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1194.22 (a) A text equivalent for every non-text element shall be provided (e.g., via "alt", "longdesc", or in element content).

What does this requirement mean?

Terms and Definitions

text equivalent –words added as (electronically readable) text to represent the purpose of a non-text element.

non-text element – any element that is not presented in electronically readable text and that conveys meaning that is required for comprehension of content or to facilitate navigation. (e.g., an image, image of text, graphic, audio clip, or other element).

Assumptions

Assume that informed humans can reasonably consistently judge whether the alternative text is actually equivalent in meaning and/or function of the non-text element, and whether the text equivalents are accurate.

Questions and Clarifications

1. Is [a text version of the] audio description required as text equivalent for video in a multimedia web page?

   No. Essentially this is 'doubling up' accessibility for usability – it suggests providing an alternate form (text) for the alternate form (audio description) of the original information content (video).

2. Is a mathematical equation considered a non-text element?

   No. If the mathematical equation is represented numerically or with some appropriate markup (e.g. MathML), then this provision does not require a text equivalent. However, if the mathematical equation is presented by a graphic image, then as with all graphic images a text equivalent is required.

How can I tell if this requirement is met?

Identify the non-text elements that require text alternatives.

1. Some tips for inspection of HTML to help identify non-text elements and their text equivalents.
   a. Search the HTML source for "IMG" tags. For each IMG, note if there is an "alt" or "longdesc" attribute. The "alt" attribute should always be present (although for spacer and other non-content images, the value of "alt" should be ALT=""). The "longdesc" attribute is optional, and should be used when the text needed to describe the function of the graphic is too long for an alt text. The longdesc can also optionally be used to describe visual information not critical to page comprehension or use. Note if adequate alternative text is contained within the element content.

b. Search the HTML source for image maps (image with an "ismap" or "usemap" attribute). For each map, note if there is an "alt" text equivalent provided for all active links. Note if adequate alternative text is contained within the element content.
c. Search the HTML source for <APPLET> or <OBJECT> or <EMBED> tags. For each <applet> element, note if there is an "alt" attribute or nested content which provides the text equivalent. For each <object> element, note if there is nested content which provides the text equivalent. For each <embed> element, note if there is an "alt" attribute.

Note: There are authoring tools that can help to identify and prevent potential accessibility problems with a resulting Web page. It may be a good suggestion to explore the availability of such tools when issuing RFPs.

2. Apply AT to verify that all images have appropriate text equivalent. **Note the use of AT as a measurement method is limited by the adequacy of algorithms and heuristic methods of the specific AT tool used**. It can be used to identify problems with specific AT-E&IT interoperability but it cannot predict results with other AT or with other versions of the same AT, OS, application or accessibility architecture. AT should include the full range e.g. screen readers, screen magnifiers, alternate input devices, etc

Note: Satisfying this requirement will support interoperability between user agents, such as Web browsers, media players and plug ins, and assistive technology such as screen readers and magnifiers

Where can I get additional information?

1. Guide to the Section 508 Standards for Electronic and Information Technology, Web-based Intranet and Internet Information and Applications (1194.22), Updated: June 21, 2001, http://www.access-board.gov/sec508/guide/1194.22.htm#(a))
2. The W3C WAI Web Content Accessibility Guidelines 1.0 Checkpoint 1.1 provides further guidance and techniques for this requirement, at http://www.w3.org/TR/WCAG10/#tech-text-equivalent
3. The W3C WAI maintains a listing of various tool and services available for evaluation and repair of web pages for web content accessibility, at http://www.w3.org/WAI/ER/existingtools.html
4. An example web page illustrating typical violations of this provision can be found at http://projects.accessibilityforum.org/demos/Rule_a.htm.

1194.22 (b) Equivalent alternatives for any multimedia presentation shall be synchronized with the presentation.

What does this requirement mean?

Terms and Definitions

equivalent alternatives – captioning provided for audio information, audio description of visual information, or other alternative presentations of information that fulfills the same function or purpose upon presentation to the user.

multimedia presentation – any presentation of more than one type of media, typically both audio and visual information.

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synchronized - having common timing and coordination of execution.

Assumptions

Assume multimedia rendering software applications are required to display synchronized equivalent alternatives, and that informed humans can reasonably consistently judge whether the equivalent alternatives are synchronized with the presentation within an acceptable time window.

How can I tell if this requirement is met?

Identify all uses of multimedia presentation.

1. Check each multimedia presentation for the synchronization of captioning and audio description.
    a. Inspect to find synchronized text tracks in SMIL or Quicktime files.
    b. Open captioning might be embedded into video stream, requiring human verification.

Note: Satisfying this requirement does not involve interoperability with assistive technology.

Where can I get additional information?

