

Technical Notes on Website Development and Maintenance

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Office of the Government Chief Information Officer
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1. Introduction

This document supplements the “Guidelines on Dissemination of Information through Government Websites”. It highlights some useful technical information and good practices in developing websites for reference by Government bureaux and departments (“B/Ds”) to enable effective, efficient, and user friendly dissemination of information through websites.

2. Registration of Domain Names

Domain names are Internet addresses of websites. When setting up websites, B/Ds are advised to register a bilingual pair of English and Chinese domain names under the “gov.hk” and “政府.香港” categories to facilitate public access.

Reference

Hong Kong Internet Registration Corporation Limited (HKIRC)
<https://www.hkirc.hk>

Domain Name Registration Policies, Procedures and Guidelines for .hk and
.香港 Domain Names
<https://www.hkirc.hk/content.jsp?id=33>

Hong Kong Domain Name Registration Company Limited (HKDNR)
<https://www.hkdnr.hk>

3. Use of Portable Document Format

Use the Portable Document Format (“PDF”) only for very long documents or when the exact formatting must be preserved. We should avoid using PDF file for information that is of wide public interest because PDF file may not be readable on mobile devices or by users without the necessary reader. Whenever PDF file is used, provide a hyperlink to access the required reader software. PDF should be produced by proper PDF creation tools instead of scanning from a document, as scanned image of text is inherently inaccessible.

Image-based documents, such as TIF files produced by scanning, should be converted into a text-based document with Optical Character Recognition (“OCR”) software prior to producing the PDF file. Alternative text (alt text

or Alt Text) should be provided for pictures (except for decorative purpose) in your document and it would help people with screen readers to understand the content of pictures. One way to test if a PDF file is accessible is to select a portion of the text with the “text select” function in the Adobe Reader, copy them onto a text document and then check if the text is editable. For pictures, you can check if alternative text appears when you move the pointer over a picture.

Use Password Protection in PDF

If password protection is required for a PDF file, relevant accessibility option permitting access by screen readers should be enabled, such as “Enable text access for screen reader devices for the visually impaired” option in the “Password Security Settings dialog” must be enabled when creating a PDF file. This feature allows screen readers to access the content of the PDF file while preventing users from copying, printing and editing the file.

Convert PDF files to Fast Web View PDF files

Convert the PDF files to Fast Web View PDF files before uploading to the websites to minimise file size and facilitate page-at-a-time downloading. To facilitate keyword searching, the document summary of the PDF file containing information on the author, document title, keywords, etc. should be properly completed.

Reference

PDF Techniques for WCAG 2.0
<https://www.w3.org/TR/WCAG-TECHS/pdf.html>

4. Bilingual Pages

Use separate pages for the Chinese and English versions. This is to avoid upsetting English screen reader software which cannot handle Chinese encoding.

If the entry page is in Chinese, the link to the ‘English version’ should be placed at the top left-hand corner of the website to facilitate language switching. Limitation in English screen reader software is also the reason for placing the English version as a link of the website.

Government websites should include simplified Chinese version in addition

to the English and traditional Chinese versions to enhance the accessibility of the websites to other Chinese communities. Web Content Hosting (WCH) Service of OGCIO provides Simplified Chinese Conversion Service (https://itginfo.ccgo.hksarg/content/wch/wh_newSC.asp) (for government internal access only) which provides conversion into simplified Chinese version in offline mode. Webmasters should verify and review the translated web content before publishing.

Online Translation

For websites that use their own online translation system to convert traditional Chinese character web pages to simplified Chinese character web pages, a disclaimer should be included in every Government website to remind users that the content in the translated version are conversion from the traditional Chinese character version using a translation software, and users should verify the translated version by making reference to the published traditional Chinese character version.

ISO/IEC 10646 coding standard

The ISO/IEC 10646 coding standard should be adopted for newly established Chinese version websites or websites undergoing major revamp. The adoption of the ISO/IEC 10646 standard and the HKSCS provides a unified coding standard that ensures compatibility.

To foster the adoption of international standards, only ISO/IEC 10646 code points will be assigned for newly included HKSCS characters and Big 5 code point has ceased to be assigned since 31 March 2008. Existing “Big5” or “Big5-HKSCS” encoded web pages should also be migrated to the ISO/IEC 10646 standard.

