aloud the text equivalent of a visual track, provide an auditory description of the important information of the visual track of a multimedia presentation.

1.4 For any time-based multimedia presentation (e.g., a movie or animation), synchronize equivalent alternatives (e.g., captions or auditory descriptions of the visual track) with the presentation.

And if all else fails (Priority 1)
11.4 If, after best efforts, you cannot create an accessible page, provide a link to an alternative page that uses W3C technologies, is accessible, has equivalent information (or functionality), and is updated as often as the inaccessible (original) page. [See **CHIN's Internet Accessibility Tip Sheet, #18**.]

Priority 2 Checkpoints

In General (Priority 2)

2.2 Ensure that foreground and background color combinations provide sufficient contrast when viewed by someone having color deficits or when viewed on a black and white screen. [Priority 2 for images, Priority 3 for text]. [See **CHIN's Internet Accessibility Tip Sheet, #6**.]

3.1 When an appropriate markup language exists, use markup rather than images to convey information.

3.2 Create documents that validate to published formal grammars.

3.3 Use style sheets to control layout and presentation. [See **CHIN's Internet Accessibility Tip Sheet, #5**.]

3.4 Use relative rather than absolute units in markup language attribute values and style sheet property values. [See **CHIN's Internet Accessibility Tip Sheet, #12**.]

3.5 Use header elements to convey document structure and use them according to specification.

3.6 Mark up lists and list items properly.

3.7 Mark up quotations. Do not use quotation markup for formatting effects such as indentation.

6.5 Ensure that dynamic content is accessible or provide an alternative presentation or page.

7.2 Until user agents allow users to control blinking, avoid causing content to blink (i.e., change presentation at a regular rate, such as turning on and off). [See **CHIN's Internet Accessibility Tip Sheet, #8**.]

7.4 Until user agents provide the ability to stop the refresh, do not create periodically auto-refreshing pages.

7.5 Until user agents provide the ability to stop auto-redirect, do not use markup to redirect pages automatically. Instead, configure the server to perform redirects.

10.1 Until user agents allow users to turn off spawned windows, do not cause pop-ups or other windows to appear and do not change the current window without informing the user. [See **CHIN's Internet Accessibility Tip Sheet, #14**.]

11.1 Use W3C technologies when they are available and appropriate for a task and use the latest versions when supported.

11.2 Avoid deprecated features of W3C technologies. [See **CHIN's Internet Accessibility Tip Sheet, #9**.]

12.3 Divide large blocks of information into more manageable groups where natural and appropriate. [See **CHIN's Internet Accessibility Tip Sheet, #10**.]

13.1 Clearly identify the target of each link. [See **CHIN's Internet Accessibility Tip Sheet, #11**.]

13.2 Provide metadata to add semantic information to pages and sites.

13.3 Provide information about the general layout of a site (e.g., a site map or table of contents).

13.4 Use navigation mechanisms in a consistent manner.

And if you use tables (Priority 2) [See **CHIN's Internet Accessibility Tip Sheet, #4**.]
5.3 Do not use tables for layout unless the table makes sense when linearized. Otherwise, if the table does not make sense, provide an alternative equivalent (which may be a linearized version).

5.4 If a table is used for layout, do not use any structural markup for the purpose of visual formatting.

....

And if you use forms (Priority 2) [See **CHIN's Internet Accessibility Tip Sheet, #10**.]
10.2 Until user agents support explicit associations between labels and form controls, for all form controls with implicitly associated labels, ensure that the label is properly positioned.

12.4 Associate labels explicitly with their controls.

And if you use applets and scripts (Priority 2)
6.4 For scripts and applets, ensure that event handlers are input device-independent.

7.3 Until user agents allow users to freeze moving content, avoid movement in pages.

8.1 Make programmatic elements such as scripts and applets directly accessible or compatible with assistive technologies [Priority 1 if functionality is important and not presented elsewhere, otherwise Priority 2.]

9.2 Ensure that any element that has its own interface can be operated in a device-independent manner. [See **CHIN's Internet Accessibility Tip Sheet, #16**.]

9.3 For scripts, specify logical event handlers rather than device-dependent event handlers. [See **CHIN's Internet Accessibility Tip Sheet, #16**.]

