Project
Accessibility Assessment Simulation Environment for New Applications Design and Development
(ACCESSIBLE, Grant Agreement No. 224145)

Deliverable
D 2.1 - State of the Art Survey in Accessibility Research and Market Survey

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### History of versions Table

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Executive Summary

This Deliverable consists of two parts.

The first part focuses on research efforts and achievements in the fields of accessibility and assistive technologies and presents the results stemming from a thorough review conducted in the context of the ACCESSIBLE project to search for the state of the art of application accessibility technologies. Such technologies include well-established standards, but also appropriate accessibility assessment tools, developer’s aid tools and well-defined methodologies.

As a starting point, the relevant research work conducted in ASK-IT IP project for various disabilities (both literature work and prototypes trials results) was thoroughly reviewed. The recommendations coming from all relevant conducted trials with relevant prototypes as well as the identification of gaps in the undergoing literature review and studies oriented the further research held in the context of ACCESSIBLE.

In summary, the current state-of-the-art in the following fields was considered:

a) Current and emerging accessibility standards such as Section 508, WCAG 1.0&2.0, WAI-ARIA, ISO/IEC Guide 71, ISO/DIS 9241-151, etc.
b) Existing accessibility check or repair tools for accessibility assessment such as Bobby, WebKing, RAVEN, aDesigner, LIFT, AccRepairf
c) Current guidelines and accessibility technologies from Sun, Microsoft and IBM
d) The current accessibility status of desktop and mobile applications and services
e) Survey regarding simulation tools for accessibility support.

The second part focuses on market data, as a way to establish the commercial possibilities of the systems developed in the ACCESSIBLE project. This Deliverable describes the plans and preparations towards the market survey to be conducted in ACCESSIBLE, including the realisation and circulation of a relevant template for collecting structured data on actual state of art of the benchmarking accessibility tools market.

The task T8.4 (Market Analysis & Business Plan) will take-over this activity to carry a full market survey by Month 12, which will be constantly updated during the course of the project, to cater for new technological evolution and reported as part of the month 32 milestone “Business plan and market analysis available”.
# Table of contents

Authors List ........................................................................................................ iii
Peer Reviewers List ............................................................................................... iii
History of versions Table ....................................................................................... iv
Executive Summary ............................................................................................... vi
Table of contents ................................................................................................... viii
List of figures .......................................................................................................... x
List of charts .......................................................................................................... xi
List of tables .......................................................................................................... xi
List of definitions & abbreviations ........................................................................ xii

## 1 Introduction..................................................................................................... 15
  1.1 Aim and object ............................................................................................... 15
  1.2 Methodology ................................................................................................ 15

## 2 Survey of standards....................................................................................... 17
  2.1 Accessibility standards & guidelines templates ........................................... 18
    2.1.1 Template for Standards Gathering & Standards Compliance ............ 18
  2.2 Accessibility standardisation bodies and initiatives .................................... 18
  2.3 Accessibility standards overview ................................................................. 22
    2.3.1 Web application accessibility standards ........................................... 23
    2.3.2 Web services accessibility standards .............................................. 27
    2.3.3 Description languages accessibility standards .................................... 27
    2.3.4 Mobile applications accessibility standards ....................................... 27
  2.4 Conclusions for the accessibility standards ................................................ 29
  2.5 Accessibility guidelines & technologies ...................................................... 29
    2.5.1 IBM accessibility guidelines ............................................................... 30
    2.5.2 Sun Microsystems accessibility technologies .................................... 30
    2.5.3 Microsoft accessibility technologies ................................................. 33
    2.5.4 APPLE accessibility technologies .................................................... 37
  2.6 European benchmarking initiatives .............................................................. 41
    2.6.1 The Fifth Framework Programme ...................................................... 41
    2.6.2 The Sixth Framework Programme ..................................................... 42
    2.6.3 Benchmarking Tools and Methods for the Web ................................. 42
    2.6.4 The Seventh Framework Programme ............................................... 46
    2.6.5 Relevant Projects ............................................................................... 48

## 3 Market Survey............................................................................................... 53
  3.1 Survey of tools ............................................................................................. 53
  3.2 Market survey Template .............................................................................. 54
  3.3 Accessibility assessment tools ...................................................................... 55
    3.3.2.1 Results for accessibility assessment tools ..................................... 55
    3.3.2.2 Conclusions for the accessibility simulation tools ...................... 62
  3.3.3 Accessibility simulation tools .................................................................... 67
    3.3.3.1 Results for accessibility simulation tools ..................................... 68
    3.3.3.2 Conclusions for the accessibility simulation tools ...................... 75
  3.4 Survey of devices ........................................................................................ 77
    3.4.1 Screen Readers .................................................................................... 77
    3.4.2 Braille .................................................................................................. 79
    3.4.3 Alternative Keyboards or Switches ..................................................... 80
    3.4.4 Screen Magnifiers ............................................................................... 81
3.4.5 Scanning Software ................................................................. 81
3.4.6 Speech Devices ........................................................................ 81
  3.4.6.1 Speech recognition .......................................................... 81
  3.4.6.2 Speech synthesis ............................................................. 81
  3.4.6.3 Visual notification ............................................................ 82
  3.4.6.4 Voice browsers ............................................................... 82
3.4.7 Listening Devices .................................................................... 82
3.4.8 Text Browsers ......................................................................... 82
3.5 Market survey Results ................................................................. 82
4 General Conclusions ................................................................... 84
References ....................................................................................... 85
Annex A: “Standards Gathering Template”.......................................... 94
    “Standards Gathering Template” ................................................. 95
Annex B: “Accessibility Assessment Tools Gathering Template” ............ 100
Annex C: “Accessibility Simulation Tools Gathering Template” .......... 156
Annex D .......................................................................................... 164
   “Template for initial data gathering” & .......................................... 164
   “WTH & WTP Questionnaire” ................................................... 164
Annex D1: “Template for initial data gathering” ................................... 165
   “Template for initial data gathering” ............................................ 166
Annex D2 ......................................................................................... 168
   “WTH & WTP Questionnaire” .................................................... 168
     Questionnaire for Developers .................................................. 169
   “WTH & WTP Questionnaire” .................................................... 170
Annex E .......................................................................................... 171
   “IBM GUIDELINES” ............................................................... 171
List of figures

Figure 1: OpenSolaris system overview ............................................................. 31
Figure 2: Orca cooperation with the AT-SPI ...................................................... 32
Figure 3: Internet Explorer 8 accessibility options overview ............................... 33
Figure 4: On-Screen Keyboard overview .......................................................... 35
Figure 5: Windows Vista accessibility options overview ..................................... 36
Figure 6: Accessibility scores of the tested countries ........................................ 44
Figure 7: The SPs of ASK-IT project ............................................................... 45
Figure 8: DIADEM architecture ....................................................................... 46
Figure 9: The Ontology-Driven Platform developed within OASIS project .......... 47
Figure 10: Observation Sequence .................................................................... 49
Figure 11: Observation Sequence for an online document ................................. 50
Figure 12: Observation Sequence for an uploaded or directed inputted document .. 50
Figure 13: AccRepair assessment tool overview ................................................ 57
Figure 14: Bobby WorldWide Web Accessibility Tool overview .......................... 59
Figure 15: Sheriff Accessibility Module features overview .................................. 61
Figure 16: Accessibility color wheel simulation tool overview ............................. 68
Figure 17: ADesigner simulation tool overview .................................................. 69
Figure 18: ColorDoctor simulation tool overview .............................................. 70
Figure 19: Colour Blindness Simulator tool overview with an example of deuteranopia .......................................................... 71
Figure 20: VIS for Microsoft Windows ................................................................ 72
Figure 21: VIS dropdown menu for visual impairments ...................................... 72
Figure 22: An example of deuteranopia and tritanopia ...................................... 73
Figure 23: WebAIM Low Vision Simulator ....................................................... 74
Figure 24: WebAIM Distractibility Simulation .................................................. 75
Figure 25: Apple_Voice Over overview ............................................................. 78
Figure 26: Code factory mobile speak application overview ................................ 78
Figure 27: ALVA Satellite series overview ....................................................... 79
Figure 28: Goldtouch Adjustable Keyboar overview ......................................... 80
Figure 29: Kinesis Maxim Adjustable Keyboar overview .................................... 80
Figure 30: Microsoft Natural Keyboard Elit overview ....................................... 81
Figure 31: A-Checker assessment tool overview ............................................... 101
Figure 32: A-Prompt assessment tool, file selection and text prompt dialogue box overview ................................................................................. 102
Figure 33: AccRepair assessment tool overview .............................................. 105
Figure 34: Bobby WorldWide Web Accessibility Tool overview ........................ 108
Figure 35: Fujitsu ColorSelector Accessibility assessment tool overview ............ 111
Figure 36: Colour Contrast Analyser Firefox Extension Accessibility assessment tool overview ................................................................. 113
Figure 37: EveryEye Accessibility assessment tool overview ............................ 120
Figure 38: HTML Validator for Firefox and Mozilla assessment tool overview .... 124
Figure 39: Kontrasttest assessment tool overview............................................. 128
Figure 40: PEAT assessment tool overview ...................................................... 135
Figure 41: Readability index calculator assessment tool overview ....................... 136
Figure 42: Sheriff Accessibility Module features overview .................................. 139
Figure 43: WAEX Accessibility Module features overview .................................. 147
Figure 44: Web Accessibility Inspector Accessibility Module features overview .... 149
Figure 45: Web Accessibility Toolbar for Internet explorer overview..................150
Figure 46: Web Accessibility Toolbar for Opera, overview..............................151
Figure 47: Web Developer Extension Accessibility Module features overview......152
Figure 48: Accessibility color wheel simulation tool overview..........................157
Figure 49: ADesigner simulation tool overview.............................................158
Figure 50: ColorDoctor simulation tool overview...........................................160

List of charts
Chart 1: Accessibility assessment tools guidelines and combinations..................63
Chart 2: Accessibility assessment tools guidelines...........................................64
Chart 3: Accessibility assessment tools browser.............................................64
Chart 4: Accessibility assessment tools assistance.........................................66
Chart 5: Accessibility assessment tools licence..............................................67
Chart 6: Percentage of type of impairment of simulation tools........................77

List of tables
Table 1: Type of impairment each tool simulates..............................................76
### List of definitions & abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Definition</th>
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<tbody>
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<td>AJAX</td>
<td>Asynchronous JavaScript + XML</td>
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<td>AVI</td>
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<td>Barrierefreie Informationstechnik-Verordnung</td>
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<td>BMP</td>
<td>Bitmap image file format</td>
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<td>Design for All Network of Excellence</td>
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<td>Dynamic Hyper Text Markup Language</td>
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<td>EDeAN</td>
<td>European Design for All e-Accessibility Network</td>
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<td>EIAO</td>
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<td>ERA</td>
<td>European Research Area</td>
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<td>ES</td>
<td>Expert System</td>
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<td>FP</td>
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<td>Musical Instrument Digital Interface</td>
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<td>MP3</td>
<td>Moving Picture Experts Group Layer-3 Audio</td>
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1 Introduction

1.1 Aim and object

The aim of this Deliverable is to present an overview of the existing standards, guidelines, methods and tools for accessibility assessment and simulation, that are relevant to ACCESSIBLE project, and also to provide a methodology for an extend survey of the market environment, within which the future ACCESSIBLE products are to be introduced.

