

# Making Web-Based Online Help Accessible: A Case Study

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*Accessibility is about providing successful access to information, and the use of information technology by people who have disabilities. The IBM® WebSphere® Commerce development team adopted IBM's mandate to make its software accessible, and achieved a high level of accessibility in its release of the IBM WebSphere Commerce, Version 5.4, suite of products. Continuing with the next release, the WebSphere Commerce development team strove for an even higher level of accessibility. This paper discusses some of the experiences and lessons learned from making WebSphere Commerce online help and software accessible. It examines some of the most common issues from the User Experience, Information Development, and Test perspectives.*

## ACCESSIBILITY: INTRODUCTION

Before you can appreciate software and Web accessibility, you have to understand what accessibility means. You need to know who needs it, what drives it, what role you can play, and how to achieve accessibility. For this paper, we provide a cursory explanation of IBM® WebSphere® Commerce and its online help documentation because they are the source of our examples. As a multidisciplinary team of developers for WebSphere Commerce, our expertise ranges from Information Development, UI Design and User Experience, and Quality Assurance Testing. This information focuses on those aspects of accessibility.

Accessibility is about removing barriers, and providing everyone with access to information, and access to technology. From the WebSphere Commerce perspective, accessibility is about ensuring that everyone can use our Web site, our software, and our documents.

Use of the Web is spreading rapidly into all areas of society, replacing traditional sources of information and business. People with various types of disabilities, such as visual, hearing, physical, or cognitive, have difficulties accessing this information if the people providing the information do not make the efforts to reveal this information properly. There is legislation in place in many countries now to ensure that some Web sites and software vendors supply accessible information. Other legislation limits the business proposals that can be selected to do government work,

based on the level of accessibility that their software provides.

## Disability Issues and Needs

### Vision Impairment

There are three categories of vision impairment:

1. Low vision
2. Color-blindness
3. Blindness

#### Low Vision

People with low vision may have perception problems. Their vision may worsen over time (such as in a degenerative condition). They may need enlarged fonts, high contrast, or screen magnifiers.

#### Color-blindness

People who are color-blind are either unable to see color differences or they confuse two or more colors. They require information that is independent of color.

#### Blindness

People who are blind are unable to see the screen or use a mouse pointer. They need a tactile (Braille) display or screen reader software to "see" the screen for them. They need to use the keyboard for navigation.

### Accessibility Barriers

- Unlabeled graphics, undescribed video
- Poorly described tables
- Complex graphics
- Lack of keyboard support
- Lack of screen reader compatibility

### Hearing Impairment

People who are deaf or hard of hearing are unable to hear sounds and warning beeps. They need captions instead; sounds must be shown visually.

### Accessibility Barriers

- Lack of captioning for audio

### Mobility Impairment

People who are mobility impaired have limited or no ability to use their hands or fingers. Their movements have limited range, speed, and strength. They may be unable to press multiple keys simultaneously, unable to double-click a key, or have no control over how long they press a key. They need access keys and alternative input methods such as speech recognition software.

## Accessibility Barriers

- Lack of keyboard support for menu commands

## Cognitive Impairment

People who are cognitively impaired have difficulty reading, writing, and comprehending or expressing thoughts. They need reading, writing, and comprehension aids: speech synthesis for reading, speech recognition or word prediction software for writing.

## Accessibility Barriers

- Lack of consistency for navigation
- Unnecessarily complex language
- Lack of illustrative non-text materials

Developers of accessible software, Webs, or online documentation must remember that some people have a combination of disabilities, and so the technologies need to coexist.

## IBM's Goals for Accessibility

IBM has a long tradition of employing people with disabilities; it has done so since 1914. It was proactively involved in forming a Special Needs System with a focus on assistive technologies, and enacted Corporate Instruction 162 to ensure that IBM's hardware, software, Internet systems, Web sites, and documentation were accessible before the U.S.A. released its Federal Rehabilitation Act (also known as Section 508) in 2001. Section 508 covers electronic and information technology, and affects all federal and state agencies receiving government funds. All U.S. federal agencies must purchase information technologies that are accessible to people with disabilities. There are similar regulations worldwide. Canada has the Canadian Human Rights Act, with its "duty to accommodate", and there is a Government of Canada Internet guide, which makes specific mention of "universal accessibility".

