

Enhancing the accessibility of web conferencing with Adobe® Acrobat® Connect™ Pro 7

Providing web conferencing and real-time collaboration technology for the hearing, vision, and motion impaired

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Although web technologies have broken down many traditional barriers to communication, not everyone has been able to participate fully in new communication channels.

For millions of individuals with disabilities, accessing digital information is still challenging. Government agencies, advocacy groups, and businesses are working to improve accessibility for all web users, including individuals with visual, auditory, or motion impairments whose disabilities make it difficult to interact with traditional computer input technologies, such as the mouse and keyboard.

For software developers, accessibility constitutes a design challenge, because foundational platforms and technologies are not all inherently accessible. User experience designers must create application interfaces that provide shortcuts and alternate access modes for key functions. Additionally, applications must allow for content to be properly formatted so that assistive technologies, such as screen readers and screen magnifiers that serve the visually impaired, can accurately interpret it.

New tools, new challenges

Web conferencing technology is unleashing new possibilities for conducting rich interactions with more people without the cost and hassle of traveling physically to a meeting location. While providing these benefits, web conferencing also poses challenges for accessibility. Real-time collaboration demands immediate interactions between virtual meeting participants. Live streaming of dynamic content makes it difficult to translate multimedia information into text or to provide non-animated alternatives. Additionally, the richness of options and the granularity of controls can create complex navigation, whereas assistive technologies work better with simplified controls.

Adobe Acrobat Connect Pro is a leading web conferencing and eLearning solution that supports real-time collaboration using a combination of voice, video, and data streaming. It allows knowledge workers, instructors, and learners to meet in virtual spaces and to collaborate by sharing rich media files and applications, and by commenting in real time through audio, video, and chat modules. An award-winning solution for web collaboration, Acrobat Connect Pro sets a new and richer standard for synchronous collaboration and on-demand access to knowledge resources.

Built on the Adobe Flash® Platform, Connect Pro offers end users the ability to easily launch the interface and take advantage of accessibility support in Flash—two key benefits that competing web conferencing solutions do not offer. Because the Adobe Flash Player is installed on 98% of computers worldwide, participants can access Connect Pro meetings from any PC or Mac, without downloading proprietary client software—a cumbersome process for users with disabilities. Adobe Flash technology enables the creation of sophisticated, dynamic audio and visual files that are widely accessible, both on the Web and in a growing number of rich applications and interfaces.

In Acrobat Connect Pro 7 Service Pack 1 and later versions, several key improvements can help organizations realize their business productivity objectives while also ensuring that their electronic communication is accessible to the largest possible community of users.

Accessibility standards and regulations

Accessibility defines a set of standards to make information technology and software applications more usable by everyone, including users who are visually impaired, who have difficulty hearing, or whose mobility is reduced.

According to data collected by the U.S. Census Bureau in 2005, 54.4 million Americans, or 18.7% of the population, had some level of disability, and 35 million, or 12%, had a severe disability. According to the International Labour Organization (ILO), one of every ten people in the world has a disability—some 650 million worldwide. Approximately 470 million of these individuals are of working age.

U.S federal regulations

Accessibility has been widely promoted and mandated by federal agencies in the United States. The Rehabilitation Act is a civil rights law that was passed in 1973 to protect individuals with disabilities. The act barred federal agencies and programs funded with federal money from discriminating against qualified individuals with disabilities in their hiring practices. The law defines “disability” broadly as “a physical or mental impairment that substantially limits a major life activity.”

In 2001, Section 508 of the Rehabilitation Act was created to require federal agencies to make electronic files and technology accessible to disabled individuals. Section 508 leverages the government’s buying power to ensure equitable treatment for disabled workers by requiring that all information technology products purchased by the federal government meet certain accessibility standards.