The term of “standards” has a wide range and variety of meanings, associated most of the time with their usage. For example, a technical standard is an established norm or requirement, and it is usually a formal document that establishes uniform engineering or technical criteria, methods, processes and practices. Also, the term of “open standards” exists, that is identified to be a standard publicly available and has various rights to use associated with it, and may also have various properties of how it was designed (e.g. open process). The definitions of the term "open standard" used by academics, the European Union and some of its member governments or parliaments such as Denmark, France, and Spain preclude open standards requiring fees for use, as do the New Zealand and the Venezuelan governments. On the standard organisation side, the W3C ensures that its specifications can be implemented on a Royalty-Free (RF) basis. [331]

In the software domain, standards exist to ensure interoperability and a common definition of standards is given: “Software standards are certain terms, concepts and techniques agreed to by software creators so that their software can understand each other.”

In the scope of this Deliverable, a thorough review will be performed to search for the state of the art application accessibility technologies. These technologies include well-established standards as mentioned before, but also appropriate accessibility assessment and simulation tools, developer’s aid tools and well-defined methodologies.

Finally the market survey will present what are the common trends followed so far, what are the barriers and the achievements and what is the maturity of the market as a whole, but also of each specific cluster. Thus, this Deliverable aims to present the commercial and most innovative existing solutions in the accessibility market.

1.2 Methodology

This Deliverable consists of two relevant parts, the Literature review and the Market survey part.

During the Literature review a thorough research has been performed, to define the state of the art on accessibility support and benchmarking technologies. Such technologies include well-established standards and proposed guidelines, but also appropriate accessibility assessment and simulation tools, developer’s aid tools and well-defined relevant methodologies.

The purpose of the literature review is to identify background and related work with regards to the objectives of the ACCESSIBLE project. Of particular interest is the following R&D, areas identified early in the project:

1. Accessibility standards.
2. Open source assessment tools.
3. Simulation tools on accessibility benchmarking.

A survey of existing standards which are relevant to the areas covered by the ACCESSIBLE project was carried out in the very beginning of the project. A “Template for Standards Gathering” (Annex A) was initially distributed to all ACCESSIBLE partners and completed templates were used to develop an exhaustive list of relevant standards and guidelines.

The Market analysis was performed to establish the commercial possibilities of the systems developed in the ACCESSIBLE project. In the Market analysis part of the Deliverable, there is a presentation of the state of the art tools for accessibility assessment and simulation. A “Template for accessibility assessment tools” was used in order to cluster the modules of the tools and in this structure all the accessibility assessment tools are presented in Annex B. The same template was also used in order to format the accessibility simulation tools that are illustrated in Annex C: “Template for accessibility simulation tools”.

The market analysis part of the Deliverable presents a market survey of the ACCESSIBLE product, from the developer’s side. The data were gathered using two templates given in the Annex D. In Annex D1 the “Template for initial data gathering” and in Annex D2 the “WTH & WTP Questionnaire” template are presented. These templates will be updated during the course of the project and will be circulated to all relevant ACCESSIBLE partners with the perspective to collect data for furthermore analysis during Task T8.4 (Market Analysis & Business Plan). This template, “Template for initial data gathering”, is to be circulated to all internal developers, while the “WTH & WTP Questionnaire” is to be filled up by external developers and ACCESSIBLE possible users. In addition, inputs from the literature review will be considered. An extend elaboration of the market survey method is to be presented in Chapter 4.1: Market survey Methodology, of the current Deliverable. In this Deliverable the market survey will only refer to the methodology and the templates used in order to define the market circumstances and needs, and to specify the way the data are going to be gathered in order to cater new technological evolution, in the related to ACCESSIBLE project fields.
2 Survey of standards

In addition to RTD efforts aiming to provide solutions to accessibility problems (following either reactive or proactive approaches), there have been also policy initiatives. In the recent past, the principles and practice of design for all have been progressively adopted and advocated by an increasing proportion of the research community (i.e., research Consortia in the context of various RTD Programmes of the European Commission such as TIDE\(^2\), RACE\(^3\), ACTS\(^4\), TAP\(^5\), COST\(^6\), industrial Consortia (such as the USA Telecommunications Policy Roundtable), scientific and technical Committees (USACM\(^7\)), as well as national legislation (e.g., Americans with Disability Act and the 1996 Telecommunications Act in the USA), and International Directives (e.g., United Nations General Assembly Standard Rules of 1995).

In addition, there are several on-going efforts to promote accessibility in National and International Standardisation Bodies and Industrial Consortia (e.g., the World Wide Web Consortium - W3C). The majority of these efforts aim to formulate accessibility guidelines, either general (e.g., HFES/ ANSI Draft, Section 508\(^8\)), platform specific (e.g., for Graphical User Interfaces or the Web\(^9\)), or domain-specific guidelines (e.g., for text editing, graphic manipulation\(^10\)). Such guidelines are typically documented on paper, and reflect previous experience gained and best practices available for designing accessible interactive software (also including content). The systematic collection, consolidation and interpretation of these guidelines is currently pursued in the context of international collaborative initiatives (e.g., W3C-WAI Initiative\(^11\), ISO TC 159 / SC 4 / WG 5\(^12\)), as well as national projects, such as the Universal Design Project, and international scientific fora\(^13\). In this context, it is worth pointing out the efforts carried out by the W3C-WAI Initiative in the area of Web accessibility guidelines.

Today, the eEurope 2005 action plan recognises the compelling need for “an information society for all” in Europe. In the context of eEurope, the eAccessibility Action Plan focuses on promoting the access opportunities that innovative

\(^2\) Telematics for Disabled and Elderly people (http://www2.echo.lu/telematics/disabl/disabel.html).
\(^3\) Research and Technology Development in Advanced Communications Technologies in Europe (http://www.analysys.co.uk/race/).
\(^4\) Advanced Communications Technologies & Services (http://www.uk.infowin.org/ACTS/).
\(^5\) Telematics Applications Programme (http://www2.echo.lu/telematics/home.html).
\(^7\) The ACM U.S. Public Policy Committee (http://www.acm.org/usacm/).
\(^8\) The following is an example of general guidelines: Software should enable as many input and output alternatives as possible (ANSI/HFES, 1997).
\(^9\) The following is an example of platform specific guidelines concerning the Web: Document conversion algorithms should produce accessible markup (see http://www.w3c.org/WAI/).
\(^10\) The following is an example of domain-specific guidelines concerning graphic manipulation: Software should enable users to change graphic attributes of visual codes used to represent data, without changing the meaning of that data (ANSI/HFES, 1997).
\(^12\) International Standards Organisation, Technical Committee 159 (Ergonomics) / Subcommittee 4 (Ergonomics of human-system interaction) / Working Group 5 (Software Ergonomics and human-computer dialogues).
\(^13\) E.g., the International Scientific Forum "Towards an Information Society for All" (Stephanidis et al., 1998).
technologies can offer to citizens in the Information Society, and especially to members of social groups at risk of exclusion, and in particular people with disability and elderly people. A line of commitment in this direction has also been formulated in the Ministerial Declaration on eInclusion. The Ministerial Declaration on eInclusion\textsuperscript{14} signed during the Ministerial Symposium “Towards an Inclusive Information Society in Europe”, jointly organised by the European Commission and the Greek Presidency in Crete, Greece, 11 April 2003, Heraklion, Crete, Greece, 11/04/2003.

The European Design for All e-Accessibility Network - EDeAN\textsuperscript{15}, was established in July 2002, in accordance with the eAccessibility Action Plan, to promote awareness and application of the Design for All and Universal Access principles. The EDeAN Network aims to facilitate the exchange of ideas, knowledge and experience, by fostering common activities among the European Union member-states. The exchange and interaction in the EDeAN network is largely organised by topics in special interest groups (SIGs). Five EDeAN SIGs are active\textsuperscript{16}, addressing the issues of Policy and legislation, Standardisation, Curricula on Design for All, Benchmarking and Technology Proactive Assessment.

### 2.1 Accessibility standards & guidelines templates

#### 2.1.1 Template for Standards Gathering & Standards Compliance

A survey of existing standards which are relevant to the areas covered by the ACCESSIBLE project was carried out. A “Template for Standards Gathering” was initially distributed to ACCESSIBLE partners and completed templates were used to develop an exhaustive list of relevant standards and guidelines. In the “Standards Gathering Template” that is consisted of 3 fields, and is presented in Annex 1, the reader can find a thorough list of the available standards. This template was sent to all WP leaders, in order to gather standards that refer not only to the development part of the project but also to the content itself. Currently, 37 standards have been gathered, covering all the main areas of ACCESSIBLE that are:

- Web application accessibility standards.
- Web services accessibility standards.
- Description languages accessibility standards.
- Mobile applications accessibility standards.

### 2.2 Accessibility standardisation bodies and initiatives

All the accessibility standards that refer to ACCESSIBLE fields of interest come from certain standardisation bodies that make a lot of effort to emerge accessibility in software applications, so it is important to present these bodies. The main existing bodies on the field of accessibility standards are the following:


\textsuperscript{15} [http://www.eaccessibility.org/](http://www.eaccessibility.org/)

\textsuperscript{16} The IST-2001-38833-D4ALLnet project supports the operation and the networking activities of EDeAN through the virtual networking platform HERMES ([http://www.edean.org](http://www.edean.org)).
**ANEC**
The European Association for the Co-ordination of Consumer Representation in Standardisation\(^\text{17}\) (known informally as 'the European consumer voice in standardisation'), is an organisation promoting and defending consumer interests in the processes of standardisation and certification and in legislation related to standardization and certification. In November 2008, ANEC adopted the strapline 'Raising Standards for Consumers' as part of an initiative to improve the visibility of the association. ANEC provides technical expertise and advice drawn from a network of more than 200 consumer representatives across Europe. The organisation's experts contribute directly to the work of more than 80 technical committees and working groups of the European Standards Organisations, CEN, CENELEC and ETSI.