## WebSphere Commerce and its Online Help

IBM WebSphere Commerce is a comprehensive set of integrated software components used to build, maintain, and host stores on the Web. WebSphere Commerce, Version 5.4 provides a complete solution for customers' e-commerce needs.

WebSphere Commerce provides its online help documentation in HTML. The audience for the documents ranges from the business user to the developer. Within the online help is a large number of files, explaining concepts and tasks, and providing reference information in the form of database schema (for example, object models, data models, tables), commands, JavaServer Pages, use cases, and so on.

# ACCESSIBILITY GUIDELINES

In order to achieve accessibility compliance, WebSphere Commerce followed a series of guidelines and techniques that IBM put together based on the U.S. Federal government Section 508 regulations. In particular, IBM specified the following guidelines for documentation:

## 1. Provide Documentation in an Accessible Format

There are many things to consider when making a Web-based online help accessible. The following list describes the guidelines that we followed for the IBM WebSphere Commerce online help.

### Navigation Guidelines

- **Frames:** Title all frames.
- **Cascading Style Sheets (CSS):** Web pages should be readable when CSS is turned off.
- **Forms:** Ensure that forms are accessible with assistive technology.
- **Skip to Main Content:** Provide methods for users to skip over repetitive content.

### Textual Content Guidelines

- **Tabular Data:** Make tabular data easy to read by using labels.
- **Clear and Structured Text:** Define headings, paragraphs, and subheadings.
- **Acronyms and Abbreviations:** Use the ABBR, ACRONYM, and LANG attributes.
- **Blinking, Moving and Flickering Text:** Avoid flashing text.

### Pictorial Content Guidelines

- **Diagrams, Graphs and Charts:** Provide descriptive information for each graph and chart.
- **Images and Animations:** Provide text equivalents for all images and animation.
- **Image Maps:** Use descriptive text for all image map hot spots.
- **Multimedia:** Provide captions or transcripts for audio and video content.
- **Color and Contrast:** Ensure that all information with color is also conveyed without color.

## 2. Document Accessibility Product Features

If you want users to know about accessibility features, you must document the accessibility features and limitations in the product. This information is documented in the WebSphere Commerce, Version 5.4

online help; it describes the accessibility functions that are offered with WebSphere Commerce, such as keyboard equivalents, lists the screen readers and digital media that can be used with the product, and explains how to magnify images and change the colors on the screen. It covers the accessibility limitations currently in the product. We ensure that customers with differing needs have the most current information possible, and can use the product to the best of their abilities.

### **3. Use Available Tools for Accessibility Testing**

The third way to make online documentation accessible is to test your documentation using available accessibility tools. Accessibility testing is an essential part of making software and documentation accessible. Without it, any kind of software cannot be claimed accessible, even if it is implemented using accessibility guidelines and techniques. The main purpose of accessibility testing is to ensure that a software product and its documentation meet the needs of physically disabled or impaired users. Accessibility testing needs to ensure that these things have been implemented in such a way that physically disabled or impaired users can use them as effectively as people without disabilities would.

There are many tools available to test accessibility. The IBM Corporate Accessibility Center evaluates the available tools and prepares the suggested test tools and techniques list.

#### **Test Tools.**

##### **IBM Home Page Reader (HPR)**

HPR is a commonly used tool to test online documentation at IBM. It is installed on top of Microsoft® Internet Explorer. This tool has regular browser features as well as special accessibility features. HPR can narrate what is in the documentation and can help users navigate the documentation. Using HPR, documentation-related accessibility nonconformances can be detected. This tool can be used as either a test tool or as an end-user accessibility tool.

##### **Bobby™ by Watchfire Corporation**

Bobby is another accessibility tool that can be used to test online documentation. URLs of the documents can be entered into this tool. Then the tool will parse the pages and create a summary of accessibility nonconformances. Bobby has the option to customize the accessibility checkpoints.