1. Guide to the Section 508 Standards for Electronic and Information Technology, Web-based Intranet and Internet Information and Applications (1194.22), Updated: June 21, 2001, http://www.access-board.gov/sec508/guide/1194.22.htm#(b)
2. The W3C WAI Web Content Accessibility Guidelines 1.0 Checkpoint 1.4 provides further guidance and techniques for this requirement at http://www.w3.org/TR/WCAG10/#tech-synchronize-equivalents
3. The W3C WAI maintains a listing of various tool and services available for evaluation and repair of web pages for web content accessibility, at http://www.w3.org/WAI/ER/existingtools.html
4. An example web page illustrating typical violations of this provision can be found at http://projects.accessibilityforum.org/demos/Rule_b.htm.

1194.22 (c) Web pages shall be designed so that all information conveyed with color is also available without color, for example from context or markup.

What does this requirement mean?

Assumptions

Assume that informed humans can reasonably consistently judge whether color is being used to convey information, and whether that information is adequately available without color.

How can I tell if this requirement is met?

Identify all cases where information is conveyed with color, for example, "Fields in red are required to be filled out".

1. A simple but not comprehensive way to identify problems would be:
    a. View the page on a black and white monitor.
    b. Print the page out on a black and white printer

     c. Is all information still discernable?

Note: Sometimes color combinations that are readable become unreadable when mapped to black-and-white in printing which could yield a different result than viewing with the eye, color-blind or not. Printing operations will render shades of gray by dithering, in an attempt to match the luminance of the color original; a person viewing the result might incorrectly conclude that a page lacks color-dependence. Gray-scale and monochrome monitors have become a tiny fraction of the overall market, and some mechanisms that attempt to support them on modern video hardware do so in ways that lead to incorrect conclusions about the software being viewed. In particular, some systems support gray-scale monitors by connecting only the output of the green signal to the monitor's input, effectively discarding the red and blue portions of the signal. This incorrectly maps the luminance information because the discarded colors account for 40% of the total. (In contrast, a black-and-white television will correctly display the picture because the luminance of the gray-scale output is a weighted average of all three colors.)

2. Insure that links are not distinguished by color alone. Note a common practice of removing underlines for links creates this problem.

Note: Satisfying this requirement does not involve interoperability with assistive technology.

Where can I get additional information?

1. Guide to the Section 508 Standards for Electronic and Information Technology, Web-based Intranet and Internet Information and Applications (1194.22), Updated: June 21, 2001, http://www.access-board.gov/sec508/guide/1194.22.htm#(c)
2. The W3C WAI Web Content Accessibility Guidelines 1.0 Checkpoint 2.1 provides further guidance and techniques for this requirement at http://www.w3.org/TR/WCAG10/#tech-color-convey
3. The W3C WAI maintains a listing of various tool and services available for evaluation and repair of web pages for web content accessibility, at http://www.w3.org/WAI/ER/existingtools.html
4. An example web page illustrating typical violations of this provision can be found at http://projects.accessibilityforum.org/demos/Rule_c.htm.

1194.22 (d) Documents shall be organized so they are readable without requiring an associated style sheet.

What does this requirement mean?

Terms and Definitions

documents – named, structured units of text, images, or other elements; web pages.

style sheet – A collection of formatting instructions stored in a file that determines how the layout of the documents to which it is attached are presented (e.g. displayed on screens, printed, or pronounced).

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Assumptions

Assume that informed humans can reasonably consistently judge whether the document is adequately readable in the absence of presentational features from style sheets.

Assume this requirement relates only to the page as delivered to the user and not as stored on a server or transmitted over a network.

Questions and Clarifications

1. Is compatibility with user defined style sheets required by the existing 508 standards?

   No. Although user defined style sheets are important for many users to allow personalized the presentation of web pages to suite particular user requirements, there is no requirement in the Section 508 standard requiring use defined style sheet compatibility.

2. How does this provision relate to the use of XML? More specifically, for XML data is the following acceptable: "Have an available XSL transform on the server that generates XHTML which meets the requirements of these provisions, with any XML data not related to the XSL flowing to a user application that meets the requirements of 1194."?

   Yes. The specific statement is acceptable. The Section 508 requirements apply to the display of information as it is presented to the user, regardless of the particular language or format used to represent, transport, and store the information.

How can I tell if this requirement is met?

Identify if any style sheets are used, (e.g. by looking for the <link> or <style> elements, or the attribute "style=" in any element).

1. View the pages using a browser with style sheets turned off or inactive and determine if the content is adequately readable.

   Note: Information on how to turn style sheets on and off is typically available from the help pages of Internet browsers.