The World Wide Web Consortium (W3C) Web Accessibility Initiative (WAI) developed a set of guidelines (WCAG), in which Adobe was involved, for making web content—information in a web page or application—accessible to those with disabilities. The WCAG 1.0 guidelines were adopted as the basis for the web accessibility standards in Section 508 but have since been superseded by WCAG version 2.0.

International directives

Many other international public and private organizations are putting a stronger emphasis on the usability of collaboration technologies by disabled users.

The ILO is promoting employment opportunities for persons with disabilities based on the principles of equal opportunity and equal treatment. The ILO aims to achieve this goal through labor standards, advocacy, knowledge building, and technical cooperation.

Over the past 25 years, the ILO has enacted multiple conventions, including the Vocational Rehabilitation and Employment (Disabled Persons) Convention in 1983. Adopted at the start of the United Nations Decade of Persons with Disabilities, the convention requires member states—in accordance with national conditions, practice, and possibilities—to formulate, implement, and periodically review a national policy on vocational rehabilitation and employment of disabled persons. The convention has been ratified by 80 countries, as of October 2007. Supplemental recommendations and a code of practice, “Managing Disability in the Workplace,” adopted in 2001, extend the reach of this convention.

Although these documents are nonbinding, they reflect recent changes in the understanding of disability. Since 1983, there have been significant shifts in legislation, policies, and services concerning people with disabilities.

Another initiative, the Convention on the Rights of Persons with Disabilities and its Optional Protocol, marks a milestone in viewing persons with disabilities as “subjects” with rights and recognizing them as active members of society.

Adopted at the United Nations in December 2006, this convention defines a broad categorization of persons with disabilities and identifies areas where adaptations have to be made by the 139 signatories for persons with disabilities to effectively exercise their rights and participate in society on an equal basis with others.

Types of disability

In the context of using a web conferencing solution, three categories of disabilities call for specific attention: visual, auditory, and mobility.

Visual

There are three major types of visual disabilities: blindness, low vision, and color blindness.

- Blindness is the condition of lacking visual perception due to physiological or neurological factors.
- Low vision is a visual impairment—not corrected by standard glasses, contact lenses, medicine, or surgery—that interferes with the ability to perform everyday activities. A related term is “legally blind,” which is defined as visual acuity of 20/200 or less or a visual field of less than 20 degrees (the norm being 180 degrees).
- Color blindness is a color-vision deficiency resulting in the inability to perceive differences between some of the colors that others can distinguish. It ranges from total color blindness in which a person perceives the world as shades of gray, to more common types in which a person does not perceive the differences between red and green or yellow and blue correctly.

A blind person is usually precluded from using a mouse or pointing device because of the hand-eye coordination required to effectively operate such a device. A blind person is also likely to use a screen reader. People with low vision might use a screen magnifier to enlarge text.

Auditory

There are two major auditory issues: deafness and being hard of hearing.

- Deafness is the inability to understand speech or recognize environmental sounds. Deaf people generally communicate using sign language. According to data from the National Health and Nutrition Examination Survey in 2004, an estimated 16.1% of adults (29 million people) in the United States had speech-frequency hearing loss.

Access to interpreting services, closed captioning on television, instant messaging, and text messaging (SMS) has broadened the entertainment and communication options for the deaf. Some of these text-based channels, such as chat, are common features in web conferencing applications.

- Hard of hearing or hearing loss is categorized as a continuous spectrum of loss. There are several levels of severity: mild, moderate, severe, and profound. On average, people with mild hearing loss are able to hear sounds of 25 to 40 decibels with their better ear. For those with profound hearing loss, the quietest sound they might hear is 90 decibels. People who suffer from profound hearing loss are very hard of hearing and rely mostly on lip-reading and sign language.

Hearing impairments make it difficult or impossible for individuals to handle various levels of audible cues, such as sound alerts or special audible indicators. Visual representations of auditory information and translation of audio information in a visual format are required for people affected by hearing impairments.

Mobility

Impaired mobility can arise from neurological disorders, repetitive stress or other physical injury, or degenerative diseases.

