



Developer Guidelines for Incorporating a Section 508 Accessibility Standards

This document provides guidelines for developing a database solution that is Section 508-compliant. FileMaker, Inc. has also provided the following resources:

- **Overview of Section 508 Regulations and FileMaker Pro** provides general information on the legislation and why it is important to the FileMaker community.
- **Voluntary Product Accessibility Template (VPAT) for FileMaker Pro** illustrates conformance with the Section 508 guidelines.

FileMaker, Inc. recognizes the importance of complying with Section 508 regulations and has enhanced the accessibility features in FileMaker Pro 8 and FileMaker Pro 8 Advanced. For best results with screen reader applications, use the latest release of FileMaker Pro, screen reader software, and web browser applications. It is important to note that developers have a great deal of flexibility in how they design databases, and care should be taken to consider accessibility issues during the design process.

Below is a list of Section 508 requirements for applications. To make FileMaker databases accessible, they must be published as Web Applications using the Instant Web Publishing ("IWP") feature in FileMaker Pro 8 or later. See the product documentation for instructions on using Instant Web Publishing. Visually impaired users can access the FileMaker data using a web browser like Microsoft Internet Explorer (Windows) or Safari (Mac OS). Database developers should pay attention to designs that may not be accessible. Testing a database for accessibility with a screen reader is the best way to determine accessibility

These documents primarily address accessibility issues for visually impaired customers in the Windows operating system, using Microsoft Internet Explorer, and the Instant Web Publishing feature in FileMaker Pro. Instant Web Publishing is also accessible with the Apple OS X screen reader application, VoiceOver and the Safari web browser. Other disabilities are impacted much less by the Section 508 guidelines for software.

To build Section 508-compliant databases, developers must use the most recent version of FileMaker software, version 8 or later. Earlier releases of FileMaker did not produce web pages that are as accessible with screen reader applications.

The Section 508 guidelines include criteria for both stand-alone applications and web-based applications. Because FileMaker developers will work in the stand-alone environment and have no control over the actual HTML code of the web-based output, only the requirements for application development are listed below. If a FileMaker developer follows these guidelines, they can create a solution that is accessible when it is accessed via Instant Web Publishing. The guidelines below will help provide an accessible environment for the IWP output. Bolded items below are the areas of most concern when developing a database.

- (a) When software is designed to run on a system that has a keyboard, product functions shall be executable from a keyboard where the function itself or the result of performing a function can be discerned textually.
- (b) Applications shall not disrupt or disable activated features of other products that are identified as accessibility features, where those features are developed and documented according to industry standards. Applications also shall not disrupt or disable activated features of any operating system that are identified as accessibility features where the application programming interface for those accessibility features has been documented by the manufacturer of the operating system and is available to the product developer.

- (c) A well-defined on-screen indication of the current focus shall be provided that moves among interactive interface elements as the input focus changes. The focus shall be programmatically exposed so that assistive technology can track focus and focus changes.**

Focus support in FileMaker Pro IWP is implemented by tabbing through the fields when in edit, new record, or find modes. IWP supports the tab order defined within FileMaker layouts to fields. FileMaker automatically assigns a tab order to most controls when a form is created.

- (d) Sufficient information about user interface elements including the identity, operation and state of the element shall be available to assistive technology. When an image represents a program element, the information conveyed by the image must also be available in text.**

What is considered a “user interface element”?

Examples of user interface elements include dialog boxes, menus, scripted buttons, checkboxes, toolbars, scroll bars, edit boxes, and any other feature of a program that is intended to allow the user to perform some action. Essentially, this segment covers any control that can be clicked or activated from the keyboard to perform a function.

What does this provision require to be done with these elements?

This provision requires that text must be associated with each element. The text must identify the element and its current state or condition. For example, an on-screen button that shows a graphic question mark or some other graphic symbol for getting more help must have the word “help” associated with the button. If a checkbox is present, a text label must indicate what is being checked, and whether the checkbox is checked or unchecked.

The tooltip feature in FileMaker Pro 8 Advanced and the later releases enables you to associate additional text with each user interface element. When designing a layout, the properties for each element can include tooltip text that can describe the element, provide guidance on how to use the element, or indicate that the field is required. Screen readers can detect and read the tooltip but they typically do not work in Browse mode without sophisticated techniques in the Jaws screen reader application. While tooltips can only be assigned to objects in FileMaker Pro Advanced, they are displayed in FileMaker Pro and with Instant Web Publishing.

- (e) When bitmap images are used to identify controls, status indicators, or other programmatic elements, the meaning assigned to those images shall be consistent throughout an application’s performance.**

What forms of bitmap images are affected by this provision?

This provision applies to those images which are used to indicate an action. An image used strictly for decoration is not covered by this provision.

Why is the provision important for accessibility?