   Note: One method, but not the only one, for how XML documents can comply with this requirement is to have an available XSL transform on the server that generates XHTML which meets the requirements of these provisions, with any XML data not related to the XSL flowing to a user application that meets the accessibility requirements of 1194.

Note: Satisfying this requirement does not involve interoperability with assistive technology. Interference between web pages and user-defined style sheets may be a problem for accessibility but is not specified in the requirements of this or any other technical provision of 1194.

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1. Guide to the Section 508 Standards for Electronic and Information Technology, Web-based Intranet and Internet Information and Applications (1194.22), Updated: June 21, 2001, http://www.access-board.gov/sec508/guide/1194.22.htm#(d)
2. The W3C WAI Web Content Accessibility Guidelines 1.0 Checkpoint 6.1 provides further guidance and techniques for this requirement at http://www.w3.org/TR/WCAG10/#tech-order-style-sheets
3. The W3C WAI maintains a listing of various tool and services available for evaluation and repair of web pages for web content accessibility, at http://www.w3.org/WAI/ER/existingtools.html
4. W3C Web Style Sheet homepage, http://www.w3c.org/Style
5. An example web page illustrating typical violations of this provision can be found at http://projects.accessibilityforum.org/demos/Rule_d.htm.

1194.22 (e) Redundant text links shall be provided for each active region of a server-side image map.

What does this requirement mean?

Terms and Definitions

redundant text link – A link that points to the same location as the active image region, or to another location that is equivalent to that referenced by the active image region.

Assumptions

Assume that when the image map contains an impractical number of regions (e.g. equal to the number of pixels in the screen region), some other means for achieving the function of the image map could be provided instead.

How can I tell if this requirement is met?

Identify all active regions of all server-side image maps. All regions of all image maps (which excludes maintenance and setup features) are included in the complete set of elements to be assessed.

1. Inspect web content source to identify server-side image maps and identify the presence of appropriate redundant text links for each active region of all server-side image maps.

    Note: The two methods to indicate server-side image maps are:
    - the presence of an ismap attribute in the <img> image element
    - the presence of "input type = image" within a form.

    Note: That redundant text links are most effective if they are positioned before or at least adjacent to the image map so that a user can know what is going on before getting to a non-readable image map.

Note: Satisfying this requirement supports interoperability with assistive technology, such as screen readers. Web pages must use redundant text links so that screen readers can provide choices to people who cannot see the choices presented on the image.

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1. Guide to the Section 508 Standards for Electronic and Information Technology, Web-based Intranet and Internet Information and Applications (1194.22), Updated: June 21, 2001, http://www.access-board.gov/sec508/guide/1194.22.htm#(e)
2. The W3C WAI Web Content Accessibility Guidelines 1.0 Checkpoint 1.2 provides further guidance and techniques for this requirement at http://www.w3.org/TR/WCAG10/#tech-redundant-server-links
3. The W3C WAI maintains a listing of various tool and services available for evaluation and repair of web pages for web content accessibility, at http://www.w3.org/WAI/ER/existingtools.html
4. An example web page illustrating typical violations of this provision can be found at http://projects.accessibilityforum.org/demos/Rule_e.htm.

1194.22 (f) Client-side image maps shall be provided instead of server-side image maps except where the regions cannot be defined with an available geometric shape.

What does this requirement mean?

Assumptions

Assume that active regions of client-side image maps have alternative text as required under 1194.22 (a).

How can I tell if this requirement is met?

Identify all server-side image maps.

1. Inspect web content source to help identify server-side image maps that could have been represented by client-side image maps. Examine the map - could the map region have been defined with an available geometric shape?

   Note: The two methods to indicate server-side image maps are:
   - the presence of an ismap attribute in the <img> image element
   - the presence of "input type = image" within a form.

   Note: Access to a server-side map file is not in the client HTML and so not typically available over HTTP with most Web servers.

Note: Satisfying this requirement supports interoperability with assistive technology, such as screen readers. Using a client-side map allows assistive technology, such screen readers and alternative input devices, to navigate links embedded in the map.

Where can I get additional information?

1. Guide to the Section 508 Standards for Electronic and Information Technology, Web-based Intranet and Internet Information and Applications (1194.22), Updated: June 21, 2001, http://www.access-board.gov/sec508/guide/1194.22.htm#(f)
2. The W3C WAI Web Content Accessibility Guidelines 1.0 Checkpoint 9.1 provides further guidance and techniques for this requirement at http://www.w3.org/TR/WCAG10/#tech-client-side-maps

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3. The W3C WAI maintains a listing of various tool and services available for evaluation and repair of web pages for web content accessibility, at http://www.w3.org/WAI/ER/existingtools.html
4. An example web page illustrating typical violations of this provision can be found at http://projects.accessibilityforum.org/demos/Rule_f.htm.