Charset Code

The "charset" code should be included in all web pages to facilitate web browsers to choose the character type. The “charset” code should be put before the <title> tag to avoid any potential display problem if the title has Chinese characters. The “charset” code should be added between <head> and </head>, or before <body> tags in the following way:

- (a) In the HTML5, the charset declaration should be:

```
<META charset="UTF-8">
```

(b) In the HTML4, the charset declaration should be:

```
<META HTTP-EQUIV="Content-Type"  
CONTENT="text/html; charset=utf-8">
```

Notes:

(c) Some HKSCS characters were assigned to Private Use Area (PUA) code points when the versions of the ISO/IEC 10646 did not include them. Since the release of the ISO/IEC 10646:2011, all HKSCS-2008 characters are included.

Webmasters are advised to check and convert the PUA characters to standard code points for better content searching and interchange. The following on-line tool can detect the PUA characters of a web page:
<http://www.ccli.gov.hk/iicore/iicore.html>.

Reference

Common Chinese Language Interface
<https://www.ccli.gov.hk/eindex.html>

ISO/IEC 10646 & Hong Kong Supplementary Character Set (HKSCS) (*for government internal access only*)
<https://itginfo.cgo.hksarg/content/hkscs/index.htm>

5. Browser Requirements

To facilitate the public users in accessing Government websites, web pages should be viewable and supported by the prevailing versions of popular browsers. Industry standard HTML should be followed and browser-specific features should be avoided for best compatibility with most browsers.

B/Ds should test their web pages with all popular browsers prior to

production launch, and re-test as soon as possible upon launch of new browser versions.

6. Screen Layout Design

In addition to desktop devices, it is now a major trend for the public users to access government websites through mobile devices. It will optimise user experiences in surfing government websites with devices of different screen or window sizes if websites can automatically detect the sizes and adjust web page layouts accordingly for best viewing effects.

Responsive web design (RWD) is a prevailing approach for implementing websites to cater for different screen sizes. B/Ds should actively consider adopting RWD to enhance viewing experience when implementing or revamping their websites. An example is the Data.Gov.HK Portal for Public Sector Information (<https://data.gov.hk>).

7. Optimise the Performance of the Websites

Many users may access government websites through mobile devices with limited bandwidth and there is cost implication for viewing web pages of large file sizes. As such, when designing websites, developers should take necessary measures to optimise the sizes of web pages and the corresponding multimedia files. The following paragraphs highlight some of the related best practices.

Remove Unnecessary HTML Tags

Unnecessary tags increase page size and induce poor semantics. Nested HTML tags are one of the common reasons of bloated HTML pages. Unnecessary or empty tags should be removed.

Avoid Inline Cascading Style Sheets (CSS) and JavaScript

Inline CSS and JavaScript codes not only increase page sizes, but also discourage the separation of functionalities. The “presentation layer” (CSS) and “behaviour layer” (JavaScript) of a web page should be separated from its structure (HTML). Separating resources files also improves the response time of a page because browsers can concurrently download the files and the page.

Enable Compression

Modern browsers support compression for HTTP requests. Enabling

compression on web servers can reduce the sizes of the HTTP responses, and hence can significantly reduce the amount of time in downloading resources, reduce data usage of the clients, and improve the time of rendering web pages.

Leverage Browser Caching

Downloading web pages may require multiple roundtrips between the clients and servers. All web server responses should specify a caching policy to help the clients determine if and when it can reuse previously downloaded contents. Less frequent updated contents, such as images, CSS and JavaScript coding, might have longer caching time, while more frequently updated contents might have no caching and shorter caching time.

Minify Resources

Minification of resources reduces the sizes of HTTP responses by removing unnecessary or redundant data, such as code comments and formatting, unused code segments, long variable and function names. There are many free tools available from the Internet for minification of various resources.

Optimise Image Sizes

As images often account for most of the downloaded bytes of a web page, optimising image sizes can often result in large byte savings and performance improvements.

8. Use of HTML5

B/Ds should actively consider using HTML5 upon development or revamping of websites. The main advantages are as follows:

- It is mobile device friendly, eases the development of mobile websites and makes it possible for mobile websites to access some smart phone native functions, e.g. GPS locations.
- It is an industry standard and supported by all popular browsers. Adopting HTML5 improve website compatibility across browsers.

- It supports video and audio web contents and is convenient for playing back multimedia files directly in browsers without the need of additional software.

Reference

HTML5
<https://www.w3.org/TR/html5/>

9. Improve Site Visibility to Public Users

Search Engine Optimisation

To ensure websites have high rankings among search engine results, B/Ds should include in the descriptive titles and meta tags “descriptions” and “keywords” with keywords commonly used by users to search for the web pages. The visibility of web pages in search engine results is generally improved if the meta tags are descriptive, relevant, precise and meaningful.