Most screen reading programs allow users to assign text names to bitmap images. If the bitmap image changes meaning during a program’s execution, the assigned identifier is no longer valid and is confusing to the user. For example, if you have a scripted button on layouts that displays a thumbnail picture of a report, it is best to use that same image in a consistent manner across all your layouts and solutions. If you must change the image programmatically, you should also update the object’s tooltip or label programmatically. This can be done by setting the tooltip text as a calculation instead of a static text value.

- (f) Textual information shall be provided through operating system functions for displaying text. The minimum information that shall be made available is text content, text input caret location, and text attributes.**

- (g) Applications shall not override user-selected contrast and color selections and other individual display attributes.
- (h) When an animation is displayed, the information shall be displayable in at least one non-animated presentation mode at the option of the user.

How can screen animation affect accessibility for people with disabilities?

The use of animation on a screen can pose serious access problems for users of screen readers or other assistive technology applications. When important elements such as push-buttons or relevant text are animated, the user of assistive technology cannot access the application reliably. This provision requires that in addition to the animation, an application shall provide an option to turn off animation.

- (i) **Color coding shall not be used as the only means of conveying information, indicating an action, prompting a response, or distinguishing a visual element.**

How can color coding create accessibility difficulties?

A software program that requires a user to distinguish between otherwise identical red and blue squares for different functions (e.g., printing a document versus saving a file) would pose problems for anyone who was color blind and would generally be very difficult to run with assistive technology. Screen reading software can announce color changes in some software applications. However, this is an "on/off" feature. This means that if a user had to identify a specific color, they would have to have all colors announced, which would greatly reduce the usability of the software for that person.

Does the provision prohibit the use of colors?

No. This provision does not prohibit the use of color to enhance identification of important features. It does, however, require that some other method of identification, such as text labels, be combined with the use of color.

For example, using red labels to indicate a required field can present difficulties for a blind user. However, placing an asterisk at the beginning or end of the text label can also be as effective in indicating required information. This does not preclude also using the color to indicate required fields as long a text method is also used.

Use of FileMaker Pro's tooltip feature can also be used to indicate other relevant information about the control, however they do not work in all cases in the Jaws screen reader application.

- (j) When a product permits a user to adjust color and contrast settings, a variety of color selections capable of producing a range of contrast levels shall be provided.
- (k) **Software shall not use flashing or blinking text, objects, or other elements having a flash or blink frequency greater than 2 Hz and lower than 55 Hz.**

Why are flashing or blinking displays limited by this provision?

This requirement is necessary because some individuals with photosensitive epilepsy can have a seizure triggered by displays that flicker or flash, particularly if the flash has a high intensity and is within certain frequency ranges. The 2 Hz limit was chosen to be consistent with proposed revisions to the ADA Accessibility Guidelines which, in turn, are being harmonized with the International Code Council (ICC)/ANSI A117 standard, "Accessible and Usable Buildings and Facilities", ICC/ANSI A117.1-1998 which references a 2 Hz limit. An upper limit was identified at 55 Hz.

Some visually impaired users may also have difficulty reading flashing or blinking items, and many screen readers will not automatically announce flashing or blinking items. If a blinking item is used to indicate a required field, then a blind user may have trouble finding required fields on the screen.

(I) When electronic forms are used, 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.

Why are electronic forms so difficult for some people with disabilities to access?

At present, the interaction between form controls and screen readers can be unpredictable, depending upon the design of the page containing these controls. Correct placement of labels and descriptive text is important in creating an accessible database. Database designs that try to put too much information on a page by placing labels very close to each other can confuse screen readers and cause the wrong label to be announced.

Also labels that do not provide enough information about a field should be avoided. For example, a common technique is to put a label for Phone Number or Social Security Number and then have three separate edit fields for the different parts of the number. In this type of situation, it can be difficult to know what type of information to enter in the second and third edit fields.

A better on-screen approach would be to label each field, for example, Area Code, Prefix, and Number, or to use a single field for the entire phone number.

How can forms in a software application meet this provision?

If keyboard alternatives are provided for navigating through a form, and all elements of the form are labeled with text located in close proximity to the field that is to be completed, the form will most likely meet this provision. Attention must be paid to the placement of field labels.

***IMPORTANT:** On a webpage, a label can have a direct association with a particular field that is indicated in the HTML code. Assistive technology can interpret the HTML and correctly announce the appropriate label. There is no similar method for forms in software programs. However, because FileMaker converts the developers database into HTML format, it is important to follow some simple guidelines to create a database the accessible when published. Therefore, the label must be in a logical position relative to the input areas. For example, placing labels to the immediate left of where the user is to enter information is by far the most logical position for the label. This is also the most effective place to put the label because the screen reader software will detect and read the label before it reads the state/contents of the field control to its right.*

FileMaker Design Tips

Here are some things you can do in FileMaker to improve the accessibility of your IWP-hosted database.