**ANSI**
The American National Standards Institute or ANSI [60] is a private non-profit organization that oversees the development of voluntary consensus standards for products, services, processes, systems, and personnel in the United States. The organization also coordinates U.S. standards with international standards so that American products can be used worldwide.

**BITV**
Stands for "Barrierefreie Informationstechnik-Verordnung", barrier free Information technology regulation. It is an enhancement to the German "Behindertengleichstellungsgesetz." All regulations apply to Web presences and public accessible services on the internet offered by public authorities. BITV clauses are based on Web Content Accessibility Guidelines 1.0.. BITV goes along with WCAG priorities 1 and 2. Central navigation- and access services even have to fulfill priority 3 requirements.

**CEN**
The European Committee for Standardization\(^\text{18}\) or Comité Européen de Normalisation (CEN), is a private non-profit organisation whose mission is to foster the European economy in global trading, the welfare of European citizens and the environment by providing an efficient infrastructure to interested parties for the development, maintenance and distribution of coherent sets of standards and specifications.

**DATSCG**
A dedicated Working Group (WG) of the ICTSB\(^\text{19}\) called the Design for All and Assistive Technologies Standardization Co-ordination Group (Design of All & Assistive Technologies Steering Co-ordination Group), addresses the area of eAccessibility. This WG aims to be a single standardization entry point for people with disabilities and the organisations that represent them. DATSCG was created as a follow-up action to Standardization Mandate (M/27320) on “Design for All and Assistive Technologies in the field of Information and Communications Technologies (ICT)”.

\(^{17}\) [http://www.anec.org/anec.asp](http://www.anec.org/anec.asp)

\(^{18}\) [https://www.cen.eu/cenorm/homepage.htm](https://www.cen.eu/cenorm/homepage.htm)

\(^{19}\) [http://www.ictsb.org/Working_Groups/DATSCG/Index.htm](http://www.ictsb.org/Working_Groups/DATSCG/Index.htm)

EDeAN
The European Design for All e-Accessibility Network - EDeAN21 is a network of 160 organisations in European Union member states. The goal of the network is to support all citizens' access to the Information Society. EDeAN provides:

- a European forum for Design for All issues, supporting EU's e-inclusion goals
- awareness raising in the public and private sectors
- online resources on Design for All

The network is coordinated by the EDeAN Secretariat, which rotates annually. The EDeAN Secretariat rotates annually. In 2009 the secretariat is based in Hungary, at the Faculty of Information Technology of the University of Pannonia, the national contact centre for the Hungarian Design for All network.

ETSI
The European Telecommunications Standards Institute22 (ETSI) is an independent, non-profit organization, whose mission is to produce telecommunications standards for today and for the future. ETSI is officially responsible for standardization of Information and Communication Technologies (ICT) within Europe. These technologies include telecommunications, broadcasting and related areas such as intelligent transportation and medical electronics.

ISO
The International Organization for Standardization23 (Organisation internationale de normalisation), widely known as ISO, is an international-standard-setting body composed of representatives from various national standards organizations. Founded on 23 February 1947, the organization promulgates worldwide proprietary industrial and commercial standards. It is headquartered in Geneva, Switzerland. While ISO defines itself as a non-governmental organization, its ability to set standards that often become law, either through treaties or national standards, makes it more powerful than most non-governmental organizations. In practice, ISO acts as a consortium with strong links to governments.

JISC
Japanese Industrial Standards Committee consist of many national committees and plays central role in standardization activities in Japan. The task of JISC is establishment and maintenance of JIS, administration of accreditation and certification, participation and contribution in international standardization activities, and development of measurement standards and technical infrastructure for standardization.

OASIS
Organization for the Advancement of Structured Information Standards24 is a not-for-profit consortium that drives the development, convergence and adoption of open standards for the global information society. The consortium produces more Web

21 www.edean.org
22 www.etsi.org
23 http://www.w3.org/
24 www.oasis-open.org
services standards than any other organization along with standards for security, e-business, and standardization efforts in the public sector and for application-specific markets. Founded in 1993, OASIS has more than 5,000 participants representing over 600 organizations and individual members in 100 countries.

Section 508
Section 508 was enacted to eliminate barriers in information technology, to make available new opportunities for people with disabilities, and to encourage development of technologies that will help achieve these goals. The law applies to all Federal agencies when they develop, procure, maintain, or use electronic and information technology.

Stanca act
The “Stanca Act” – which derives its name from the name of the current Minister for Innovation and Technologies - was promoted by the latter in collaboration with the “Interministerial Commission on Development and Use of Information Technology at the Service of the Disadvantaged Categories”. The works of the Commission, which was made up by a pool of stakeholders (relevant Ministers, Trade Associations such as software and hardware producers, Associations of the disabled, etc.), were carried out over a 3 year period - from 2001-2004. The Act draws on EU guidelines and international regulations.

The Americans with Disabilities Act
The Americans with Disabilities Act of 1990 (ADA) is the short title of United States (Pub.L. 101-336, 104 Stat. 327, enacted July 26, 1990), codified at 42 U.S.C. § 12101 et seq. It was signed into law on July 26, 1990, by President George H. W. Bush, and later amended with changes effective January 1, 2009. The ADA is a wide-ranging civil rights law that prohibits, under certain circumstances, discrimination based on disability. It affords similar protections against discrimination to Americans with disabilities as the Civil Rights Act of 1964, which made discrimination based on race, religion, sex, national origin, and other characteristics illegal. Disability is defined as "a physical or mental impairment that substantially limits a major life activity". The determination of whether any particular condition is considered a disability is made on a case by case basis.

W3C
The World Wide Web Consortium (W3C) is the main international standards organization for the World Wide Web (abbreviated WWW or W3). It is arranged as a consortium where member organizations maintain full-time staff for the purpose of working together in the development of standards for the World Wide Web. As of February 2008, the W3C had 434 members.

http://www.section508.gov/
www.ada.gov
2.3 Accessibility standards overview

There is a growing, worldwide recognition that users with disabilities have the same right as others to access information technologies. This recognition is manifested in the enactment of legislation whose aim is to make the Web and other information technologies accessible to users with disabilities [1]. Such legislation has led to the creation of standards, guidelines, and checklists for accessibility. The goal is straightforward: To develop a common understanding of what is needed to make Web pages accessible thereby enabling Web designers and developers to meet these requirements.

Throughout history, disability law and public policy have reflected the norms of the many governments of the world and the varying socioeconomic environments. But one common thread in many societies has been the tendency to isolate and segregate persons with disabilities because of ignorance, neglect, superstition, or fear. Within this social environment, disability policy has evolved from the early social welfare approach, under the medical model of institutional care, to rehabilitation and education. Because of the growing body of laws and public policies requiring the accessible design of products and websites, it’s important for both policymakers and designers of this technology to be able to recognize the barriers that restrict access, and how to comply with these laws and policies. Just as security, cybercrime, privacy, and copyright are important issues for technologists, so too is accessible software applications design. [2]

Stephanidis et al. [3] have defined universal access as “the global requirement of coping with diversity in: (i) the characteristics of the target user population (including people with disabilities); (ii) the scope and nature of tasks; and (iii) the different contexts of use and the effects of their proliferation into business and social endeavours”. A fundamental goal of software accessibility standardisation efforts is to provide consensus driven design guidance that will substantially improve universal access to information technology.

Universal design, usability and accessibility standardisation activities have been motivated by the substantial benefits that software usability and accessibility standards may provide to end users, designers, developers and organisations[4]. Benefits for both end users and employers can result from the use of software accessibility standards and guidelines, including:
1. increased productivity,
2. reduced mental and physical stress,
3. reduced training expense,
4. improved user-system interoperability across applications
5. improved overall product quality and aesthetics.

In addition to the aforementioned, there are also many general benefits in using accessibility standards (see, e.g. [5, 6, 7, 8, 9]), that are:
– Lower Costs. It becomes much easier to manage a for example a site-wide look and feel due to the separation of content and presentation. The development and deployment processes are simplified, and rendering differences become minimal across browsers. Furthermore, page sizes are reduced, and they render faster in browsers. The speed is increased by the browser caching mechanism of CSS,
combined with faster rendering speed of browser engines in standards-compliance mode.

− Future-Proof. Standardized code is more portable across devices, and allows its reuse, without giving room to less compelling designs. It also allows extensibility to other XML-based languages like SVG, SMIL or MathML, that can be easily rendered in new browsers. It also avoids being locked to a particular tool, browser or even a particular developer, that created code-forkings compatible with different browsers.

− Wider Customer Base. Better search engine rankings are obtained because separating presentation from content augments the information/markup ratio.

In this chapter there will be a short presentation of the main standards and guidelines that have been developed in each ACCESSIBLE field of interest. The complete list is presented in Annex A.

2.3.1 Web application accessibility standards.

Web accessibility is the ability for a person using any user agent (software or hardware that retrieves and renders web content) to understand and fully interact with a website’s content. The idea of accessibility is based on more than the implementation of standards; it embodies the idea that everyone has the right to be included in society, regardless of disability, geographical location, language barriers, or any other factor. [10]

At the most basic level, web accessibility is about people being able to get and use web content. It is about designing web pages that people can present and interact with according to their needs and preferences. A primary focus of accessibility is access by people with disabilities. The larger scope of accessibility includes benefits to people without disabilities. What is nice to have for some people is required by other people for them to be able to access web sites at all. [12] Users with disabilities can only utilize a web site if it is designed to be compatible with the various assistive technologies. A web site that is sufficiently flexible to be used by all of these assistive technologies is called an accessible web site [13].

There are various means by which users can attempt to alter page renderings to meet their needs [14]. One available means is through features built into browsers. The major browsers (e.g., Internet Explorer®, Netscape, and Opera) all have features designed to allow users some control over page presentation. The mechanics of utilizing these features may often thwart the users who need them [15]. To provide additional needed features or needed ease of use, various technologies have been developed. For example, software applications, gateways, and proxy servers have been designed (e.g., [16], [17], [18], [19], [20]). But, the main way to achieve accessibility in a holistic perspective is to implement guidelines and standards that have been developed for this reason and ensure the long-term growth of the Web. When sites are correctly designed, developed and edited, all users can have equal access to information and functionality.