Recommended
In order to further improve access to the product, it is recommended that, where feasible, the product also conform to the Priority 3 checkpoints of the W3C's **Web Content Accessibility Guidelines 1.0**, thus bringing the product's conformance level to "Triple-A."

The Priority 1 and Priority 2 checkpoints comprise a significant number of technical requirements and considerations, and should be reviewed early in the product's design and development.

For more detailed explanations of and implementation techniques for each of the checkpoints, refer to the following W3C documents:

- **Checklist of Checkpoints for Web Content Accessibility Guidelines 1.0**
- **Techniques for Web Content Accessibility Guidelines 1.0**
- **Core Techniques for Web Content Accessibility Guidelines 1.0**
- **HTML Techniques for Web Content Accessibility Guidelines 1.0**
- **CSS Techniques for Web Content Accessibility Guidelines 1.0**

In addition to the above documents, **CHIN's Internet Accessibility Tip Sheet** includes an overview of important points to consider when developing an accessible virtual exhibit, and provides links to a number of online accessibility resources.

It is also recommended that the product's adherence to the accessibility requirements be validated using one of several online accessibility validators available, such as **Watchfire WebXACT™ (Bobby)**, the **Cynthia Says™ Portal**, or the **Wave 3.0 Accessibility Tool**.

Additional resources on accessibility can also be found at the end of this document.

7.0 Search Engine Optimization (SEO)

The majority of Internet sessions on the Web begin with search engines. Those Web resources that search engines determine as having content relevant to a particular search will obviously have a greater chance of attracting as visitors the people performing that search. An important way, then, of potentially increasing the number of visitors to a Web site is to raise its visibility and ranking for specific searches in search engines. The procedures and methods for accomplishing this are known as search engine optimization (SEO).

Search engines index each of a Web site's pages as a standalone page. It is therefore possible that visitors arriving through a search engine could land on any of the individual Web pages within the site. For this reason, every page within a Web site should be considered a potential landing page and thus include appropriate, search engine friendly content.

Yet, SEO procedures must not ignore the fact that Web resources are for human users. In other words, SEO involves making Web content more visible to people using search engines. It is about preparing or modifying Web content intended for a human audience so that search engines might better index and rank it, thereby enabling users to better find it.

While all search engines follow particular steps and criteria when indexing and ranking Web resources, these steps and criteria are not the same for each search engine. Further, the search algorithms with which they rank Web content are continually changing. To accommodate this variability, the following requirements and recommendations are general and not search engine specific. Incorporating them into the product will help improve how it is indexed by search engines and the overall rankings it receives.

Note: It is important that the following SEO guidelines be considered early on in a Web product's design. This will help prevent the need for major changes to the product later on during development as a result of trying to retro-fit the product for search engine friendliness. It will also aid in the preparation of content for the different (X)HTML elements that must be included in every Web page, e.g., the <title> and <meta> "keywords" and "description" elements.

A Note on Keywords

A keyword is a word or sequence of characters, e.g., "manitoba," that people type into a search engine when performing a search for Web resources with certain content. A keyphrase is a short phrase or sequence of words, e.g., "manitoba history," that acts as a keyword insofar as it is entered as a unit in a search engine.

Keywords and keyphrases are also the specific words and phrases that can meaningfully be used to identify a text's central subject(s) and/or meaning(s). Of course, this is why people use them in search engines to find particular content, and why search engines rank Web resources according to the keywords they contain and their relative frequency. For this reason, including text with appropriate keywords placed in prominant positions on the page will help increase the Web resource's chance of ranking higher for searches based on those keywords. See **Indexable Text and Text Links**.

Online tools to aid in the identification and creation of relevant and popular keywords and keyphrases are available. **Overture's Keyword Selector Tool** is free, while **WordTracker** provides a more comprehensive service for a subscription fee.

<Title> Element

INSTITUTIONAL PARTICIPATION: The institution should prepare each product page's <title> element that will then be implemented by the developer.

The <title> element appears within the <head> section of a Web page and is used to describe the page's content for both users and search engines. The <title> element is the most important element from an SEO perspective. Ideally, the <title> element will contain keywords and keyphrases that are popular search terms, and thereby help increase the number of people that find the page when using search engines. The content of a page's <title> element is displayed as the window header in a Web browser, in bookmarks and in search results.

Required

A. Each page of the product must include in its <head> section a <title> element containing a meaningful and keyword-rich title for that page's content. Each page must therefore have a <title> element unique to that page.