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1194.22 (g) Row and column headers shall be identified for data tables.

Terms and Definitions

data tables – tables used to represent tabular information.

Assumptions

Assume this requirement does not apply to tables used strictly for layout purposes, and assume that informed humans can reasonably consistently judge whether a table is used strictly for layout.

How can I tell if this requirement is met?

Identify all uses of a data table. Establish that the table is a data table which needs column and / or row headers for understanding its contents.

1. Inspect web content source to help identify appropriate data table headers. Some tips for inspection of HTML to help identify appropriate identification of data table headers:
   a. Column headers: the first data row of the table is composed of <th> elements instead of <td> elements.
   b. Row headers: the first cell of each data row is a <th> element instead of a <td> element.

   Note: Tables that are used strictly for layout should avoid this markup.

2. Apply AT to make sure row and column headers are identified. **Note the use of AT as a measurement method is limited by the adequacy of algorithms and heuristic methods of the specific AT tool used**. It can be used to identify problems with specific AT-E&IT interoperability but it cannot predict results with other AT or with other versions of the same AT, OS, application or accessibility architecture. AT should include the full range e.g. screen readers, screen magnifiers, alternate input devices, etc

Note: Satisfying this requirement supports interoperability with assistive technology, such as screen readers and magnifiers, which must be able to interpret data tables.

Where can I get additional information?

1. Guide to the Section 508 Standards for Electronic and Information Technology, Web-based Intranet and Internet Information and Applications (1194.22), Updated: June 21, 2001, http://www.access-board.gov/sec508/guide/1194.22.htm#(g)
2. The W3C WAI Web Content Accessibility Guidelines 1.0 Checkpoint 5.1 provides further guidance and techniques for this requirement at http://www.w3.org/TR/WCAG10/#tech-table-headers
3. W3C WAI User Agent Accessibility Guidelines 1.0 techniques for browsers, etc. to handle HTML tables: http://www.w3.org/TR/UAAG10-TECHS/topics.html#table-techniques
4. The W3C WAI maintains a listing of various tool and services available for evaluation and repair of web pages for web content accessibility, at http://www.w3.org/WAI/ER/existingtools.html

5. An example web page illustrating typical violations of this provision can be found at
http://projects.accessibilityforum.org/demos/Rule_g.htm.

1194.22 (h) Markup shall be used to associate data cells and header cells for data tables that have two or more logical levels of row or column headers.

What does this requirement mean?

Terms and Definitions

data tables – tables used to represent tabular information.

Assumptions

Assume that informed humans can reasonably consistently judge whether the markup adequately reflects the table row and column headers.

How can I tell if this requirement is met?

Identify all uses of a data table that have two or more logical levels.

1. Inspect web content source to help identify appropriate multi-level data table headers. Are row and column headers associated with each data cell?
   a. Inspect the HTML find appropriate identification of multi-level data table headers by looking for various combinations of the <thead>, <col>, <colgroup>, and <th> elements, and "axis", "id", "scope", and "headers" attributes.

   Note: Tables that are used strictly for layout should avoid this markup.

2. Apply AT to make sure row and column headers are identified. **Note the use of AT as a measurement method is limited by the adequacy of algorithms and heuristic methods of the specific AT tool used**. It can be used to identify problems with specific AT-E&IT interoperability but it cannot predict results with other AT or with other versions of the same AT, OS, application or accessibility architecture. AT should include the full range e.g. screen readers, screen magnifiers, alternate input devices, etc

Note: Satisfying this requirement supports interoperability with assistive technology, such as screen readers and magnifiers, which must be able to interpret data tables.

Where can I get additional information?

1. Guide to the Section 508 Standards for Electronic and Information Technology, Web-based Intranet and Internet Information and Applications (1194.22), Updated: June 21, 2001, http://www.access-board.gov/sec508/guide/1194.22.htm#(h)
2. The W3C WAI Web Content Accessibility Guidelines 1.0 Checkpoint 5.2 provides further guidance and techniques for this requirement at http://www.w3.org/TR/WCAG10/#tech-table-structure
3. W3C WAI User Agent Accessibility Guidelines 1.0 techniques for browsers, etc. to handle HTML tables: http://www.w3.org/TR/UAAG10-TECHS/topics.html#table-techniques

4. The W3C WAI maintains a listing of various tool and services available for evaluation and repair of web pages for web content accessibility, at http://www.w3.org/WAI/ER/existingtools.html
5. An example web page illustrating typical violations of this provision can be found at http://projects.accessibilityforum.org/demos/Rule_h.htm.

1194.22 (i) Frames shall be titled with text that facilitates frame identification and navigation.

What does this requirement mean?