When the Web first entered mainstream use it was primarily text-based. A blind person could access most of it easily through text-to-speech software. As Web page design
has evolved, however, and Web designers have started to include images, frames, tables, animated Java applications, and streaming audio and video to organize information in more complex ways [21], it has become saturated with obstacles for users with disabilities. Accessibility, when pertaining to a Web page, means that information has been made available for use by almost everyone, including persons with disabilities. This accessibility may be direct or through the use of assistive technologies. Web accessibility varies depending on the type of disability. Low vision users might require a large font with a sharp contrast between the background and foreground color, whereas colorblind users may need to have color-transmitted information translated into distinguishable shades of gray. Blind users may be accessing Web pages using a screen reader, a type of assistive technology that translates text displayed on the computer screen into synthesized speech. Physically impaired users might have difficulty typing key combinations or need to navigate with a non-traditional input device [22]. Other types of assistive technology include magnification programs to enlarge the text on the screen [23] and refreshable Braille displays that reproduce a tactile output of the text presented on the computer screen [24].

In this means, many standards and guidelines that promote and ensure accessibility have been developed, as we will see in the following section. In this point, the most important Web accessibility standards will be presented.

**WAI**
The Web Accessibility Initiative or WAI program office is responsible for the World Wide Web Consortium’s [29] commitment to Web accessibility for all people. The office is intensely involved with the creation of industry supported guidelines for content design, publishing tools, and user agents.

Currently, the WAI has three primary working drafts:
1. Web Content Accessibility Guidelines
2. Authoring Tool Guidelines
3. User Agent Guidelines

WAI, [25], developed an approach that assumes that universal Web accessibility can be provided by full conformance with these three components. The simplicity of this approach has helped WAI in raising the profile of Web accessibility. The WAI guidelines are now widely acknowledged as the main approach for providing accessible Web resources. Indeed, the success in which Web accessibility has been adopted as part of the increasingly popular “Web standards” movement [26] has been remarked upon by a of commentators, for example Regan [27].

Each of these documents is reviewed in the sections that follow.

- **WACAG 1.0**
WCAG 1.0[28], from the Web Accessibility Initiative of the World Web Consortium (became an official Recommendation of the W3C on May 5, 1999. The WCAG consists of 14 guidelines, or principles of accessible design [30]. Each guideline includes a set of checkpoints that explain how the guideline applies to web development. The checkpoints are prioritized according to the following criteria:
[Priority 1] A web content developer must satisfy this checkpoint. Otherwise, one or more groups will find it impossible to access information in the document. Satisfying this checkpoint is a basic requirement for some groups to be able to use web documents.

[Priority 2] A web content developer should satisfy this checkpoint. Otherwise, one or more groups will find it difficult to access information in the document. Satisfying this checkpoint will remove significant barriers to accessing web documents.

[Priority 3] A web content developer may address this checkpoint. Otherwise, one or more groups will find it somewhat difficult to access information in the document. Satisfying this checkpoint will improve access to web documents. There are 65 checkpoints in all; 16 of them are Priority 1, 30 are Priority 2, and 19 are Priority 3.

- WCAG 2.0

The 1999 WCAG is being revised by the WAI at the time of this writing. The WCAG revision process has taken about five years and entered “Last Call” on April 27, 2006. Last Call comments were allowed through late June. After processing Last Call comments, and assuming none are showstoppers, the WCAG Working Group will solicit and then verify WCAG 2.0 compliant websites. This testing phase will last about four months. There are two dramatic differences between the first edition of these guidelines, WCAG 1.0, and the second edition, WCAG 2.0 [31]. Like WCAG 1.0, the second edition is organized around guidelines. WCAG 2.0 includes 13 guidelines, and each contains a list of items similar to the checkpoints of WCAG 1.0 that are called success criteria. These are testable statements of what needs to be done to satisfy each guideline. These success criteria are technology-independent and thus very general. The generality is the first dramatic difference between WCAG 2.0 and WCAG 1.0. The second major difference between WCAG 1.0 and WCAG 2.0 is that the success criteria under each guideline are not prioritized by their importance or priority, as they were in WCAG 1.0. Instead, they are ranked by the extent to which the web design and development process must be modified in order to meet the success criteria. The ranking is by levels, as follows (as defined at the time of this writing):

Level 1 success criteria:
1. Achieve a minimum level of accessibility.
2. Can reasonably be applied to all web resources.

Level 2 success criteria:
1. Achieve an enhanced level of accessibility.
2. Can reasonably be applied to all web resources.

Level 3 success criteria:
1. Achieve additional accessibility enhancements.
2. Cannot necessarily be applied to all web resources.

Whereas Level A conformance with WCAG 1.0 required complying with all Priority 1 checkpoints, Level A conformance with WCAG 2.0 requires compliance with all Level 1 success criteria.

WCAG 2.0 is published with a great deal of supplementary documentation that make it far more educational, less ambiguous and more testable than WCAG 1.0. The former checkpoints have become success criteria and are based on four principles (Perceivable, Operable, Understandable and Robust). In WCAG 1.0 many points were so ambiguous that functionally deficient websites were able to comply with the letter
of the accessibility standards, whilst infringing its spirit. WCAG 2.0 is not tied to any specific technology and leaves a wide margin for future technologies. Furthermore, the concept of the Web site is extended to all types of virtual communication, all types of content or pages that are generated dynamically and all interactive multimedia content. WCAG 2.0 is also more usability-oriented. For example, it includes some of the Research-based web design & usability guidelines [32] and significant changes have been introduced to allow the user to control the interface (e.g. the time of reproduction of multimedia content). WCAG 2.0 covers more types of disability than version 1.0, there are several success criteria and related techniques that consider the problem of users with low vision—a group that is practically ignored in version 1.0—and users with reduced mobility; however, it still fails to deal decisively with aural pages and the problems of older individuals.[33]

Because of their wide dissemination, the WCAG have often been criticized by experts in usability and human-computer interaction [34, 35] and by associations of persons with disabilities. Four main criticisms have been made:

- They are not based on a statistically validated research of users.
- They do not deal with the needs of persons with cognitive disabilities and the elderly.
- They are not comprehensible for a typical webmaster
- They encourage webmasters to seek easy compliance rather than real accessibility.

Most of these criticisms appears to be the result of the change of direction in WCAG, which was not foreseen in its initial design. WCAG must be judged in the context of the WAI initiative, which establishes other regulations that affect browsers (user agents) and authoring tools. However, if a giant like Microsoft fails to comply with the regulations in Internet Explorer, Microsoft Frontpage creates invalid code, content management systems as widespread as Vignette fail to facilitate the monitoring of accessibility guidelines, and the new tools of participation in Web 2.0 fail to create accessible content, what chance do the W3C or governments have of enforcing the rules? Due to their definition and form, the WCAG can only be a starting point on the path towards accessibility. Real accessibility can only be achieved through the observation of users and a thorough knowledge of their needs [36].

- Authoring Tool Accessibility Guidelines
  ATAG, released in February 2000, which provide guidance for software developers in designing authoring tools that produce accessible Web content and in creating accessible authoring interfaces [37].
  The one user request that may outnumber requests for accessible Web pages is the need for authoring tools to support accessibility features. Trying to remember a set of guidelines can be a difficult task. An authoring tool that automates the accessibility process becomes a value-added productivity aid. This is principally true for Web page authors who are interested in accessibility, but simply don’t have the time to become familiar with or keep up on all the developments.

- User Agent Accessibility Guidelines
  UAAG, released in December 2002, which are concerned with how to make Web browsers and multimedia players more accessible, as well as being compatible with some of the assistive technology that people with disabilities use [38].
The one user request that may outnumber requests for accessible Web pages is the need for authoring tools to support accessibility features. Trying to remember a set of guidelines can be a difficult task. An authoring tool that automates the accessibility process becomes a value-added productivity aid. This is principally true for Web page authors who are interested in accessibility, but simply don’t have the time to become familiar with or keep up on all the developments.

Section 508
The U.S. Access Board [39] has issued access standards [40] for federal electronic and information technology as required under Section 508 of the Rehabilitation Act: The Electronic and Information Technology Accessibility Standards, 36 CFR Part 1194, Web-based Intranet and Internet Information and Applications (1194.22). The Access Board has also published an online guide [41] for all the standards. This guide site is the easiest route to view the 16 provisions of the Section 508 Standards for the Web. The force of the Section 508 Standards is that electronic and information technology purchased by the U.S. federal government must comply with these provisions. Because of that force of law, these provisions are seen as playing an important role in defining accessibility, especially in the U.S. There are additional applications of the Section 508 Standards. Several states use the Section 508 Standards as at least a reference for state accessibility requirements. Many of the Section 508 provisions correspond to Priority 1 WCAG checkpoints with minor changes for regulatory wording. Some of the Priority 1 checkpoints were deemed by the Access Board to be too restrictive on web development or too difficult to judge for compliance. In addition, the Section 508 Standards add provisions that combine WCAG 1.0 checkpoints of lower priorities, like the Section 508 provision for accessible forms. The Association of Assistive Technology Act Projects [42] sponsored a detailed side-by-side comparison [43] of the Section 508 provisions and the Priority 1 WCAG 1.0 checkpoints.

2.3.2 Web services accessibility standards.
The Web services field lacks of standards and guidelines for accessibility. This is a great technological gap that is going to be filled by the ACCESSIBLE achievements during the project. Specific web services guidelines are going to be developed based on the aforementioned established standards.

2.3.3 Description languages accessibility standards.
The lack of standards and guidelines for accessibility stands for the Description languages too. This is a great technological gap that is going to be filled by the ACCESSIBLE achievements during the project. Specific web services guidelines are going to be developed based on the aforementioned established standards.

2.3.4 Mobile applications accessibility standards.
It has been noted for several times that the constraints imposed by accessibility are akin to those imposed by the limitations of mobile devices (c.f.) [52]. Examples such as properly structured information, correct (and linear) labeling of forms, or media equivalence of contents, are landmarks that illustrate this assertion. Consequently, striving for an accessible application is (partially) striving for a usable mobile application. Thus, a starting point to define a way to evaluate the accessibility of a
mobile application is ensuring that in fact the application is usable in a mobile-centric environment.

The first problem in this scenario concerns the highly diverse ecosystem of mobile devices. There are different technology constraints imposed by devices’ hardware features (e.g. screen size, CPU, memory, connectivity), operating systems, APIs, UI Toolkits, look-and-feel, manufacturers’ human-machine interface guidelines, programming languages, amongst others. For all of these reasons, it is very difficult to ensure that a mobile application is usable by any user in a holistic way (i.e., independent from any of these variables).

However, abstracting away from these constraints, there are general-purpose usability guidelines that can be applied to the mobile applications domain, as well as mobile-specific development guidelines that help building usable mobile applications [53].