- Add tooltips to objects on the layout. FileMaker Pro Advanced has a feature that allows a developer to assign a tooltip to any object. The tooltip can be set as static text, or can be set using a calculation using values from one or more fields to compose the tooltip. These tooltips can provide users with additional information about a control when they tab to it, however they do not work in Browse mode without sophisticated techniques in the Jaws screen reader application. For more information on assigning tooltips, please refer to the FileMaker Pro Advanced Development Guide.
- **Important information for converted databases:** Layouts must be modified or re-created in FileMaker Pro version 7.0v3 in order to properly work with screen readers. If layouts are too complex to re-create, you can modify them by manually moving each field label, then the

accompanying field by using the "Send to Back" menu item. This will ensure that the field labels and fields are reported to the screen reader application in the proper order. You can verify that the order is correct by viewing the layout in Layout mode and pressing the tab key to make sure that the field labels are tabbed to before the accompanying field. The tab order should reflect the order that you want the screen reader to read each field label and field.

- Labels that are carefully lined up with the edit box are best. Labels should be on the same base line as the edit box, and to the immediate left of the edit box. Often, labels can also be placed above the edit box and lined up with left edge of the edit box. Also, each edit box should have it's own separate label.
- Also avoid using a single label for a group of edit fields. For example, some developers will push several edit fields close together on a page and then place a single label over the first label that then spans all three edit boxes. While this can be visually effective in labeling the edit boxes, most screen readers will assume the label is for the first edit box and find no labels for the others.
- Avoid using abbreviations for field labels. Abbreviations are often mispronounced by screen readers and can be confusing if many of them are used on a page.
- Place checkboxes near the text label. Label placement is often best when the label is to the left of the checkbox so they are read before the field control.
- Avoid using checkboxes for a series of Yes/No answers. This format usually places labels at the top of a column of checkboxes making it difficult to tell which box is for the Yes column or the No column. Instead consider using a labeled drop down list box with yes and no as the choices in the listbox.

While the IWP experience is very similar to working with data in the FileMaker application, there are some key differences. For complete information on working with the IWP feature, please review the *FileMaker Instant Web Publishing* guide, located in the FileMaker > English Extras > Electronic Documentation folder.

- Because printing from web browsers offers limited options, printing summary reports is only available from the FileMaker Pro client.
- Some automated script steps are not supported from a web browser, for example script steps that interact with a hard drive or print reports. When you are creating a script, enable the "Indicate web compatibility" option in the "Edit Script" window. The script steps in the list that are gray will not work when the script is run via an IWP-hosted database.
- When you are done designing your database, host it using IWP and test it with the screen reader your users will be using. Most screen reader applications have trial versions of their product, so you can test the solutions before purchasing the software.
- Be sure that both you and your users understand how to access the objects in the IWP-hosted database using the keyboard, as well as commands that the assistive technology products provide. Test using tab-based keyboard navigation, as well as by accessing things like JAWS' Links list, which provide access to commands that are not keyboard accessible, but provide users with access to functionality nonetheless.

End-User Guidelines

Visually impaired users who wish to access FileMaker data with a screen reader application should use Internet Explorer, and whatever access technology they are using to read the screen contents. FileMaker has been tested with JAWS and should also be compatible with Window-Eyes, two of the more popular screen readers. Databases must be developed and shared via Instant Web Publishing with FileMaker version 8 or later. For fewer than 5 simultaneous users, you can publish the database with Instant Web Publishing using FileMaker Pro or FileMaker Pro Advanced. If you have more simultaneous users connecting, you must publish the database to the web using FileMaker Server 8 Advanced or later.

Accessibility technology might change with new releases. It is important to verify that the accessibility features work as expected after upgrading the screen reader, web browser, or FileMaker release.

Users should also be familiar with the commands and functions of their screen reader that pertain to web browser applications, like Internet Explorer. While the client version of FileMaker is not accessible, the Instant Web Publishing feature in FileMaker creates an HTML version of the database that can be accessed in Internet Explorer.

Users that are familiar with the commands and functions of their screen reader will be much more efficient while using FileMaker databases. The following types of commands will be most useful for navigating FileMaker databases in a web browser via IWP:

- The search command
- The command that provides a list of links on a web page
- The commands that list form elements on a page
- The short cut commands for jumping from element to element
- Commands for accessing tooltips: a well designed FileMaker Pro database can use tooltips to provide additional information about elements on the page, but the feature must be enabled in the screen reader application

Useful Links

Resources for understanding and implementing the requirements of Section 508:
www.section508.gov

Federal agency committed to design that is accessible to persons with disabilities :
www.access-board.gov

Guide for Software Applications and Operating Systems (1194.21):
www.access-board.gov/sec508/guide/1194.21.htm

Guide for Web-based Intranet and Internet Information and Applications (1194.22):
www.access-board.gov/sec508/guide/1194.22.htm

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