Assumptions

Assume that informed humans can reasonably consistently judge whether the frame text title is appropriate to facilitate frame identification and navigation. Frames should not be titled "top", "left" or "right" or "bottom". Frame names should be indicative of the contents of the frame, e.g. 'navigation bar', 'table of contents', page header', or 'main content'.

Assume that the "name" attribute does not identify a frame for purposes of this provision. The "name" attribute may identify frames for scripting, but not for the requirement of this provision.

How can I tell if this requirement is met?

Identify all uses of frames.

1. Inspect web content source to help identify frames and frame identification. Some tips for inspection of HTML to help identify appropriate identification of frames. For each frame check if either of the following cases is true:
    a. Is the frame clearly identified through the "title" attribute of the <frame> or <iframe> element? e.g. <frame src="nav.html" title="Navigational Links">
    b. Is the frame clearly identified by including text within the body of each frame that clearly identifies the frame?

Note: When including text within the body of a frame for identification, the text should be at the beginning of the frame contents to facilitate quick identification of the frame contents beyond the title attribute.

Note: Satisfying this requirement supports interoperability with assistive technology, such as screen readers and magnifiers, which must be able to identify frames and frame content for navigation.

Where can I get additional information?

1. Guide to the Section 508 Standards for Electronic and Information Technology, Web-based Intranet and Internet Information and Applications (1194.22), Updated: June 21, 2001, http://www.access-board.gov/sec508/guide/1194.22.htm#(j)
2. The W3C WAI Web Content Accessibility Guidelines 1.0 Checkpoint 12.1 provides further guidance and techniques for this requirement at http://www.w3.org/TR/WCAG10/#tech-frame-titles
3. The W3C maintains a listing of techniques for dealing with frames, including using the "title" attribute, at http://www.w3.org/TR/WCAG10-HTML-TECHS/#frames

4. The W3C WAI maintains a listing of various tool and services available for evaluation and repair of web pages for web content accessibility, at http://www.w3.org/WAI/ER/existingtools.html
5. An example web page illustrating typical violations of this provision can be found at http://projects.accessibilityforum.org/demos/Rule_i.htm.

1194.22 (j) Pages shall be designed to avoid causing the screen to flicker with a frequency greater than 2 Hz and lower than 55 Hz.

What does this requirement mean?

Terms and Definitions

Hz – hertz - the international unit of frequency, equal to one cycle per second.

flicker - an unintentional and undesirable cyclic variation in display of a screen image.

Assumptions

Assume that anything visually present on the page, including interface elements and background, is subject to this requirement.

How can I tell if this requirement is met?

Requires the capability to measure screen flicker frequency that might be caused by web pages.

Note: Because 2 hz is relatively slow, webmasters are currently using visual observation to determine if flicker is greater than 2 hz.

Note: Screen flicker should be measured on wide range of processor speed. Processor speed and graphics card can affect this measurement.

1. Inspection
   a. Exercise the functionality of the page as would be expected in use.
   b. Does the page result in a flicker greater than 2 Hz and less than 55 Hz?

Note: Satisfying this requirement does not involve interoperability with assistive technology.

Where can I get additional information?

1. Guide to the Section 508 Standards for Electronic and Information Technology, Web-based Intranet and Internet Information and Applications (1194.22), Updated: June 21, 2001, http://www.access-board.gov/sec508/guide/1194.22.htm#(j)
2. The W3C WAI Web Content Accessibility Guidelines 1.0 Checkpoint 7.1 provides further guidance and techniques for this requirement at http://www.w3.org/TR/WCAG10/#tech-avoid-flicker
3. The W3C WAI maintains a listing of various tool and services available for evaluation and repair of web pages for web content accessibility, at http://www.w3.org/WAI/ER/existingtools.html
4. An example web page illustrating typical violations of this provision can be found at http://projects.accessibilityforum.org/demos/Rule_j.htm.

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1194.22 (k) A text-only page, with equivalent information or functionality, shall be provided to make a web site comply with the provisions of this part, when compliance cannot be accomplished in any other way. The content of the text-only page shall be updated whenever the primary page changes.

What does this requirement mean?

Assumptions

Assume that informed humans can reasonably consistently judge whether compliance could not be accomplished in any other way than a text-only page and whether the text-only page is actually equivalent to the primary page.

How can I tell if this requirement is met?

Identify all cases where an equivalent text-only page is provided.

1. Compare each text-only page to the corresponding primary page to see if the information is actually equivalent.

   Note: The link to an alternative text only page should be easily found on the web page and should not require any special technology to be activated.

Note: This requirement is important for interoperability with assistive technology and is applied where interoperability cannot be attained through other means.

Where can I get additional information?