Another set of guidelines for mobile applications concerns those targeted to the Web. Mobile Web applications have been gaining momentum in the last years, due to the ever-increasing proliferation of Web-enabled mobile devices (especially smartphones).

With global mobile phone use at an all time high, there has been a surge of interest in developing Web sites that are accessible from a mobile device. Similarly, making Web sites accessible for people with disabilities is an integral part of high quality Web sites, and in some cases a legal requirement. Most Mobile Web specialists don't know about design issues for people with disabilities. Likewise, most Web accessibility specialists don't know Mobile Web design best practices. [54]

The Mobile Web Best Practices document [55] specifies Best Practices for delivering Web content to mobile devices. The principal objective is to improve the user experience of the Web when accessed from such devices. The W3C (World Wide Web Consortium), through its Mobile Web Initiative has been created for “Making Web access from a mobile device as simple as Web access from a desktop device.” This motto has been conducted in several directions, such as studying social developments (e.g. the increasing usage of mobile devices in developing regions and its intersection with the Web), and easing the task of creating Web sites that are usable on mobile devices.

MWBP define a set of checkpoints (akin to WCAG’s) that developers must/should take into account, to ensure that a Web page or Web site is properly functional and tailored to mobile devices. There is a two level structure that narrows MWBP into a subset of checkpoints that are machine verifiable, called MobileOK Basic Tests [56, 57].

These checkpoints are aligned into 4 Best Practice Headings, as follows:

1) Overall Behaviour: general purpose guidelines for any mobile device, independent of its features;
2) Navigation and Links: how navigation and hyper linking should be done, in order to ease the task of interacting with Web-based user interfaces with the limited capabilities of mobile devices;
3) Page Layout and Content: how Web pages have to be designed, and how content must be created for mobile devices;
4) Page Definition: how to potentiate usability by exploiting the features of Web technologies;

Another set of guidelines from W3C according to mobile web is the “Mobile Web Applications Best Practices” [58]. This document specifies Best Practices for the development and delivery of Web applications on mobile devices. The recommendations expand and amplify upon general statements made in the Mobile Web Best Practices 1.0, especially concerning statements that relate to the exploitation of device capabilities and awareness of the delivery context.

Also I this point we have to refer to the “Mobile Web Developer’s Guide” from DotMobi. This is quite a comprehensive guide to mobile web development. It layers on the advice from the W3C's Mobile Web Initiative Mobile Web Best Practices 1.0 document, but takes it further.[59]

2.4 Conclusions for the accessibility standards
From the 37 accessibility standards related to ACCESSIBLE, that were found after the executed research, it is clear that the domain that has the most well developed and analytically described standards, is the web application domain. The reason for this is that an impaired end user usually meets accessibility difficulties that are related with this domain in the first place, and those are the main fields that must be accessible for a user to be able to use them. So in the field of web applications the standardisation efforts are up to date and very analytically described.

In the field of mobile applications, as we already have mentioned above, the standardisation efforts are not as well established as in the web applications. This can be explained by the W3C’s Mobile Web Best Practices, which is an example that proves the relation between the two fields. On the other hand the existence of this Document proves the necessity of differential and well established standardisation for every existing field of research.

Accessibility standards exclusively for the description languages and web services do not exist. This is quite expected, since the accessibility in these fields is very difficult to obey specific standardisation.

2.5 Accessibility guidelines & technologies
In this paragraph the state of the art accessibility technologies and the guidelines their developers either propose or have already implement, that have been gathered after an extend survey, are illustrated.

The main actor in the field of accessibility technologies and guidelines are IBM, Sun Microsystems, Microsoft and APPLE. Most of the aforementioned actors use the standards that were mentioned in the previous chapter of the current Deliverable in
order to provide accessible technologies and have implement improved accessible features to their products in order to be accepted and usable for all kind of end users. Especially IBM has launched series of guidelines that can be followed by developers in order to check the accessibility of the developed technology. In this point the guidelines of IBM and the features of the accessibility technologies of the other actors will be presented.

2.5.1 IBM accessibility guidelines

IBM has launched a list of guidelines that can help developers and content providers understand why and what they need to do to make their technology and information accessible to people with disabilities. Those guidelines are clustered, based on the application areas that are used to check. The application areas that the IBM’s guidelines are checking are presented below.

*Software accessibility guidelines*\(^{29}\)

In addition to the checklist to help the user create accessible software, this section includes resources such as helpful information about software accessibility test tools and additional references on software accessibility issues.

*Web accessibility guidelines*\(^{30}\)

This section provides the implementation and testing techniques and information on tools to help the developers create accessible Web sites and Web applications.

*Java™ accessibility guidelines*\(^{31}\)

This checklist can help any developer to create accessible Java™ applications. This section also contains the industry's first set of 100% pure Java application development guidelines for accessibility, the "IBM Guidelines for Writing Accessible Applications Using 100% Pure Java".

*Lotus Notes application accessibility*\(^{32}\)

In addition to the checklist to help create notes applications that will be deployed on the Notes Client or the Web, this section includes additional references on Lotus Notes issues.

This IBM Software Accessibility Checklist, the IBM Web Accessibility Checklist, the IBM Java Accessibility Checklist, and the Lotus Notes Application Accessibility Checklist are presented in Annex E of the current Deliverable.

2.5.2 Sun Microsystems accessibility technologies

a. OpenSolaris system

OpenSolaris\(^{33}\) 2008.11 is the latest release of the OpenSolaris Operating System, a powerful and complete operating environment for users, developers and deployers. OpenSolaris OS is an open source software, freely re-distributable.

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\(^{29}\) [http://www-03.ibm.com/able/guidelines/software/accesssoftware.html](http://www-03.ibm.com/able/guidelines/software/accesssoftware.html)

\(^{30}\) [http://www-03.ibm.com/able/guidelines/web/accessweb.html](http://www-03.ibm.com/able/guidelines/web/accessweb.html)

\(^{31}\) [http://www-03.ibm.com/able/guidelines/java/accessjava.html](http://www-03.ibm.com/able/guidelines/java/accessjava.html)

\(^{32}\) [http://www-03.ibm.com/able/guidelines/notes/accessr5.html](http://www-03.ibm.com/able/guidelines/notes/accessr5.html)

\(^{33}\) [http://www.opensolaris.com/](http://www.opensolaris.com/)
b. Orca system

Orca [66] is a free, open source scriptable screen reader that is used to assist people with visual impairments. Orca's main advantage is its application-specific support. This means that it has an understanding of the specific user interaction models of particular applications in addition to the general meta-information available via the ATK toolkit (and the AT-SPI system). For instance, the latest version adds greatly improved support for OpenOffice, Firefox, Thunderbird, Pidgin (previously known as
GAIM) and Java applications. It also now deals with progress bars, tooltips, and notification messages, and can use custom pronunciations for special words.

Orca works by using various combinations of speech, braille, and magnification.

- **Speech**: Orca supports a variety of speech synthesis systems: gnome-speech, Speech Dispatcher, and emacspeak speech servers.

  Gnome-speech [67]: gnome-speech component of GNOME provides a service-based approach to speech synthesis engines. Each speech engine that is installed on the system can be exposed as a speech service by gnome-speech, allowing assistive technologies such as Orca to share the resource. Most of the available synthesis engines on the Open Solaris and Linux platforms are available via gnome-speech.

  Speech Dispatcher project[68]: The goal of Speech Dispatcher project is to provide a high-level *device independent* layer for speech synthesis through a simple, stable and well documented interface.

  Emacspeak[69]: Emacspeak is a speech interface that allows visually impaired users to interact independently and efficiently with the computer.

- **Braille with Orca (BrLTYY[70]):** BRLTTY is a background process (daemon), which provides access to the Linux/Unix console (when in text mode) for a blind person using a refreshable braille display. It drives the braille display, and provides complete screen review functionality. Some speech capability has also been incorporated.

- **Magnification**: This application help the experts work on documenting setting up magnification. The topics should include split screen magnification and full screen magnification. When discussing full screen magnification, a discussion of determining hardware and X Server requirements is also required.

Finally, Orca helps provide access to applications and toolkits that support the AT-SPI (e.g., the GNOME desktop). The development of Orca has been led by the Accessibility Program Office of Sun Microsystems, Inc., with contributions from many community members.

![Figure 2: Orca cooperation with the AT-SPI.](image-url)
2.5.3 Microsoft accessibility technologies

a. Accessibility in Internet Explorer 8

Internet Explorer 8 has compatibility with several assistive technology products and new and improved accessibility features, including Caret Browsing, Accelerators, and Zooming, to make Internet navigation easier to all kinds of end users and mostly for people with any kind of impairment. Enhanced keyboard access can also be found in the default toolbar buttons, search box items, address bar, and tabs.

Figure 3: Internet Explorer 8 accessibility options overview.

Accessibility features in Internet Explorer 8:
- The user is able to select text and move around a Web page with the keyboard, rather than using a mouse to select text and move around within a Web page, by using standard navigation keys on the keyboard—HOME, END, PAGE UP,
PAGE DOWN, and the arrow keys. This feature is called Caret Browsing and is named after the caret—or cursor. This makes it easier to select, copy, and paste text to another document—without a mouse.

- Zoom in on a Web page lets the user enlarge or reduce the view of a Web page. Unlike changing font size, zoom enlarges or reduces everything on the page, including text and images.
- Internet Explorer 8 supports the system link color, so high contrast mode and color preferences that have been chosen in Windows will work in Internet Explorer.
- Change text size on Web pages, gives the user the opportunity to choose from smaller, smallest, medium, larger, or largest.
- The user can choose the font style and size used on Web pages and documents in order to adjust to make them more legible.
- Internet Explorer 8 provides the ability to choose accessibility settings for Web pages and in this way, allows the user to choose to ignore colors, font styles, and font sizes specified on Web pages to make the pages easier to see.
- The user can format Web pages using a custom style sheet and make color, test size, and picture handling work best for you with a custom style sheet.
- By choosing advanced settings the user can make Web pages easier to see and work with by adjusting accessibility settings for browsing, multimedia, printing and more in Internet Options.
- The user can find text on a Web page using the Find on Page feature that highlights matches with a yellow background (easier to see) and scrolls the page to the first match, saving mouse moves and keystrokes.

b. Accessibility in Windows Vista

Windows Vista includes built-in accessibility settings and programs. The accessibility settings and programs in Windows Vista are particularly aimed to help people with visual difficulties, hearing loss, discomfort in their hands or arms, or reasoning and cognitive issues.