Recommended
CHIN recommends the following guidelines when creating a page's <title> element:

- Place the page's important keywords or keyphrases in the <title> element in order of their decreasing importance.
- The <title> element should not exceed 64 characters (including spaces and punctuation) in length.
- The <title> element should be legible and function meaningfully as a general heading to the entire page.

<Meta> "Keywords" and "Description" Elements

INSTITUTIONAL PARTICIPATION: The institution should prepare each product page's <meta> "keywords" and "description" elements that will then be implemented by the developer.

Note: Do not confuse the (X)HTML <meta> "keywords" and "description" elements with Dublin Core or other metadata elements that also use the <meta> tag. See **8.0 Metadata (Dublin Core)**.

The <meta> "keywords" and "description" elements appear within the <head> section of a Web page and are used to further describe the page's content for both users and search engines. While the <title> element has remained a crucial element in establishing a Web page's search engine ranking, the <meta> "keywords" and "description" elements are not as important, although they should be used thoughtfully and correctly. Incorrect use of the <meta> "keywords" element, for instance, can negatively affect a site's search engine rankings.

When a Web resource is listed in search engine results, there is usually some descriptive text that accompanies the link to that resource. If the <meta> "description" element for the resource contains the word or phrase searched for, it will be displayed along with the link. Otherwise, the search engine will use an excerpt from the resource's page content that contains the relevant search word or phrase.

Ideally, the <meta> "keywords" and "description" elements will contain keywords and keyphrases that are popular search terms, and thereby help increase the number of people that find your site when using search engines.

Required

B. Each product page must include in the <head> section a <meta> "keywords" element containing a list of keywords and keyphrases for that page's content. Each page must therefore have a <meta> "keywords" element unique to that page. Separating the keywords and keyphrases with commas is optional.

C. Each product page must include in the <head> section a <meta> "description" element containing a meaningful and keyword-rich description of that page's content. Each page must therefore have a <meta> "description" element unique to that page.

Recommended
CHIN recommends the following guidelines when creating a page's <meta> "keywords" and "description" elements:

- Place the page's important keywords or keyphrases in the <meta> "keywords" and "description" elements in order of their decreasing importance.
- The <meta> "keywords" element should not exceed 1024 characters (including spaces and punctuation) in length.
- Place common misspellings and alternate spellings (i.e., color, colour) of your important keywords and keyphrases in the <meta> "keywords" element.
- The <meta> "description" element should not exceed 250 characters (including spaces and punctuation) in length, and be written as a paragraph. This description is often used in search engine results to provide users with additional information on the resource.

Indexable Text and Text Links

INSTITUTIONAL PARTICIPATION: The institution should prepare the product pages' indexable text that will then be implemented by the developer.

A good way to help a Web resource achieve high rankings is to make sure that it contains throughout well-written, keyword-rich text with text links (hyperlinked text). Search engines can only index text, and thus prefer Web resources containing text and text links. Text contained in images cannot be read by search engines, and so does not count towards a page's ranking. Search engines also give greater relative importance to keywords and keyphrases that are linked to other resources, whether the latter are located within the same site or not.

However, it is crucial to note that simply adding a bunch of text with the same keywords repeated over and over, and similar behaviour, is regarded as trickery or "spam" by most search engines, and offending sites will normally be punished in their search engine rankings. Search engines are continually working to thwart those who have developed tricks in the attempt to artificially inflate a particular Web resource's ranking. See **Spam** under **7.0 Search Engine Optimization (SEO)**.

Recommended
It is recommended that each product page include in the <body> section some keyword-rich, meaningful, indexable text related to the page content. This is especially important for the product's unilingual entrance pages, which are the most important pages for search engines. Place the most important keywords or keyphrases near the top of the page. The ideal amount of text for each page is 250 to 500 words, except in the case of posting a larger text document (e.g., a journal article or research report) in (X)HTML, in which case the amount of text on the page will be significantly greater.

Also add keyword-rich and meaningful text links to as many of the product's pages as possible. Keep in mind that the links should remain meaningful and legible to human readers. Also ensure that the links are search engine compatible, and therefore do not use "javascript" as the URI, i.e., in the <a> element's "href" attribute (see **checkpoint 6.5** under **6.0 Accessibility**).