1. Guide to the Section 508 Standards for Electronic and Information Technology, Web-based Intranet and Internet Information and Applications (1194.22), Updated: June 21, 2001, http://www.access-board.gov/sec508/guide/1194.22.htm#(k)
2. The W3C WAI Web Content Accessibility Guidelines 1.0 Checkpoint 11.4 provides further guidance and techniques for this requirement at http://www.w3.org/TR/WCAG10/#tech-alt-pages
3. The W3C WAI maintains a listing of various tool and services available for evaluation and repair of web pages for web content accessibility, at http://www.w3.org/WAI/ER/existingtools.html
4. An example web page illustrating typical violations of this provision can be found at http://projects.accessibilityforum.org/demos/Rule_k.htm.

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1194.22 (l) When pages utilize scripting languages to display content, or to create interface elements, the information provided by the script shall be identified with functional text that can be read by assistive technology.

What does this requirement mean?

Terms and Definitions

functional text – text that when read conveys an accurate message as to what is being displayed by the script or that describes or what action the script will perform.

scripting language - a programming language that is used to manipulate, customize, and automate the facilities of an existing system. Note this provision only refers to the use of scripting languages for creating and displaying dynamic web content.

Assumptions

Assume that informed humans can reasonably consistently judge whether the text information is an adequate functional text.

How can I tell if this requirement is met?

Identify all uses of scripts to display necessary information or create interface elements. For example, one would identify a script on an HTML document by the presence of:
- The <script> element
- Event handler attributes, i.e. attributes whose name begins with "on" e.g., "onmouseover"
- JavaScript URLs, i.e. href attributes that use the javascript protocol e.g., text

1. Inspect web content source to help identify presence of functional text for scripts. Some hints on how to determine what part of a script is necessary information vs. decoration:
    a. *Image rollovers* – Scripts that are used to change an image's state when a user moves a mouse over it are an accessibility problem if:
        i. text or other meaningful information is conveyed in the mouseover image (e.g., the normal state is a blank button, but on mouseover the button shows a title for the item or a recognizable logo);
        ii. the item changes other content on the page (e.g., mousing over an area on the page causes text or other content to appear in another area, when that content is otherwise invisible).This is an issue for users who are blind or use a keyboard or switch device exclusively.
    b. *interface adjustments* – can be ok, but needs verification
    c. *form validation* – ok if server-side error reporting is provided
    d. *form submission* – If the form uses an anchor and JavaScript to submit a form (e.g.,), people with JavaScript turned off won't be able to submit the form.

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    e. *dynamic html* – often problem, really needs human judgement
    f. *redirect/refresh page* – problem (accessible alternatives exist)
    g. *create popup window and change current window* – Popup windows () and window focus changes () confuse users of screen readers by changing the focus on their windows without permission.
    h. *generate content* – problem

2. Ensure that pages are usable when scripts, applets, or other programmatic objects are turned off or not supported.

3. Apply AT to make sure functional text is available. **Note the use of AT as a measurement method is limited by the adequacy of algorithms and heuristic methods of the specific AT tool used.** It can be used to identify problems with specific AT-E&IT interoperability but it cannot predict results with other AT or with other versions of the same AT, OS, application or accessibility architecture. AT should include the full range e.g. screen readers, screen magnifiers, alternate input devices, etc.

    Note: Some screen readers will react to scripts and some will not - testing with a modern screen reader may not find problems for other screen readers still in use.

Note: Satisfying this requirement supports interoperability with assistive technology such as screen readers.   If information conveyed by scripting languages is not coded properly, it will be at best difficult to read.

Where can I get additional information?

1. Guide to the Section 508 Standards for Electronic and Information Technology, Web-based Intranet and Internet Information and Applications (1194.22), Updated: June 21, 2001, http://www.access-board.gov/sec508/guide/1194.22.htm#(l)
2. The W3C WAI maintains a listing of various tool and services available for evaluation and repair of web pages for web content accessibility, at http://www.w3.org/WAI/ER/existingtools.html
3. An example web page illustrating typical violations of this provision can be found at http://projects.accessibilityforum.org/demos/Rule_1.htm

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1194.22 Web based intranet and Internet information and applications

1194.22 (m) When a web page requires that an applet, plug-in or other application be present on the client system to interpret page content, the page must provide a link to a plug-in or applet that complies with §1194.21(a) through (l).

What does this requirement mean?

Terms and Definitions

applet – An applet is a program that is part of content, and that the user agent executes.

plug-in - A plug-in is a program that runs as part of the user agent and that is not part of content. Users generally choose to include or exclude plug-ins from their user agent. Note these add-on programs or "plug-ins" can be downloaded and installed on the user's computer that makes it possible for their web browsers to display or play the content of the files with proprietary formats when these file(s) is (are) included as a part of the web page.