- Neurological disorders, either caused by birth or accident, can result in partial or full paralysis when nerves fail to control the muscles of the body.
- Repetitive stress injuries are a result of repeating motions over a long period of time. Common manifestations include wrist tendonitis and backache.
- Degenerative diseases and conditions such as arthritis may be associated with aging. According to the Centers for Disease Control and Prevention, an estimated 46 million U.S. adults (about 1 in 5) report doctor-diagnosed arthritis.

Mobility or dexterity impairments often limit a person's movement or fine-motor skills. These impairments can affect the ability to type and to use a mouse or pointing device. People suffering from mobility impairments might use alternate input devices for interacting with their computer, such as voice-dictation software.

Usability model of Connect Pro

Connect Pro 7 Service Pack 1 and later versions include many accessibility features to facilitate navigation, enable new key workflows for disabled persons attending meetings or delivering presentations over Connect Pro, support closed captioning, and provide flexibility in customization. These features are in addition to accessibility capabilities existing in prior versions of the product. But before listing improvements in accessibility, it is important to understand how users access and navigate the Connect Pro application.

In Connect Pro, interactions among users occur in the context of meeting rooms. Each room is a virtual space identified by a unique URL address. The properties and contents attached to each room can persist across meeting sessions. The same concept applies to eLearning uses although the meeting rooms are referred to as virtual classrooms, which are rooms enhanced with additional training features.

Hosts, presenters, and participants can join a meeting room just by entering the room URL address in a browser, such as Internet Explorer, Firefox, or Safari. Rooms are launched from the Adobe Flash Player, which is installed on 98% of computers worldwide. Each room exhibits a variable number of screens, referred to as "pods." Pods are independent, shareable, mini applications that fulfill specific functions in the meeting, such as attendee management, text-based messaging, or sharing. Users are meant to navigate across these pods during a meeting session. A main toolbar and a set of menus complete the navigation framework.

Facilitated navigation

Key improvements have been made to help ensure that the Connect Pro navigation framework provides accessibility support. Notable changes pertain to menu navigation, keyboard shortcuts, and tab navigation.

Menu navigation

Users can now navigate through the Acrobat Connect Pro interface using the onscreen menu. This is important to users with mobility impairments, because it can reduce reliance on traditional—and more challenging—input devices such as a mouse.

When using the Connect Pro meeting client window, users can now press Ctrl+space to place the focus in the top-level menu and then use arrow keys to browse through the menu options. Users can navigate horizontally and vertically and within each menu.

For example, to change bandwidth settings for their meeting room, hosts can go to Meeting and then navigate the drop-down list. There they can select Room Performance and Appearance and then Optimize Room Bandwidth to change the settings from DSL to LAN. Using the keyboard, the hosts can select LAN, and then press the spacebar. The menu dims after their selection. Previously, such an option could be accessed and modified only via mouse input.

Keyboard shortcuts

Another major improvement is enabling keyboard shortcuts to manage key meeting functions. Those with mobility challenges can use keyboard shortcuts to ease screen navigation by bypassing more physically challenging input devices. Shortcuts allow users to quickly activate program accessibility functions. For example, pressing Ctrl+. (period) toggles to full-screen display, expanding the size of an active pod for visually impaired users.

Blind users should familiarize themselves with important keystrokes and ensure that a reference list is handy during a meeting.

Ctrl+M	Toggle microphone on or off.
Ctrl+Up Arrow	Toggle raise-hand status.
Ctrl+.	Toggle Full Screen mode. Applies to the currently selected Share pod.
Ctrl+'	Promote to host. Requires selected items in attendee list.
Ctrl+]	Demote to participant. Requires selected items in attendee list.
Ctrl+/'	Promote to presenter. Requires selected items in attendee list.
Ctrl+,	Toggle start and stop recording. For start, brings up the Start Recording dialog.
Ctrl+\	End meeting. Brings up the End Meeting dialog.
Ctrl+[Toggle start and stop desktop sharing. Applies to currently focused Share pod.
Ctrl+Space	Access main menu for keyboard navigation.