Heading Elements

INSTITUTIONAL PARTICIPATION: The institution should prepare and organize the product's <h1> and other heading elements that will then be implemented by the developer.

The structure of a Web page's <body> content should be indicated through the use of heading tags (<h1> through <h6>) and other structural markup elements. This helps search engines to understand the relative importance of the different content on a page. Of all the heading elements, the <h1> element, which can be viewed as the main headline or heading for all of the page content below it, is the most important. It can only be used once per Web page.

Recommended
The entrance page for each of the product's language-specific versions should include in the <body> section an <h1> heading element containing a meaningful and keyword-rich headline or main title for the page.

In addition to the <h1> heading element, the remaining heading elements (i.e., <h2> through <h6>) should be applied hierarchically to the titles of important sections or paragraphs within the page to emphasize the document's structure.

Note: The <h1> heading element is not the same, nor should it necessarily contain the same content, as the page's <title> element. Also note that the size and style of all heading elements (i.e., <h1> through <h6>) can be established using Cascading Style Sheets.

Site Map

The site map is an important component of search engine optimization, and serves to demonstrate the navigational structure of the site, providing search engines with a single location in which can they can find all the links needed to index all sections of the site. See **Site Map** under **5.0 Navigation and Layout** for the requirements regarding the product's use of a site map.

Flash

While search engines are improving their ability to index Flash Web sites, the degree to which they currently do remains well below the degree to which traditional Web sites are indexed. Information and text embedded graphically in Flash movies cannot be indexed, and in the case of Web sites built entirely in Flash, there may be only one Web page used, leading search engines to disregard the site for its apparent lack of pages with content. These issues also raise concerns for the accessibility of Flash Web sites and resources. Se **6.0 Accessibility**, especially **checkpoint 11.1** and **checkpoint 9.2**.

Recommended
For products developed in Flash, CHIN recommends either of the following:

- Separate each 'page' or section of the Flash site into an individual Flash movie that can be loaded from its own (X)HTML page. Additionally, add a short passage of text to each individual page, above or below the Flash movie, describing the content or purpose of the page. While Flash-based transitions between pages of the site will no longer be functional, the number of pages the product has, and their attractiveness to search engines, will increase.
- Create an alternate version of the Flash site in search engine friendly (X)HTML, which will provide a site that can be entirely indexed by search engines, while also leaving all Flash transitions intact in the Flash version.

File Directory Structure

The closer a product is to the root directory of the Web site domain in which it is located, the more likely it is to be indexed by search engines. For example, Google indexes only up to two levels deep on its first visit (e.g., www.website.ca/First_Level/Second_Level/), meaning that pages located deeper in the site's directory structure are indexed less often. Some search engines do not even index content more than several directory levels deep. In addition, search engines generally view pages located closer to a site's root directory to be more important, helping to increase their ranking within search engines.

Recommended
A Web product's file directories (i.e., the 'folders' containing all of the site's content and other files) should be located as closely as possible to the top or root directory level of the active domain in which the product is located. The fewer directory levels a product has, the better, three or four levels being ideal.

Dynamic URLs

Recommended
Until dynamic content is indexed as well as static content, dynamic URLs (i.e., the URL contains a '?' character and usually one or more parameter names and their values) should contain no more than two parameters whose names and values are as short as possible. The parameter names should be as meaningful as possible, e.g., use the word "status" as opposed to the letter "s." Also, avoid using "SID" (or "sid") and "ID" (or "id") as parameter names since Google and some other search engines will not index dynamic URLs containing such parameters, which they take to indicate the use of session IDs.

Spam

Deliberately manipulating a Web page to artificially raise its search engine rankings is called spamming, and is frowned upon by all search engines, though different search engines have different definitions of what comprises spamming. Common among search engines, however, is their disdain for spamming, and their tendency to punish spammers, at the least lowering spammers' standings in search results, if not outright omitting them.

For more information on spam, as well as some SEO best practices, **Google** and **Yahoo!** each provide some information on what to do and what not to do when designing a Web site for their search engines:

- **Google Information for Webmasters**
- **Yahoo! Help>Search Spam and Deletions**

8.0 Metadata (Dublin Core)

What are Metadata?

Note: Do not confuse this type of metadata, which also uses the <meta> tag, with the <meta> “keywords” and “description” elements. See **<Meta> "Keywords" and "Description" Elements** under **7.0 Search Engine Optimization (SEO)**.