Besides, it is a common practice for the popular search engines (e.g. Google) to publish their own guidelines for search engine optimisation of their own products. B/Ds may refer to these guidelines for reference. Here is an example of a Google guideline: Search Engine Optimization (SEO) Starter Guide (<https://support.google.com/webmasters/answer/7451184?hl=en>)

Reference

GovHK Search Service (*for government internal access only*)
<https://itginfo.ccgo.hksarg/content/ns/gsg-search.asp>

10. User Feedback

The views, opinions and feedback from public users may help improve the design and enrich the contents of the websites. Collections of user feedbacks can be carried out via online and/or offline channel(s), e.g. user satisfaction survey, focus group discussions and etc. Through these exercises, it not only provides better understanding on users’ needs and satisfaction towards the websites, but also identifies areas of improvement. The findings can be used to enhance the design of the websites for better user experiences, and enrich the contents of the websites for better meeting user needs.

11. User Preference

For better relations with website users and their best viewing experience, Government websites should recognise a user's previous preferences by storing his/her preferred language, font size and/or colour preference, etc., in cookie(s) based on the last access. When a user accesses a government website, B/Ds should check the cookie(s) about the stored user preferences and automatically redirect to the welcome message page of the corresponding language preference with appropriate font size and/or colour preference. However, if the user's browser does not have that cookie and it is not a departmental website, it should go to the first language selection page of the website as usual. If it is a departmental website, "Common Look and Feel Guidelines and Design Specifications" should be referred.

Reference

Common Look and Feel Guidelines and Design Specifications (*for government internal access only*)

<https://itginfo.ccgo.hksarg/content/clf/download.htm>

It is important to note that, if cookies are used in a government website, the website must have a notice under Important Notices for providing relevant information on the purpose, the kind of data to be stored, and the expiry date, etc..

For cookies related to collection of personal data of users, please refer to the relevant information on the purpose, the kind of data to be stored,

12. Web Accessibility Conformance Logo and Statement

Government web pages conforming to W3C WCAG 2.0 Level AA standard should display the corresponding W3C conformance logo to claim the relevant conformance and to help raise awareness of web accessibility design. By default, the scope of the claim by a W3C WCAG 2.0 Level AA conformance logo refers to a single web page. If the claim is meant to apply to include more than one web page, the conformance icon may be accompanied by explicit scope information explaining which web pages are covered by the claim.

For non-conforming web pages, exceptions must be justified and a "web accessibility conformance" statement / explanation with the following logo should be provided:

**WEB ACCESSIBILITY
CONFORMANCE**

This “Web Accessibility Conformance” logo can be downloaded in <http://itginfo.ccgo.hksarg/content/accessibility/statements.htm>. When users click on this icon, it should link to a web page with a “web accessibility conformance” statement / explanation.

B/Ds should set out their own “web accessibility conformance” statement / explanation according to their circumstances.

Reference

W3C WCAG 2.0 Conformance Logos

<https://www.w3.org/WAI/WCAG2-Conformance>

Web/Mobile App Accessibility Campaign

https://www.ogcio.gov.hk/en/our_work/community/web_mobileapp_accessibility/

13. Linking up with the Data.Gov.HK Portal

As announced in the 2014-15 Budget, the Government will make all information released online and free of charge for public consumption available in machine-readable formats for free re-use from 2015 onwards. Under this initiative, B/Ds should release Public Sector Information (PSI) datasets in digital formats for all information released online and free of charge for public consumption starting from 2015. Examples of such PSI datasets are tables, documents and images provided in B/D websites for online perusal or downloading.

In this regard, the Data.Gov.HK Portal has been launched since March 2015 to disseminate PSI in digital formats for the public. The “Guidelines for the Dissemination of PSI” includes the standards, best practices and other technical arrangements for linking up B/Ds’ PSI with the Data.Gov.HK Portal.

Reference

DATA.GOV.HK (*for government internal access only*)

<http://psi.host.ccgo.hksarg/en/index.htm>

14. Other Related References

The following references are also related to the implementation and maintenance of government websites.

Reference

IT Security

<https://www.infosec.gov.hk/english/main.html>

Central Internet Services - Central Internet Gateway (*for government internal access only*)

https://itginfo.ccgo.hksarg/content/ias/ia_desc.asp

HKSARG Interoperability Framework

https://www.ogcio.gov.hk/en/our_work/infrastructure/e_government/if/interoperability_framework.html

Electronic Transactions Ordinance

https://www.ogcio.gov.hk/en/our_work/regulation/eto/