The new shortcuts in Connect Pro are available from a PC or a Mac. Limitations may apply to certain international keyboards, such as French or German, because the arrangement of keys differs.

The list of shortcuts is available from the meeting room by selecting the Keyboard Shortcuts option in the Help menu.

For example, presenters or hosts can decide to record the session just by pressing Ctrl+, (comma). After this option is selected, the Start Recording dialog box opens. The user can press the Tab key to move from one field to another for editing. When finished, the user presses Enter to start the recording. Recording is indicated by the notifier in the upper right corner of the meeting window. To stop the recording, the user can use the same keystrokes or, alternately, press Ctrl+space and navigate to the Meeting menu to select Stop Recording.

Tab navigation

Users can now use the Tab key to navigate the options of the client interface, particularly the pods. A colored line wraps the object currently selected. Administrators can customize the color for optimal contrast. See the “Customizable display, contrast, and color scheme” section of this document.

Tab navigation has proven useful to users with mobility challenges because it reduces the more physically demanding movements required by navigation devices such as the mouse to steer through screen pods during meetings or training sessions.

For example, to easily share an application, hosts and presenters can place the input focus on the Applications option displayed under the label “What do you want to share?” in the Share pod. When users want to share an item on their computer, they press the spacebar to select this option. The list of applications currently running on the computer is displayed, which can be navigated by tabbing. Users can go back to select Desktop if they want to share their complete view. With Desktop selected, a user can tab to the Share button and press Enter to start sharing the desktop with all attendees.

To stop sharing, the user goes back to the Connect window by pressing Alt+Tab. From there, the user presses Ctrl+[(opening bracket) to stop streaming the desktop view. Other workflows are possible with tabbing and keystrokes, such as navigating the attendee list and promoting and demoting users, muting and unmuting the phone line, or using full screen mode.

Useful tips for navigation

At meeting start

- Open the meeting in the Acrobat Connect Meeting Add-in to take advantage of all accessibility enhancements. If the Add-in is not installed on the computer, open the Help menu, select Check For Updates, and download Adobe Acrobat Connect Add-in.
- Use Ctrl+space to start menu navigation.

During the meeting session

- Open the Help menu, and select Keyboard Shortcuts to view all current shortcuts.
- For sharing functions, place the input focus in the Share pod by using the Tab key. Sharing shortcuts are active only when the application focus is in the Share pod.
- Use menu navigation to the Pods menu to manage the pods in the meeting room.
- Use a combination of tab navigation and keyboard shortcuts to actively manage key meeting functions.

Enabled workflows

Sharing a desktop or a presentation is a key workflow of web conferencing. This function is now accessible.

Sharing a desktop

To share a desktop, a user must first place the input focus on the Share pod (a blind user may need assistance to ensure that the focus is on the Share pod). The user can press the Tab key to cycle through the different pods. A colored line frames the pod on which the focus is placed. If the Tab key is pressed again, it moves to another pod. When the focus is on the Share pod, the user presses Ctrl+[(opening bracket) to start sharing. The Share dialog displays.

Sharing a presentation

Users can access the main menu via keystrokes by pressing Ctrl+space. From there, they can browse to the Pods menu, choose Select From My Computer, and navigate to the folder where their file is stored. When the user selects a target file (such as a PPT file) and click Open, the upload and conversion process begins. For instance, a Microsoft PowerPoint presentation can be converted into a richer, Flash-based presentation using the Adobe Presenter authoring technology.

When the document is open, it is possible to use additional keyboard functions, such as the left or right arrow key to go from slide to slide or, alternately, using the Page Up and Page Down keys. The following keyboard shortcuts are also supported in the context of shared presentations that have been created or converted using Adobe Presenter:

Page Up or right arrow	Next slide
Page Down or left arrow	Previous slide
P	Play and pause
S	Stop
M	Mute
V	Change view

Saving input on a whiteboard

Whiteboarding can be challenging for many disabled users, especially those with visual and mobility impairments. However, keyboard shortcuts enable users to contribute or print the output.