Accessibility Features in Windows Vista

- Ease of Access Center is a centralized location where the user can adjust accessibility settings and manage accessibility programs. It supports services, such as get quick access to start common accessibility tools, get recommended settings based on answers to questions, or explore settings by category.
- Speech Recognition enables the user to interact with the computer using only voice input, significantly reducing the use of a mouse and keyboard while maintaining overall productivity. An interactive training guides the user through an easy setup process and will familiarize you with the voice commands.
- Magnifier, enlarge a portion of the screen to make things easier to see. Choose a magnification level from 2 to 16 times the original and choose to track the mouse, the keyboard, or text editing.
- Narrator is a text-to-speech program that reads aloud on-screen text and describes some events (such as error messages) that happen while using the computer. Narrator in Windows Vista now reads Narrator menus without leaving the active window and has a natural sounding voice.
- Captions turn on text captions for animations and video.
On-Screen Keyboard is a visual on-screen keyboard with all the standard keys that can be used instead of a physical keyboard. On-Screen Keyboard also lets the user type using an alternative input device.

- Keyboard shortcuts are an alternative to the mouse. Keyboard shortcuts can be found in the menus of programs, or, if a letter is underlined on a menu that usually means pressing the ALT key in combination with the underlined key has the same effect as clicking that menu item.
- Sticky Keys are used instead of having to press multiple keys at once, so the user can press one key at a time when Sticky Keys is turned on.
- Filter Keys ignores keystrokes that occur in rapid succession and keystrokes that are held down for several seconds unintentionally.
- Visual Notifications replace system sounds with visual cues, such as a flash on the screen, so system alerts are announced with visual notifications instead of sounds.

Figure 4: On-Screen Keyboard overview.
c. Accessibility in 2007 Office System
The 2007 Microsoft Office system is more accessible and has also improved compatibility with assistive technology products.

Accessibility Features in Windows Vista
- The menus and toolbars in some programs were replaced with the Ribbon. The Ribbon is designed to help the user quickly find the commands that you need to complete a task and provides consistent icons among Office programs.
- KeyTips feature can be used to navigate quickly and easily through the Ribbon without memorizing shortcut keys. The Ribbon also supports 2-D navigation with the TAB, arrow and F6 keys; or familiar shortcut keys and accelerators from previous versions of Microsoft Office.
- The Zoom tool makes resizing work area faster and easier.
- Galleries simplify the process of creating great looking documents, presentations and spreadsheets by showing a set of potential design choices. It's not necessary anymore to make selections through complex dialog boxes. Live Preview lets the user see exactly how gallery selection will look when it is applied.
Create diagrams and charts without a mouse, but organizational charts, process diagrams, and other complex graphics can be created with SmartArt™ graphics tools, which are accessible from the keyboard or assistive technology devices.

The 2007 Microsoft Office system works with Windows Speech Recognition in the Windows Vista operating system, allowing to navigate the User Interface, compose documents, open e-mail, and more, without using a mouse or keyboard.

SharePoint Designer 2007 includes a built-in compatibility checker for common accessibility standards to help make sure Web sites are easy to use for everyone. More Accessible Mode in SharePoint Services provides further accessibility for custom controls.

e-Zoom and scroll directly with a Microsoft IntelliMouse® or other device with similar technology, let Microsoft Narrator read aloud text and commands.

The user can correct capitalization and spelling as you type, as well as formatting punctuation marks, symbols, and lists as typing.

2.5.4APPLE accessibility technologies

Apple has built accessibility solutions directly into its products as standard features. VoiceOver, screen reading technology, that’s part of Mac OS X, provides voice description and offers plug-and-play support for Braille displays. For those who find it difficult to use a mouse, Spotlight search technology makes it easy to launch applications and find files, images, calendar events, or Wikipedia entries using a keyboard. And iPod, iPhone, Apple TV, and other products support closed captioning. More precisely: Mac OS X system includes features to assist people with visual, hearing, physical or motor, literacy or learning impairment. More analytically, for each impairment type there are different features;

Features for vision disabilities

- VoiceOver: A full-featured screen reading technology for the visually impaired, VoiceOver provides full keyboard control of the computer along with spoken audio descriptions.
- Talking alerts: When an application needs attention, Talking Alerts automatically speak the contents of dialogs and alerts for the user.
- Text to speech: If the user doesn’t use a screen reader, but have trouble reading text on his/her computer screen, he/she can have Mac, “speak” the selected text. To turn Text to Speech on, open System Preferences, click Speech, then open the Text to Speech pane. The user can set up a keyboard shortcut to initiate Speech. As an alternative, he/she can select text he/she wants Mac to speak, and then choose Speech from the application’s Services menu.
- Talking Clock: Another system preference let’s instruct the Mac to automatically announce the time of day — on the hour, half hour, or quarter hour. Or one can use a voice command to have the Mac speak the time of day whenever wished.
- Speech Magnifier: Enlarge the contents of display using Zoom, located in the Universal Access pane in System Preferences. Zoom lets the user use the scroll wheel on a mouse, a trackpad gesture, or key commands to magnify the entire
contents of the screen by up to 40x. Cursor Magnifier: In Mac OS X, one can scale the cursor so it's easier to see and follow when he/she moves the mouse. The cursor remains scaled to the preferred size even when the cursor shapes changes. The scaling remains in effect until its changed, even when the user logs out, shuts down, or restarts the Mac.

- Display Adjustment: Mac OS X includes flexible adjustments for controling the characteristics of the display. One can increase or decrease contrast by switching the screen to white-on-black or black-on-white, and you can vary the contrast using a slider control. If the user would like to remove all color from the screen, he/she’ll find controls for displaying everything in black and white or grayscale.
- Finder View Options: Use View Options (Command-J) to adjust the text size of icon names (from 10 to 16 points) and their thumbnail previews (from 16 by 16 to 128 by 128 pixels). User can change the background, normally white, to any color to increase contrast. And he/she can adjust the grid spacing between icons as well.
- Dock Magnification: The Dock offers a convenient way to access commonly used applications, files, and folders. Though the Dock can be quite small if you add a great many items, Mac OS X lets you set the default size of Dock icons so they're easier to see. One can also use Dock Magnification to automatically enlarge the icon currently under the mouse pointer.
- Cover Flow: New in Mac OS X Leopard, Cover Flow provides an ultralarge view of folder contents. Instead of a small, generic "thumbnail" icon, files appear in the Finder just as they appear when opened in an application. The user can enlarge this view by stretching the window or adjusting the splitter bar in the window, to provide a very large format, that's much easier to see and navigate than traditional list, column, and icon views.
- Safari Cascading Stylesheets (CSS): The Safari web browser included with Mac OS X features additional Universal Access preferences for web browsing. For example, a checkbox can be set to prevent a web page from being displayed using fonts smaller than the minimum size you set, from 9 to 24 point. By default, pressing the Tab key in Safari navigates only the toolbar and the form elements on a page. Pressing Option-Tab will navigate every element. If user prefers, he/she can switch this behavior so pressing Tab key by itself will navigate every element and pressing Option-Tab navigates only the toolbar and form elements.

Features for hearing disabilities

- Visual Alert: To let the user know that the system or an application requires his/her attention, he/she can have Mac OS X Leopard flash the entire screen instead of playing an audio tone as an alert.
- iChat: An Internet-based text, audio, and video conferencing application, iChat lets the user converse and work with others even when he/she is miles or continents apart. iChat works with AIM, MobileMe, Google Talk, and Jabber. With iChat, the user can interact with other users on either a Mac or a Windows PC in text, audio, or video chats.
- Closed Cartioning: The user can set QuickTime Player and DVD Player to display open and closed captioning. It’s a two-step process: The user enables captions in System Preferences or the application’s preferences, then have them displayed onscreen.
Features for Physical & Motor Skills disabilities

- Automator: Users that have trouble using a mouse or trackpad, can have Automator perform complex, routine tasks. Using its “Watch me do” feature, users can quickly and easily record what is being done on the Mac, save it as a “workflow,” and run the workflow whenever they want to perform the same series of steps.
- Speech Recognition: “Speakable Items,” built into Mac OS X and located in System Preferences, lets the user control the computer using his/her voice instead of the keyboard. One can use Speakable Items to navigate menus and enter keyboard shortcuts; speak checkbox names, radio button names, list items, and buttons; and open, close, control, and switch among open applications.
- Inkwell: Mac OS X Leopard comes with built-in handwriting recognition technology called Inkwell (or Ink). If the user connects a graphics tablet to his/her Mac, he/she can write on the tablet using a stylus, and Inkwell translates what he/she writes to typed words in your document.
- Some applications allow the user to enter text directly; with others, the user first enters the text into a “scratch pad” (where he/she can edit or revise it) before bringing it into the application. Inkwell supports several stylus gestures, making it easy to select, edit, and delete text. It also understands English, French, and German.
- Multi-Touch Trackpad: A number of Mac computers, including the MacBook Pro and MacBook Air, now support Multi-Touch technology. This technology lets the user use gestures to control the computer. With pinch, swipe, or rotate gestures, the user can zoom in on text, advance through a photo album, or adjust an image. iPhone and iPod touch also use Multi-Touch technology.
- Onscreen Keyboard: If the user finds it easier to use a pointing device than a keyboard, he/she can use the Keyboard Viewer to enter text. One can find this onscreen keyboard in the International pane of System Preferences. Keyboard Viewer floats above other applications. It can be displayed small or big, and, though one “types” with a mouse or other pointing device, it otherwise works just like a physical keyboard.
- Full Keyboard Navigation: In Mac OS X, one can use the keyboard to navigate through a document. The Tab key lets you navigate to lists, text boxes, and other controls, and the space bar and Return key let you interact with them.
- Slow Keys: If one has motor-skills disabilities, he/she can use Slow Keys to avoid typing errors and unintended multiple keystrokes.
- Adjustable Key Repeat and Delay: If one wants to change the Key Repeat or Delay Until Repeat rate to suit his/her needs, one can do so using the Keyboard & Mouse settings in System Preferences. Used in conjunction with Slow Keys, these settings let the user adapt the keyboard to match his/her abilities and use it more effectively.
- Sticky Keys: Using Sticky Keys, one can enter key combinations (called "chords") — such as Command-Q (for Quit) or Shift-Option-8 (to enter the ° symbol) — by pressing them in sequence instead of simultaneously. When Sticky Keys is active, Mac OS X visually displays each key in the sequence in the upper-right corner of the screen, accompanied by a sound effect, so one can verify the sequence and correct it (if needed) before it’s entered. When one presses the last key in the sequence, Mac OS X enters the keys as a chord and the visual representation disappears.
- Mouse Keys: If one has difficulty controlling the mouse, he/she can use Mouse Keys to control the mouse pointer using the keys on a numeric keypad. With
Mouse Keys, you can navigate menus, the Dock, windows, toolbars, palettes, and other controls by pressing keys.