Apart from these two test tools, there are some accessibility tools that come with Microsoft Windows® operating systems. Narrator is a reading tool that can be used to narrate documentation. Screen Magnifier is

another handy tool for visually impaired users. Screen Magnifier can be customized for users. An on-screen keyboard is a very useful tool for users who have mobility difficulties. During the test cycle, these tools are tested on the software to verify that they work as desired.

Users who are color-blind may require different color schemes to be supported by documentation. Documents need to be accessed using different color schemes and contrast settings to ensure accessibility.

Tools alone aren't sufficient to test the accessibility of documentation. Some manual assessment is necessary to ensure accessibility. For example, it is important to make sure no messages or warning flags in the documents are conveyed using color alone. Color can be used as an enhancement but not as the only way to convey a message. Documents need to be organized to make the navigation easy for physically challenged and impaired users.

## **EXAMPLES OF IBM WEBSHERE COMMERCE ACCESSIBILITY ENHANCEMENTS**

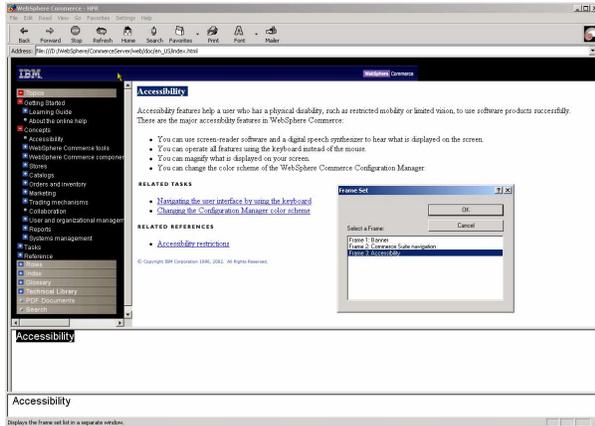
The checkpoints that made the greatest impact to accessibility for WebSphere Commerce online documentation are described here:

### **1: Navigation - Providing an Option to Skip Over Repetitive Content**

A navigation standard for Web applications is to use a consistent page layout through the use of navigation bars. A visually impaired person using a nongraphical browser is forced to repetitively listen to the contents of those navigation bars when moving from page to page. Two methods can be used to avoid such repetition:

#### **Frames**

WebSphere Commerce online help uses frames to separate the navigation bars from the main content. Each frame is named with an informative label so that nongraphical browsers can identify the active frame.



**Figure 1: The navigation style for IBM WebSphere Commerce online help**

The HTML code below shows how this would be implemented:

```
<FRAMESET>
<FRAME src="banner.html" title="Company logo"
name="company logo">
<FRAME src="navigation.html" title="navigation"
name="navigation">
<FRAME src="maincontent.html" title="Online Help main
content" name="main contents">
</FRAMESET>
```

### Skip Over Main Content

In the case where frames are not used, a link is strategically placed as the first option to users when the Web page is read out to them. In order to avoid confusion for sighted users, the “skip to main content” link should be hidden behind an image that is used for layout purposes.

The HTML code below shows how this would be implemented:

1. The following HTML code was associated with an image such as the IBM logo in the banner:

```
<A HREF="#navskip"><IMG SRC="IBMlogo.jpg" ALT="Skip to
Main Content"></A>
```

2. The following HTML code was placed in the top left corner of each content page of the online help:

```
<A NAME="navskip"></A>
```

## 2: Textual Content - Making Tabular Data Easy to Navigate

Data that is displayed in a table format allows a visual user to pick and choose what information they are looking for. Rarely does a user read every bit of data

provided. However, users who depend on nongraphical browsers to read the table content must listen to each row of data to be read out in a sequential manner. Thus it is a very frustrating task for this type of user to find a simple piece of data.

WebSphere Commerce online displays data in a table format quite often. One example of this is shown in Figure 2. All of the WebSphere Commerce database tables are described in a table format.

To solve this problem, nongraphical browsers provide a feature to users that allows them to switch from normal mode to a table navigation mode. In this mode, users can move around the cells of a table and the browser will read the contents of the cell that is selected. However, the contents of a table cell may not be informative enough on their own.