Assumptions

Assume each plug-in or applet or application is accessible on multiple platforms.

Note: Accessibility across multiple platforms is strongly desired. If an element or plug-in is available on a platform, it is assumed to be accessible on that platform.

Questions and Clarifications

1. Is the "pluginspage" attribute of the <embed> element, or similar functionality on other elements if it exists, acceptable or is a literal link required?

   No, a literal link to an explicit plug-in application is intended. Some AT manufacturers do not currently support the described markup.

How can I tell if this requirement is met?

Identify all cases where an applet, plug-in or other application is required on the client system to interpret page content. Some tips for inspection of HTML to help identify required plug-ins, applets or other applications include:
- Look for the <object>, <applet>, or <embed> elements.
- Look for links to files with extensions other than .html, .htm. jpeg .gif and .xhtml, or any proprietary tags that are not directly handled by a browser - some plug-in manufacturers may require these.

1. If plug-ins, applets, or other applications are required, then look for links to download the software necessary to render the content from those file types. For pages that use an applet, plug-in, or have a link to a file type that has inaccessible content, verify that the page has a link to an accessible version of the required application or content.

2. Run the plug-in, applet, or other application on the page and test the interface against 1194.21 or otherwise verify that the plug-in actually conforms to §1194.21(a) through (l).

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Note: The types of other applications that must be supported may include MSWord, Excel and Powerpoint in addition to pdf, shockwave, and flash files.

Note: Satisfying this requirement supports interoperability with assistive technology such as screen readers or screen magnifiers. Plug-ins or applets must be available to the user. The interoperability is between the user interface presented by the plug-in or applet and the assistive technology.

Where can I get additional information?

1. Guide to the Section 508 Standards for Electronic and Information Technology, Web-based Intranet and Internet Information and Applications (1194.22), Updated: June 21, 2001, http://www.access-board.gov/sec508/guide/1194.22.htm#(m)
2. The W3C WAI maintains a listing of various tool and services available for evaluation and repair of web pages for web content accessibility, at http://www.w3.org/WAI/ER/existingtools.html
3. An example web page illustrating typical violations of this provision can be found at http://projects.accessibilityforum.org/demos/Rule_m.htm

1194.22 (n) When electronic forms are designed to be completed on-line, the form shall allow people using assistive technology to access the information, field elements, and functionality required for completion and submission of the form, including all directions and cues.

What does this requirement mean?

Terms and Definitions

field element – a user interface element that appears within an electronic form field.

Assumptions

Assume that informed humans can reasonably consistently judge whether the order in which the information is presented in a form is logically correct.

How can I tell if this requirement is met?

Identify all information, field elements, and functionality that are required for completion and submission of the form.

1. Inspect web content source to help identify form functionality, for example in HTML look for the element <form>. Verify that the form functionality is accessible. Some examples of accessible approaches to various form element functionality include:
   a. For selection menus (or drop down boxes), radio buttons and check boxes- to ensure that AT user can ascertain the options being presented by these elements as well as determine/ edit choice marked.
   b. For edit boxes (text fields and text areas): be able to relate label to entry area and enter / verify text entered.
   c. For buttons (like reset, submit): be able to determine their purpose and activate them.
   d. For forms embedded in data tables: be able to associate the column header and row header with a text entry cell in the form.

e. For instructions: be able to navigate/access the instructions relevant to the part of the form being filled and return to that part.

Note: Some design features of an electronic form generally facilitate access to assistive technology, such as the relationship between control labels and controls or the sequence/ordering of form fields and directions or cues. Look for the attribute named "tabindex" – if used, the sequence of this attribute should be the same as the optimal sequence for a user moving through the form. Note that some browsers cannot tabindex.

Note: Labels should be associated with input fields in the HTML using the explicit <label> tag - this association is what is required by assistive technology. If this is done, the placement of the label for display on the page is not relevant for assistive technology.

2. Apply AT to make sure screen readers get information in correct order. **Note the use of AT as a measurement method is limited by the adequacy of algorithms and heuristic methods of the specific AT tool used.** It can be used to identify problems with specific AT-E&IT interoperability but it cannot predict results with other AT or with other versions of the same AT, OS, application or accessibility architecture. AT should include the full range e.g. screen readers, screen magnifiers, alternate input devices, etc.

Note: When forms are used together with tables, some screen readers can have a conflict with select boxes, permitting the user to select more than one choice in a list.

Note: Satisfying this requirement supports interoperability with assistive technology such as screen readers or screen magnifiers.

Where can I get additional information?