- Character Palette: Located in the International pane of System Preferences, the Character Palette lets one drag special characters and symbols from a palette instead of typing key chords that may be difficult to remember and even more difficult to type.
- Cover Flow View: A new option in Mac OS X Leopard, Cover Flow (like its counterpart in iTunes) lets the user browse ultra large icons and document previews instead of small thumbnails. One navigates Cover Flow by using the arrow keys on his/her keyboard or by clicking onscreen icons. When one finds the document he/she wants, simply double-clicks it to open it.

**Features for Literacy & Learning Skills disabilities**

- Built-in Dictionary and Thesaurus: Mac OS X Leopard includes a Dictionary application that provides access to such resources as the New Oxford American Dictionary, Oxford American Writer’s Thesaurus, Apple Dictionary, and the Internet-based encyclopaedia, Wikipedia. Dictionary also provides additional content from the New Oxford American Dictionary, including grammar, spelling, and pronunciation guides and such reference materials as the chemical elements, weights and measures, and conversions.
- Spelling and Grammar Checking: In Mac OS X Leopard, the Apple Cocoa Text engine provides universal spelling and grammar checking. Since all the applications access the same dictionaries, one is assured of consistency from one application to the next. And if you add a new word to the spelling or grammar dictionary in one application, it’s automatically added to the universal dictionary. Spelling and grammar checking works the same in every application. Word Completion: To avoid mistakes and reduce keystrokes, one can have Mac OS X Leopard complete his/her words for him/her. After typing a few characters, the user has to press the Escape key. Leopard displays a list of words beginning with the characters he/she typed. Double-clicking the word he/she wants, completes the partially typed word.
- Text to Speech: Mac OS X includes various male, female, and novelty voices one can use to speak a selection or text or an entire document. Text-to-Speech (TTS) technology allows the users to hear a word as well as see it onscreen. TTS works with all applications that support the Mac OS X Speech engine, including Mail, iChat, and TextEdit.
- Grapher: A full-featured graphic calculator, Grapher enables the real-time analysis and visualization of mathematical equations. It can display single or multiple equations in one graph, and it supports 2D and 3D rendering and animation. Grapher lets the user save and export animations as QuickTime files.
2.6 European benchmarking initiatives

2.6.1 The Fifth Framework Programme

The Framework Programmes for Research and Technological Development, also called Framework Programmes (FPs), are funding programmes created by the European Union in order to support and encourage European research or, more specifically, the European Research Area (ERA). ERA consists of scientific research programmes and since its creation in 2000, ERA has focused on fields of medical, environmental, industrial and socio-economic research. The detailed objectives and actions vary from one funding period to another.

The objectives of the FPs are not always the same and vary from one funding period to another. The first Framework Programme began in 1984 and ended in 1987. Until today six Framework Programmes have been launched with the latest the Seventh Framework Programme. The funding of the 7th Framework Programme started in 2007 and will run for seven years, until 2013.

The Fifth Framework Programme (FP5) [103] was active from 1998 until 2002 and consists of two parts: the Fifth European Community Framework Programme that is oriented in covering Research, Technological Development and Demonstration activities and the second part is the Fifth Euratom Framework Programme that covers research and training activities in the nuclear sector.

The main aim of FP5 was to provide solutions to problems that modern communities face and respond to the socio-economic challenges the EU is facing. In order to accomplish the objectives the Key Action concept was introduced. Key actions deal with problems through multi-disciplinary approaches involving all interested parties. The projects that are funded under the FP5 and are relevant to ACCESSIBLE project are described in the following sections.

- The Web Accessibility Initiative-Design for All

The Web Accessibility Initiative -Design for All (WAIDA) is a research project, funded under the Key Action 1 of the FP5. The duration of WAIDA was from October 2000 until September 2002. The main aim of WAIDA project was to increase Web accessibility within the EU member states. In order to accomplish this goal, all the work that has already been done by the W3C/WAI Work Groups would be incorporated. Besides, W3C/WAI Works Groups are trying to promote Web accessibility to Europe. Finally, WAIDA would contribute further to the aforementioned work by promoting not only the acceptance but also the implementation of WCAG and ATAG specifications.

- The World Wide Augmentative and Alternative Communication Project

The World Wide Augmentative and Alternative Communication Project (WWAAC) 111 is a research project, funded under the Key Action 1 of the FP5. The duration of WWAAC was from January 2001 until June 2004. The main aim of WWAAC was to address the difficulties that people with communication impairments face while trying to use the Internet. Moreover, WWAAC’s objective was to develop software tools that would make Internet applications accessible to people with communication and/or cognitive impairments.
WWAAC actually developed the **Concept Coding Framework (CCF)** that is used to represent a Web page’s content with a symbolic language. The basis of the aforementioned development was the **Augmentative and Alternative Communication (AAC)** method. **ACC** enables people with communication and/or cognitive impairments to understand the content of web site and be also able to navigate within it. WWAAC has also published the *Guidelines for developing an AAC-enabled World Wide Web* document that are usefull for developers who wish to create sites that are understandable to **AAC** users.

### 2.6.2 The Sixth Framework Programme

The **Sixth Framework Programme (FP6)** [112] took place from 2002 until 2006. The two main objectives were to strengthen the scientific and technological bases of industry and to encourage its international competitiveness while promoting research activities in support of other EU policies. The Thematic Priorities were seven and the projects were divided in the aforementioned Thematic Priorities according to their orientation. The Thematic Priority that concerned concerning information technology was the **Information Society Technologies (IST)** and the basic aim was the direct contribution to European policies for the knowledge society and the e-Europe Action Plan. Some of the most important projects that were developed under the **FP6** are mentioned in the following paragraphs.

- **The WAB Cluster**

  The EU Web Accessibility Benchmarking Cluster (WAB), Evaluation and benchmarking of Accessibility [113] is a cluster of European projects to develop a harmonized European methodology for evaluation and benchmarking of websites. WAB Cluster belongs to the FP6 and aims mostly on the development of an EU-harmonized methodology for Web accessibility, based on accessibility recommendations of the Web Accessibility Initiative (WAI) of the World Wide Web Consortium (W3C). This new methodology should be able to be synchronized with the forthcoming migration from WCAG 1.0 to WCAG 2.0. WAB Cluster includes three projects the European Internet Accessibility Observatory (EIAO), the Benchmarking Tools and Methods for the Web (BenToWEB) and the Supporting the creation of an e-Accessibility Quality Mark (SupportEAM) project. The three aforementioned projects would collaborate in order to develop an EU-harmonized methodology for Web accessibility. The result of the collaboration was the development of Unified Web Evaluation Methodology (UWEM). The latest version of UWEM is the UWEM 1.2 [114] which covers both the “Priority 1” and “Priority 2” checkpoints of the WCAG 1.0. The three projects that are included in the WAB Cluster are described in the following paragraphs.

### 2.6.3 Benchmarking Tools and Methods for the Web

The Benchmarking Tools and Methods for the Web-BenToWeb [115] was a research project co-financed by the Information Society Technologies Programme of the European Commission priority of the Sixth Framework Programme (FP6).
The project has officially ended as of September 30th, 2007, and successfully evaluated by the European Commission at the end of 2007.

The main objective of BenToWeb was to provide with new software modules and methodologies that would be able to test the conformance of a website to some of the accessibility recommendations of the Web Accessibility Initiative (WAI) of the World Wide Web Consortium (W3C). The reason that these new methodologies are innovative is that they refer to checkpoints which are too complex to automatise.

BenToWeb was also oriented in supporting the relevant W3C/WAI Work Groups by developing the Test Suites for WCAG 2.0. In particular, XHTML and CSS Test Suites are complementary documents that support the implementation of WCAG 2.0. Moreover, BenToWeb has investigated the feasibility of automatic testing procedures in the field of color-contrast, low-vision and color-blindness. The final result would be the implementation of modules that would be helpful for user testing.

- **Supporting the creation of a e-Accessibility Quality Mark**

  The Supporting the creation of a e-Accessibility Quality Mark-SupportEAM [116] was a research project under the Sixth Framework Programme. The project has officially ended on 31st July 2006. The main objective of SupportEAM was the development of a harmonized methodology used for assessing Web Accessibility. The validation of the aforementioned methodology would be conducted by experts from BenToWeb and EIAO projects. Furthermore, the SupportEAM tried to collaborate with a number of the most well-known standardization bodies. The result of such collaboration would be the development of the harmonized methodology to a standard that would be approved by all EU member states. Finally, SupportEAM has proposed a Unified Web Evaluation Methodology (UWEM 1.2), which offers, as mentioned before, an interpretation of the Web Content Accessibility Guidelines (WCAG 1.0) version 1.0 priority 1 and 2 guidelines.

  Furthermore, SupportEAM has achieved the publication of a CEN Agreement (n° 15554) on "Specifications for a Web Accessibility Conformity Assessment Scheme and a Web Accessibility Quality Mark". This publication wishes to explain the current situation of market fragmentation in the field of Web Accessibility due to lack of harmonization and to make a step forward by promoting a harmonized methodology. Also, an online Web Accessibility Evaluation Curriculum [117] has been developed. The aforementioned curriculum provides a unified training resource for Web Accessibility evaluators who wish to evaluate websites against an evaluation methodology that has been harmonized at a European level and in the context of Web Accessibility certification.

- **European Internet Accessibility Observatory**

  The European Internet Accessibility Observatory (EIAO) [118] was a research project under the Sixth Framework Programme, which ended on 31st July 2006. The project's objective was the development of a large scale accessibility benchmarking service, which will be used for evaluating the accessibility of Web content within the EU. This assessment tool is intended to conform to the Web Content Accessibility Guidelines 1.0 (WCAG 1.0) and is highly influenced from the methodology defined in UWEM. The basic notion of EIAO was to conduct an evaluation of a great number of websites and to provide a ranking list concerning accessibility.
EIAO conducted tests and measured accessibility by using the Web accessibility metrics (WAMs). The WAMs are created according to the UWEM 1.2. After the first evaluation that was conducted by EIAO, the results of the tested countries are provided in the Figure 6.