The technique to enable visually impaired users to navigate tabular data with nongraphical browsers is to mark each of the cells in the table with labels that should be read out by the browser when users put it in table navigation mode.

The HTML code below shows how this is implemented:

1. The HTML <TABLE> uses <TH> tags instead of <TD> tags to display the column label headers. The <TH> tag will also contain an “ID” attribute that is used to mark the name of the label.

```
<TR>
<TH id="COL1">Column Name</TH>
<TH id="COL2">Column Type</TH>
<TH id="COL3">Column Description</TH>
</TR>
```

2. To display the content rows of an HTML <TABLE>, the <TD> tag will contain a combination of “ID” and “header” attributes. The “ID” is used to label the cell and the “header” is used to tell the nongraphical browser what additional information to associate with this cell.

```
<TR>
<TD id="FIELD" headers="COL1">
<!-- Code to show table cell content-- >
</TD>
<TD headers="FIELD, COL2">
<!-- Code to show table cell content-- >
</TD>
<TD headers="FIELD, COL3">
<!-- Code to show table cell content-- >
</TD>
</TR>
```

Using the example in Figure 2, here are before and after transcripts of what a nongraphical browser would relate to the user for the cell describing the column description of field 1 (for example, row 5 column 3).

Before: Inaccessible table cell  
 >> IBM Home Page Reader reads: “Customizable”

After: Accessible table cell  
 >> IBM Home Page Reader reads: “Column description, Field 1, Customizable”

Column Name	Column Type	Column Description
ADDRESS_ID	BIGINT NULL	The billing address, if known.
CURRENCY	CHARACTER (10) NULL	The Currency for monetary amounts associated with this Order. This is a currency code as per ISO 4217 standards.
DESCRIPTION	VARCHAR (254) NULL	A mnemonic description of the Order, entered by the customer, suitable for display to the customer.
FIELD1	INTEGER NULL	Customizable.

Figure 2: A database table description from IBM WebSphere Commerce online help

### 3: Pictorial Content – Describing Diagrams, Graphs and Charts

The biggest challenge that most writers face when making online documentation accessible is the diagram, graph or chart. One simple solution has been to use the ALT tag in the same way images can be made accessible. But what should one do about complex diagrams? For diagrams and pictures represented by a complex image, you may need to provide more information than can be given in a short ALT tag. The Web Accessibility and Usability Evaluation Resource provides suggestions:

1. Provide a description on the image contents within the general text, giving the information and detail needed for comprehension in the absence of the image.
2. Use a d-link, which is a letter ‘d’ or link title such as ‘link to a description of the image’, and position it after or next to the image. This d-link hyperlinks to a separate page or text file containing a full description of the image.
3. Use the LONGDESC attribute to link from the image itself to a description of the image on another page.

The following examples show how the d-link and LONGDESC can be added to your documentation:

<a href="images/description.html#diagram">d</a>

<IMG="images/diagram" alt="click link that follows for a long description" LONGDESC="description.html#diagram">

#### Numbering Format.

As documentation gets more detailed, diagrams can become more complex. It is still appropriate to use a d-link, LONGDESC, or ALT tag in this case, but there are two other methods that can be used to make the diagrams accessible to all users. The following diagram depicts a relational chart. This type of chart may be difficult to describe textually. One way to make the chart accessible, while providing direction about the diagram, is using the numbering format.

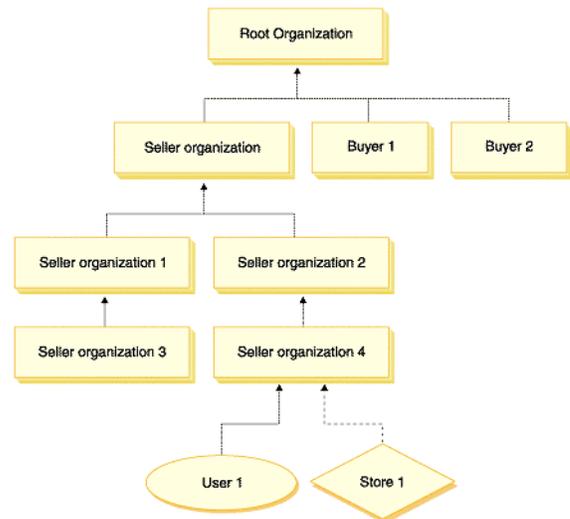


Figure 3: Organizational chart

In the numbering format, each level and its relationship to the levels above or below are described in a numbering pattern. The diagram above would be described in the following way:

#### Organizational Hierarchy

##### Top Level

1 Root Organization

##### Second Level

The second level branches are connected to the Root organization. They are sub-organizations within the Root organization

1. Seller Organization

2. Buyer 1

3. Buyer 2

##### Third Level

The third level branches are sub-organizations belonging to the second level Seller organization.

1. Seller organization 1

2. Seller organization 2

##### Fourth Level

The fourth level branches are sub-organizations belonging to the second level Seller organizations.

1. Seller organization 3. This organization is a child organization to Seller organization 1.

2. Seller organization 4. This organization is a child organization to Seller organization 2.

##### Fifth Level

The fifth level branches are members that belong to the fourth level Seller organization 4.

1. User 1

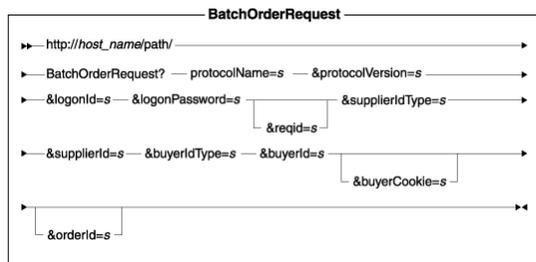
**Figure 4: Organizational chart described using the numbering format**

**Dotted Decimal Format.**

Another method used to describe complex diagrams is the dotted decimal format. This format was derived at the IBM Hursley Lab and has been used to describe syntax diagrams. In this system, each element in the diagram is numbered and then denoted by a symbol. Each syntax element is written on a separate line unless two or more syntax elements are always present together (or always absent together); they can appear on the same line, because they can be considered a single compound syntax element.

Each line starts with a dotted decimal number; for example, 3 or 3.1. All the syntax elements that have the same dotted decimal number (for example, all the syntax elements that have the number 3.1) are mutually exclusive alternatives. If you hear the lines 3.1 USERID and 3.1 SYSTEMID, you know that your syntax can include either USERID or SYSTEMID, but not both.

The dotted decimal numbering level denotes the level of nesting. If a syntax element with dotted decimal number 3 is followed by a series of syntax elements with dotted decimal number 3.1, all the syntax elements numbered 3.1 are subordinate to the syntax element numbered 3. The following syntax diagram would be described as:



**BatchOrderRequest**

- 1 protocolName=s
- 2 &protocolVersion=s
- 3 &logonId=s
- 4 &logonPassword=s
- 5 ? &reqid=s
- 6 &supplierIDType=s
- 7 &supplierID=s
- 8 &buyerIdType=s
- 9 &buyerID=s
- 10 ? &buyerCookie=s
- 11 ? &orderID=s

**Figure 5: Batch order request syntax diagram using the dotted decimal format**

In the diagram and the description, ? means an optional syntax element, and each element is mutually exclusive.

For more information on the dotted decimal format, and the different symbols used to mark elements, refer to: <http://cicsid.hursley.ibm.com/infocenter/begin.html>

**CONCLUSION**

Since starting our project of ensuring that WebSphere Commerce met our physically challenged or disabled customers' needs, our information development, testing, and user experience groups have gathered valuable accessibility information. We now have hands-on experience both creating an accessible product, and working with testing accessibility tools for a clearer understanding of user needs and expectations. We are in the process of establishing goals for our future release and providing recommendations to the larger WebSphere Commerce team. Our work is in progress, but the project has been a valuable learning experience and an excellent way for different disciplinary groups to work together toward one shared goal. We have had enough success to know that we want to continue developing our knowledge of accessibility.

*This paper reflects the views of the authors and not necessarily the views of IBM.*

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**REFERENCES**

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