Ctrl+D	Clear
Ctrl+P	Print
Ctrl+Z	Undo
Ctrl+Y	Redo
DEL	Delete selected items
Arrow keys	Move selected items

Support for closed captioning

The Adobe Acrobat Connect Captioning Extension makes real-time closed captioning possible so that deaf users can follow the progress of a Connect Pro session. Meeting leaders who want to provide closed captioning must hire a professional stenographer to transcribe the meeting. Closed captioning is a Section 508 accessibility requirement designed to accommodate deaf and hearing-impaired users.

WGBH, a leader in closed captioning research and development, developed the Connect Captioning Extension for Adobe. It is provided as SWF file that can be uploaded into a Connect Pro room. When the extension is installed, hosts can configure it to connect to their captioning server and start displaying the caption feeds.

The Connect Captioning Extension is available free of charge at www.adobe.com/cfusion/exchange/index.cfm?event=extensionDetail&extid=1032548#, along with instructions on how to use it.

Customizable display, contrast, and color scheme

In the Connect Pro meeting room, hosts can manage the display and appearance of pods through keystrokes. By using the on-menu navigation and browsing to the Pods option, they can select pods to open or close at their discretion.

For example, if hosts want to hide the Chat pod during a meeting session, they can navigate to Pods and deselect the Chat pod using the spacebar. To restore it, they can go back to the Pods menu and reselect the Chat pod, still using the spacebar.

Administrators can provide additional customization of these functionalities, such as changing a pod's border to a higher contrast color. Administrators can change this color by logging on to the Connect Pro Central web-based management interface and going to the Administration tab. Under Customization > Meeting Customization, select Button Rollover, then set the preferred color. The new setting applies to new meeting sessions.

From the palette of colors, Adobe recommends using blue (RGB 0,0,192 / #0000CC) for better contrast (5.6:1 ratio) when using default meeting templates.

Other features and considerations

Customizable text-based messaging

Since its creation, Connect Pro has offered a chat tool with functionality comparable to a text-telephone for the deaf or for users with speech impairment. With the chat tool, deaf and speech-impaired users can communicate with their colleagues in real time at live meetings. The size of the font is customizable in the chat tool.

Audio

Connect Pro's audio capabilities are compatible with hearing aids, cochlear implants, and other listening devices so that hearing-impaired users can listen in real-time at live meetings without any further assistance.

Video

For clear and readable screen images, all bitmap images are displayed in a consistent fashion throughout Connect Pro. Screen elements are designed to avoid flicker in the 2 to 55 hertz frequency range.

Tooltips

Connect Pro supports tooltips for each function or option represented in the meeting user interface. Tooltips appear as boxes of text, rendered on a yellow background for contrast, and appear when the cursor hovers over an item.

Access to help and documentation

Accessible documentation is available for all Adobe products.

Coexistence with other assistive technologies

Connect Pro is compatible with accessibility features in Microsoft Windows®, such as filter keys, toggle keys, and sticky keys, which are used by blind and visually impaired users as well as those with mobility challenges to locate active screen elements and navigate between pods. Connect Pro works seamlessly with Windows without any disruption to the operating system's accessibility features. The current version of Connect Pro offers limited compatibility with screen readers, such as JAWS and Window-Eyes.

Recommendation for optimal use

Adobe recommends the Acrobat Connect Meeting Add-in for users wishing to take advantage of the accessibility enhancements. The Meeting Add-in is based on Flash technology and is used for sharing functions by presenters and hosts. Disabled participants are advised to use it for all their Connect Pro meetings, because it provides a more consistent experience and avoids disparate rendition due to browser discrepancies.