Metadata, or “data about data,” are defined as structured descriptions of digital (e.g., Web pages, digitized images, digital learning objects, etc.) or non-digital (e.g., physical objects in museum collections) objects. Metadata, like library catalogues, connect users to the information they want to find and use. In the online world, applying metadata to Web resources can, among other things, help manage content, ease rights management, improve search engine visibility as well as site navigation.

Metadata can exist at various levels of granularity, and can be used to describe:

- objects in a museum's collection (for example, a record in a collections management database);
- the museum's collection in more general terms (for example, a "collection-level description" in an online directory of museums);
- a virtual exhibit;
- the individual images featured in that exhibit.

Metadata can be stored separately from the objects to which they are applied, or embedded within them:

- In the case of physical museum objects, metadata are normally stored separately, for example, in a database.
- For digitized images, some metadata may be stored in a database, while other metadata may be stored in a special information header that becomes part of the image file during the digitization process.
- For Web sites, metadata are often embedded in the <head> section of individual Web pages. Search engines sometimes use this embedded metadata to index the site. Sometimes only a <link> element is stored in the page’s <head> section and points to metadata that are stored in a separate file. Metadata describing Web sites can also be stored in a database to be used in a local application.

For further information on embedding metadata within digital resources, see **Standards for Encoding Metadata** on the **CHIN Web site**.

The individual pieces of metadata (i.e., title, author, description, date, language, etc.) are known as elements. Specific groupings of these elements are called element sets, and sometimes shemas. To ensure interoperability, it is important to use existing metadata element sets whenever possible.

Metadata requirements should be defined early in the project planning cycle. Metadata creation should be integrated into the digital production and development cycle rather than be left to the end of the process. This will allow for the establishment of requirements and a plan for appropriate resources and training at the beginning of product development.

Dublin Core

The most widely used metadata schema for resource discovery is the **Dublin Core (DC) Metadata Element Set, Version 1.1**, adopted in 2003 by the International Standards Organization (ISO). It is also the required metadata element set for application with VMC products.

Developed by the **Dublin Core (DC) Metadata Initiative**, an open forum composed of individuals from diverse disciplines and all over the world, the DC Element Set is intended to be simple to use, and general enough to be applied to resources in any discipline. It defines the categories of information to record about a resource (such as a Web page, a document, or an image) in order for the resource to be easily "discovered." For an introduction to using DC metadata elements, see **Using Dublin Core**, and especially its section, **The Elements**.

The DC Metadata Element Set, Version 1.1, consists of 15 metadata elements: **Title**, **Creator**, **Subject**, **Description**, **Publisher**, **Contributor**, **Date**, **Type**, **Format**, **Identifier**, **Source**, **Language**, **Relation**, **Coverage**, and **Rights**. These 15 elements are designed for simple resource discovery. However, in some applications, it may be necessary to refine or qualify the meanings of the DC metadata. In these scenarios, the meanings of simple DC elements can be refined through the use of **Dublin Core Qualifiers** or other encoding schemes. For example, the DC.Date element can be refined to DC.Date.Created. Qualifiers can refine the meanings of DC elements, but not extend them.

It is recognized that the DC Element Set will not cover the needs of all users, and will not be sufficient for purposes other than simple resource discovery. For example, DC will not handle all of the information needed for museum collections management or documentation, etc. Within any given metadata application, it may be necessary to combine more than one existing metadata schema, or to extend an existing metadata schema with local elements. A particular metadata application that uses more than one metadata element set (possibly including locally defined sets) is sometimes referred to as an application profile. For further information on the use of application profiles, see **Standards for Encoding Metadata** on the **CHIN Web site**.

Specialized metadata element sets do exist for educational and other cultural materials not explicitly included in the DC set, such as audio-visual, collective and rights management resources.

Where special metadata applications are required, it is intended that local implementations or communities of users (such as the museum community) will use DC as the standard, and develop their own extensions to meet their discipline-specific or local needs. In practice, this often happens the other way around: the museum will use a discipline-specific standard in order to document and manage its collections, and extract a subset of its collections records that map to the DC Element Set. These DC records can then be used for purposes of data exchange and simple resource discovery. This is particularly important for sharing data across disciplines, or in collaborative projects. The DC Metadata Element Set is also available in **French**.