1. Guide to the Section 508 Standards for Electronic and Information Technology, Web-based Intranet and Internet Information and Applications (1194.22), Updated: June 21, 2001, http://www.access-board.gov/sec508/guide/1194.22.htm#(n)
2. The W3C WAI User Agent Accessibility Guidelines 1.0 Checkpoint 2.1 provides further guidance and techniques for this requirement, at http://www.w3.org/TR/UAAG10/guidelines.html#tech-doc-content-access
3. The W3C WAI User Agent Accessibility Guidelines 1.0 Checkpoint 2.3 provides further guidance and techniques for this requirement, at http://www.w3.org/TR/UAAG10/guidelines.html#tech-conditional-content
4. The W3C WAI maintains a listing of various tool and services available for evaluation and repair of web pages for web content accessibility, at http://www.w3.org/WAI/ER/existingtools.html
5. An example web page illustrating typical violations of this provision can be found at http://projects.accessibilityforum.org/demos/Rule_n.htm

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1194.22 (o) A method shall be provided that permits users to skip repetitive navigation links.

What does this requirement mean?

Terms and Definitions

repetitive navigation links – a set of routine navigation links that appear on the top or the side on a web page.

Assumptions

Assume that informed humans can reasonably consistently judge whether there are repetitive navigation links, whether they are adequately identified, and whether the skip ends up in an appropriate location on the page.

How can I tell if this requirement is met?

Identify those links that are repetitive navigation links.

1. If a page has repetitive navigation links, is there a mechanism to skip past:
    a. Does an adequately identified link provide a jump past the repetitive navigation links to the main content area?
    b. Does this link appear before the repetitive navigation links?

    Note: Where to skip is not specified. Typical appropriate locations are to the beginning of the following block of links or to the top of the content new to that page.
    a. Jump to content may be a more general way of achieving this and would cover cases in addition to skipping repetitive links.
    b. Jumping straight to the beginning of the content may prevent the user from seeing additional links that are not repetitive.
    c. Navigation links are sometimes hidden because it is thought that only screen reader users need them. People that access web content only using the keyboard also need these links to enable them to bypass repetitive links. Therefore they should not be hidden, but also visually displayed prominently so as to be quickly locatable.

    Note: When frames are used, grouping all the navigation links within a single frame may be an approach. Provided that:
    a. The frame containing the rep nav links is properly identified as required by 1194.22 (i)
    b. There isn't a set of repetitive links in the content frame
    a. The frameset is static.

Note: Satisfying this requirement does not involve interoperability with assistive technology, but supports usability with assistive technology such as screen readers.

Where can I get additional information?

1. Guide to the Section 508 Standards for Electronic and Information Technology, Web-based Intranet and Internet Information and Applications (1194.22), Updated: June 21, 2001, http://www.access-board.gov/sec508/guide/1194.22.htm#(o)

2. The W3C WAI maintains a listing of various tool and services available for evaluation and repair of web pages for web content accessibility, at http://www.w3.org/WAI/ER/existingtools.html
3. An example web page illustrating typical violations of this provision can be found at http://projects.accessibilityforum.org/demos/Rule_o.htm

1194.22 (p) When a timed response is required, the user shall be alerted and given sufficient time to indicate more time is required.

What does this requirement mean?

Assumptions

Assume that the alert is provided in an accessible fashion. Assume that along with providing the user the opportunity to request additional time, the product or service is also required to actually provide the additional time.

Assume that informed humans can reasonably consistently judge whether the alert is meaningful, whether the user is clearly told how to indicate more time, and whether the amount of time given to indicate more time is required is sufficient.

Assume that this requirement applies to content is not controlled by real time events (e.g. auction), and that time is not a critical element of the activity. Where the activity is time validated (such as a timed test), assume that a non-time-validated version may be provided.

How can I tell if this requirement is met?

1. For timed response alert, determine if the page requires a user response within a time interval. If yes:
   a. Does the page have features that give the user the ability to indicate that more time is required?
   b. Does the page provide "sufficient time" for the user to indicate that more time is required?
   c. Determine if the Alert is given in an accessible fashion

2. For additional time, determine if the page provides adequate timed response alert (method 3 above). If yes:
   a. Does the page provide additional time as requested?

Note: Satisfying this requirement does not involve interoperability with assistive technology.

Where can I get additional information?

1. Guide to the Section 508 Standards for Electronic and Information Technology, Web-based Intranet and Internet Information and Applications (1194.22), Updated: June 21, 2001, http://www.access-board.gov/sec508/guide/1194.22.htm#(p)
2. The W3C WAI maintains a listing of various tool and services available for evaluation and repair of web pages for web content accessibility, at http://www.w3.org/WAI/ER/existingtools.html
3. An example web page illustrating typical violations of this provision can be found at http://projects.accessibilityforum.org/demos/Rule_p.htm

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