Major improvements have been made in the meeting application, which is based on Flash technology and is used to attend or deliver a live meeting. Connect Pro also supports a web-based application, Connect Pro Central, for the management of meetings and training sessions. This interface offers a more limited level of compliance with accessibility standards.

Adobe's commitment to democratize access

Adobe is committed to providing tools that help organizations optimize their digital content and collaboration environments for accessibility. Adobe is dedicating resources to ensure its technologies and commercial software are usable by those with special needs. Adobe's goal is to democratize access to information and creative media, so all users can access digital files with ease and participate fully in the Digital Age.

Adobe, as an industry leader in network publishing, electronic document creation, and real-time digital experience, has taken an active role in developing accessibility standards for digital content. Adobe participates in various Web Accessibility Initiative (WAI) working groups. WAI, which has a mission to promote accessible web content, is part of the World Wide Web Consortium (W3C). Adobe also participates in the W3C's Web Content Accessibility Guidelines (WCAG) working group, and was involved with the Section 508 Telecommunications and Electronic and Information Technology Advisory Committee to review current Section 508 standards. Adobe has been offering accessibility solutions since 1997, when it introduced the *access.adobe.com* website offering free services that convert Adobe PDF files into HTML or plain text for easy interpretation by assistive technologies. Increased accessibility support has also been incorporated into Adobe's foundational technologies, such as Adobe Flash and Adobe Flex.®

Summary

For Adobe, accessibility is not just a requirement mandated by national and international organizations. It is a process of making software more inclusive to all the communities that want to use it.

Adobe has its own in-house accessibility team, comprised of world-class experts in the design and implementation of enterprise software. The accessibility team provides a continuous liaison between customers and product development teams.

While accessibility features in Connect Pro take this web conferencing solution ahead of most competing offerings, Adobe knows it can always do better to make Connect Pro more accessible.

Adobe is committed to working on further improvements and implementing best practices for accessibility in future versions of Connect Pro software, not only to make Connect Pro the best training and meeting platform for absolutely all users, but also to remain true to Adobe's mission to revolutionize how the world engages with ideas and information.

Partners

Caption Colorado

Caption Colorado was founded in 1991 and is now America's largest provider of real-time closed captioning services. From traditional news and television captioning to real-time streaming media captioning services, Caption Colorado is the nation's premier provider of captioning services. Caption Colorado develops the technology to empower the deaf and hard-of-hearing and provides you with ADA and Section 508 compliant solutions.

NCAM (National Center for Accessible Media)

The Carl and Ruth Shapiro Family National Center for Accessible Media (NCAM) is a research and development facility dedicated to the issues of media and information technology for people with disabilities in their homes, schools, workplaces, and communities.

NCAM acts as the research and development arm of WGBH's Media Access Group and is involved in technology and policy and program development to ensure that the nation's media and technologies are fully accessible to people with disabilities. For more details about NCAM, visit <http://ncam.wgbh.org>.

WGBH

WGBH Boston is America's preeminent public broadcaster, producing such celebrated national PBS series as Masterpiece Theatre, Antiques Roadshow, Frontline, Nova, American Experience, and more than a dozen other award-winning primetime, lifestyle, and children's series. Boston's last remaining independent TV station, WGBH produces local TV productions (among them, Greater Boston, Basic Black, and María Hinojosa: One-on-One) that focus on the region's diverse community, while WGBH 89.7 FM is Boston's NPR Arts & Culture station, offering a rich menu of classical, jazz, blues, news programming, and more. WGBH is the leading producer of online content for pbs.org—one of the most-visited dot-org sites on the Internet—a major producer for public radio and a pioneer in developing educational multimedia and new technologies that make media accessible for people with disabilities. For its efforts, WGBH has been recognized with numerous honors, including an Academy Award nomination, Emmys, Peabodys, and a duPont-Columbia Journalism Award. Visit WGBH on the Web at www.wgbh.org.



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