Creating Metadata Content

INSTITUTIONAL PARTICIPATION: The institution should prepare the product's metadata content that will then be implemented by the developer.

The quality of the metadata produced will directly affect how successfully the product content will be found. The higher the quality of the metadata, the more likely the online resource will be discovered by users. It is therefore important that individuals responsible for metadata creation be properly trained to carry out this task. Institutions should consider the use of subject specialists or professional indexers and cataloguers. At the very least, the individual creating the metadata should have a good understanding of the content and its potential interests to users.

Several tools are available to assist with the creation of metadata:

- **DC-dot** will automatically generate DC metadata for any web page. It will generate the metadata either as (X)HTML <meta> elements, or as RDF/XML.
- **Other metadata tools and software** are also available from the **Dublin Core Web site**.

Required

A. Metadata content describing the product as a whole must be prepared for each of the product's language-specific entrance pages and include the following seven metadata elements from the **Dublin Core Metadata Element Set, Version 1.1**:

- Title
- Creator
- Subject
- Description
- Date
- Identifier
- Language (where applicable)

Recommended

It is recommended that metadata content for the remaining eight elements of the **Dublin Core Metadata Element Set, Version 1.1** also be prepared and implemented based on their relevance to the product. These optional elements are:

- Publisher
- Contributor
- Type
- Format
- Source
- Relation
- Coverage
- Rights

Dublin Core Qualifiers may be used to further refine a particular DC metadata element. Additional metadata elements not listed above may also be employed. It is strongly recommended that additional elements be selected from existing international metadata standards. This will provide projects with greater long-term flexibility and a solid foundation for interoperability.

As important as identifying the actual metadata elements to use is the question of what product content should be described by metadata. Is the insertion of metadata on the main page of a site sufficient? Should it appear on the first page of each main section? **Requirement A** above calls for metadata to be applied, at a minimum, to the product's unilingual entrance pages.

The more product pages that contain metadata, the better. However, since each product is unique, each will need to be evaluated individually to determine the placement of and degree to which metadata should be used. To help determine this, CHIN recommends that the following principles be applied:

- The page contents described by metadata should be resources that are worth listing in a search engine and for which there is sufficient context and meaning. A navigation button such as "Top of Page" would likely not be worth describing with metadata, but a digitized photo from a museum collection would be.
- Apply metadata to pages containing content in which users will likely be interested.
- Keep in mind that the more pages that have metadata, the greater the product's visibility will be.

Implementing Metadata

Required

B. All product metadata must be expressed in a standardized way that can be read, searched, and exchanged by computer systems.

Metadata can be expressed in (X)HTML or **RDF/XML** (Resource Description Framework/Extensible Markup Language). Simple metadata, such as unqualified Dublin Core elements, can easily be expressed in (X)HTML. More complex metadata, such as qualified Dublin Core elements, can be expressed in (X)HTML, but with limitations. RDF/XML has been used more successfully for highly-structured, complex metadata.

See the following documents for help with expressing metadata:

- **Expressing Dublin Core in HTML/XHTML meta and link elements**
- **Expressing Simple Dublin Core in RDF/XML**
- **Expressing Qualified Dublin Core in RDF/XML**

9.0 Technical Requirements for CHIN-Hosted Content

CHIN Web Server Environment

Required

A. Products to be hosted on CHIN's server must be developed for and in accordance with the following environment specifications:

Server
- UNIX – Sun Solaris 2.8
- Apache 1.3.28
- HTML pages require the ".html" suffix or extension.

CGI and PERL
- CGI scripts require the ".cgi" extension, and can be located anywhere in a project's directory structure of the project.
- PERL 5.8 is enabled.
- PERL and CGI scripts require the following "shebang" notation:

```
#!/home/webland/Personal/bin/perl
use strict;
```

- Most standard PERL modules are available, for example, CGI, DBI.

PHP
- PHP 4.0.4 is enabled.
- PHP scripts must use the ".php" extension.
- PHP scripts can be located anywhere in the project's directory structure.
- PHP access to MySQL is enabled.
- PHP support for XML is enabled.
- The addition of PHP extensions will be decided by CHIN on a case by case basis. If you are interested in using a particular PHP extension, enquire with CHIN.

Script Validation
PHP and Perl scripts must adhere to the following validation rules:

- All parameters passed to scripts must be validated before they are used.
- All local variables must be explicitly initialized before they are used.
- Parameters that may only contain values from constrained sets must be validated to ensure that their values are within those constrained sets.
- Parameters must be validated to ensure that their values are of the expected type. For example, if a parameter is to contain only numbers, the value passed must validate as numeric.
- Parameters used as criteria for dynamically generated SQL statements must be escaped (with a backslash) prior to being used in an SQL statement.
- Included/required files must be validated to ensure that their file paths exist on the host server.
- Included/required files must be validated to ensure that they are files.

Server-Side Includes (SSI)
Any HTML page with the ".html" suffix or extension and the execute bit set will be parsed for SSI.

Database
- MySQL 5.0

- Direct access to the MySQL database management system (DBMS) will be granted by special permission only. In the case that permission is granted, access will be available through a SSH/command line interface.
- The Department of Canadian Heritage network policy does not permit the use of graphical interfaces for connecting to the database server from outside of the departmental network.
- For the creation of the database structure or the loading of table data, a MySQL-compliant SQL file may be sent to CHIN for loading onto the DBMS.

Note: Any information that is stored in a database and that indicates product usage must have an associated timestamp value for tracking and verification purposes.

Additional Resources

Note: Inclusion of links to resources below does not imply endorsement by the Canadian Heritage Information Network, nor does their omission indicate censure.

Accessibililty

ATRC Web Accessibility Checker

Checklist of Checkpoints for Web Content Accessibility Guidelines 1.0 (W3C)

CHIN's Internet Accessibility Tip Sheet

Core Techniques for Web Content Accessibility Guidelines 1.0 (W3C)

CSS Techniques for Web Content Accessibility Guidelines 1.0 (W3C)

Cynthia Says™ Portal accessibility validator

CLF for the Internet—Accessibility (Government of Canada)

Common Look and Feel Self-Assessment Guide: Accessibility (Government of Canada)

HTML Techniques for Web Content Accessibility Guidelines 1.0 (W3C)

Techniques for Web Content Accessibility Guidelines 1.0 (W3C)

Web Content Accessibility Guidelines 1.0 (W3C)

Watchfire WebXACT™ (Bobby) accessibility validator

Wave 3.0 Accessibility Tool

WebAIM – Web Accessibility in Mind

Metadata

CHIN's MetaCollector (CHIN member access only)

Metadata Standards for Museum Cataloguing (CHIN)

DC-dot — Dublin Core metadata editor

Dublin Core (DC) Metadata Element Set, Version 1.1: Reference Description

Dublin Core (DC) Metadata Initiative

Dublin Core Qualifiers

Expressing Dublin Core in HTML/XHTML meta and link elements

Expressing Simple Dublin Core in RDF/XML

Expressing Qualified Dublin Core in RDF/XML

Government of Canada Metadata Implementation Guide For Web Resources

Introduction to Metadata: Pathways to Digital Information (Getty Research Institute)

Tools and Software (Dublin Core)

Search Engine Optimization

12 Essential Strategies for Building & Structuring Inbound Links

CHIN's Marketing Your Online Heritage Projects Tip Sheet

CreatingOnline.com — Free Online Keyword Density Analysis

Google Information for Webmasters

High Rankings Search Engine Optimization Information and Search Engine Marketing Tips

KeywordDensity.com — Keyword Density Analyzer

Overture's Keyword Selector Tool (free)

Webjectives.com — Webjectives Keyword Density Analyzer

WordTracker — Keywords to improve search engine placement and ranking (subscription-based)

Yahoo! Help>Search Help>Search Spam & Deletions

(X)HTML and CSS

Character sets & encodings in XHTML, HTML and CSS (W3C)

Common Look and Feel for the Internet (Government of Canada)

CSS Tutorial — W3Schools

CSS Zen Garden: The Beauty in CSS Design

Government of Canada Internet Guide

HTML 4.01 Reference — W3Schools

HTML 4.01 Specification (W3C)

HTML and XHTML Frequently Answered Questions (W3C)

HTML Tidy

HyperText Markup Language (HTML) Home Page (W3C)

Markup Validation Service (W3C)

Serving XHTML 1.0 (W3C)

XHTML™ 1.0 The Extensible HyperText Markup Language (Second Edition) (W3C)

XHTML Media Types (W3C)

XHTML Reference — W3Schools