![Figure 6: Accessibility scores of the tested countries](image-url)

- **The Web accessibility initiative: ageing education and harmonisation**

The Web accessibility initiative: ageing education and harmonisation (WAI-AGE), [119] is a project funded by the EU under the FP6 that officially started in April 2007 and is expected to be completed on March 2010. European Research Consortium for Informatics and Mathematics (W3C/ERCIM) is the primary partner of the project. The main objective of WAI-AGE project is to increase the accessibility of the Web mainly for the elderly people but also for people with disabilities.

In order to achieve the aforementioned goal, WAI-AGE is oriented in promoting the development of extensions on WAI guidelines (WCAG, ATAG and UAAG) and also of complementary educational materials that are oriented in the needs of elderly people. Moreover, WAI-AGE is trying to provide educational resources concerning the needs of the elderly people to Web designers and developers, as well as to develop new educational resources which support the promotion and implementation of Web accessibility solutions for people with accessibility needs due to ageing. Finally, WAI-AGE aims at promoted the notion of harmonisation of Web accessibility standards so as to make a step forward in the field of a unified market.

Under the WAI-AGE project, the Web Accessibility for Older Users: A Literature Review [120] deliverable was published. This document provides a review and analysis of guidelines and articles relating to the needs of older people with Web accessibility needs due to ageing. Moreover, these needs are compared with the needs of people with disabilities that are already mentioned in WAI guidelines (WCAG 1.0 and WCAG 2.0) [121]. This review wishes to inform all interested parties so as to develop educational materials which will promote the needs of people who have accessibility needs due to ageing. Finally, this review will also be helpful in the field of a potential extension of WAI guidelines.
Ambient Intelligence System of Agents for Knowledge-based and Integrated Services for Mobility Impaired users (ASK-IT)

ASK-IT [122] is the abbreviation of Ambient Intelligence System of Agents for Knowledge-based and Integrated Services for Mobility Impaired users. Its main aim is the establishment of Ambient Intelligence in web enabled services in order to support the mobility of Mobility Impaired people. In order to achieve the aforementioned aim, the work in ASK-IT was organized in five SubProjects (SPs) which are shown in Figure 7.

Figure 7: The SPs of ASK-IT project

ASK-IT has developed for the first time an ontology related to accessibility issues. This ontology covers the needs of mobility impaired users and provides a great amount of data and data flows concerning different domains such as transportation and multi-modal content.

Multimodal collaboration environment for inclusion of visually impaired children (MICOLE)

MICOLE [123] is the abbreviation of Multimodal collaboration environment for inclusion of visually impaired children. The main objective of MICOLE project is to develop a system that supports collaboration, data exploration, communication and
creativity of visually impaired and sighted children. It provides also effort to visually impaired children in other aspects of everyday life, such as education, work, and society in general.

In order to achieve the above mentioned goals, MICOLE employed multimodal interaction techniques (using both speech and non-speech sounds) and haptic interfaces (using force-feedback, tactile displays and gestures) in sighted users. The MICOLE’s software includes the MICOLE Architecture SDK, MICOLE Applications and also source codes and libraries that are needed for software development. The MICOLE Architecture SDK (also called as MicoleLib) enables Rapid Application Development (RAD) for multimodal applications combining graphics, audio and haptics.

- Delivering Inclusive Access for Disabled or Elderly Members of the community

The Delivering Inclusive Access for Disabled or Elderly Members of the community (DIADEM) [124] is a project funded under the FP6. The main goal of DIADEM is to provide an adaptable web browser interface that will enable people who face a cognitive impairment, remain active and independent members of society. The aforementioned goal will be achieved by developing an Expert System (ES) that will adapt and personalize the computer interface so as to enable people with cognitive impairments interact with web based forms. The ES will be located in the user’s computer and will try to make as many as possible services accessible to people.

Figure 8 illustrates the DIADEM architecture and the goal of DIADEM is to provide a plug-in to a web-browser that will monitor the ability of the user to interact with the system and will dynamically optimize and personalize the interface to the specific user. As far as service providers are concerted, they should use the Web Services standard and provide some meta-data about their structure.

2.6.4 The Seventh Framework Programme

The Seventh Framework Programme (FP7) [125] is the European Union’s basic instrument for funding research over the period 2007 to 2013. FP7 supports research and technological development within the EU. The four programmes that were created in order to address the objectives of FP7 are:

- The Cooperation Programme: supports collaborative research across Europe
- The Ideas Programme: support research at the scientific frontiers
- The People Programme: supports mainly the training, mobility and career development of European researchers
- The Capacities Programme: is targeted at enhancing research infrastructures and improving its usage

The research that will be conducted within the FP7 is divided in 10 themes, with the most important the theme of Information and Communication Technology (ICT). The ICT theme is divided into seven challenges and the one that is oriented in the field of e-Accessibility is the “Independent living and inclusion” challenge. Projects that are included in the aforementioned challenge and are also relevant to ACCESSIBLE project are mentioned in the following paragraphs.

- Open architecture for Accessible Services Integration and Standardization (OASIS)

OASIS [126] is a project included in the 7th Framework Project and its full name is “Open architecture for Accessible Services Integration and Standardization”. The project’s objective is to improve the quality and usability of services for all activities of older people. In order to support older people OASIS will utilize ICT and other innovative technologies.

OASIS introduces an Ontology-Driven Platform, which will facilitate interoperability and connectivity between applications mainly used by older people. This innovative Platform covers user needs and wishes in terms of independence living, to benefit older people in general. Figure 9 illustrates the Ontology-Driven Platform

![Common Ontology Framework](image)

- ÆGIS Open Accessibility Framework (Groundwork, Infrastructure, Standards)

The ÆGIS Open Accessibility Framework (Groundwork, Infrastructure, Standards) 127 is a project included in the 7th Framework Project. The ÆGIS project wishes to determine whether the 3rd generation access techniques will provide a more accessible approach in ICT (desktop, rich Internet and mobile applications). The basic objectives of the ÆGIS project in order to achieve the above mentioned goal are:

- to demonstrate and prove that use of 3rd generation access techniques results in equal or better end-user access experiences as compared to the existing, 2nd generation approaches;
to identify and develop the right combination of developer's tools aiding in creating accessible applications which leverage sets of pre-built and accessibility enabled user interface components for desktop, mobile, and rich Internet applications; which together allow developers to comfortably and easily create accessible applications;

- to develop a set of embeddable assistive technologies for mobile devices that fit into this framework and deliver a satisfying experience to people with disabilities;

- to develop a set of user agents for desktop and mobile devices which leverage and translate a cross-platform accessibility API from the 3rd generation access techniques of the web, to the desktop and mobile accessibility APIs – in such a fashion as to give users with disabilities the same utility and accessibility with rich Internet applications as they have with accessible desktop applications.

### Accessibility and usability validation framework for AAL interaction design process (VAALID)

**VAALID** [128] project is funded under the **FP7** and its main aim is to create new tools and methodologies that will facilitate the construction and the deployment of technological solutions in the context of AAL (Ambient Assisted Living) assuring that they are accessible and usable for senior citizens.

The main objective is the development of a 3D-Immersive Simulation Platform for computer aided design and validation of User-Interaction subsystems. This platform will improve accessibility features of Ambient Assisted Living services for the social inclusion and independent living. The use of the **VAALID** tools will aid all interested parties such as European industries, ICT companies, so as to specialize in the field of Human Factors and User Interaction design. For example, the aforementioned tools

#### 2.6.5 Relevant Projects

- **The Unicorn Project**

It is known that **W3C** is one of the biggest organizations with a leading role in the development of **Web Standards**. Furthermore, W3C has paid attention in the creation of online tools with main aim to aid the web developers. These tools aim mainly in validating the created web content and provide information concerning the web quality. Until now a variety of that kind of tools exists and web developers can use them in order to test the web content they create. The disadvantage is that these tools need to be used separately and the developer should use them sequentially. Usually a lot of tests should be executed in order to check all the possible aspects concerning web quality. The **Unicorn Project** [129] aims mainly to provide assistance to developers by integrating the results of the different kind of tools in one single page. By these means, web developers will expend less time and effort in order to check the web quality of their web content. It should be mentioned though, that **Unicorn** does not replace each individual validator, it increases their usability by gathering them together so as to assist the developer.

The **Unicorn Project** was created from the **Quality Assurance Interest Group**. The main objective of the **Quality Assurance Interest Group** is to try and involve W3C, external organizations and also all the web community in the matter of **Quality**
Assurance. Moreover, this Group promotes the interests of web developers that try to implement Web Standards in their work. The Unicorn Sources are located on W3C’s public source repository. From there, the code can be retrieved.

The **Unicorn Framework** creates and sends a sequence of *observation requests* to a number of observers, after receiving a request from a user. The user sends this request by using the *Unicorn User Interface*. Then the observers, such as validators, checkers, execute and then provide a report of their observations, which contains possible errors, warnings or information. Finally the **Unicorn Framework** gathers and processes all the observations provided from the observers and displays the final result to the user. Figure 10 illustrates these processes.

![Observation Sequence](image)

**Figure 10**: Observation Sequence

Figure 11 below shows how the Unicorn Framework implements the observations when an online document is provided. The Unicorn Framework can also process documents that are uploaded or even directly inputted. Figure 12 illustrates this task.
Figure 11: Observation Sequence for an online document

Figure 12: Observation Sequence for an uploaded or directed inputted document
- The Design for all

The **Design for All** [134] is the intervention on environments, products and services with the aim that everyone, including future generations, regardless of age, gender, capabilities or cultural background, can enjoy participating in the construction of our society, with equal opportunities participating in economic, social, cultural, recreational and entertainment activities while also being able to access, use and understand whatever part of the environment with as much independence as possible.

The main objectives are:

- To develop and promote Design for All among companies and organizations, designers and professionals who intervene with the environment, products and services.
- To offer advice about Design for All to companies and organizations in order to implement the Design for All to each level of their processes.
- To award added value to the administrations companies professionals, and organizations strengthening their image and competitiveness.

The official stamp ―Organization Recognized by the Design for All Foundation‖ is a guarantee that human diversity is taken into account in all its fields and that its objectives are socially positive.

- The European Design for All e-Accessibility Network

The **European Design for All e-Accessibility Network** (**EDeAN**) is a network of 160 organizations in European Union member states. The aim of this network is to promote the right of all citizens to have access to the Information Society. It was established in 2002 and it aims at raising the awareness both to public and private sectors in order to integrate **Design for All** to their processes. **EDeAN** hopes that the network will become a cohesive group that can effectively work toward the advancement and excellence of **Design for All**.

- The Design for All Network of Excellence

The **Design for All Network of Excellence** (**D4ALLnet**) project [140] was a thematic network of centers of excellence in Design for All (**DfA**) in Europe and in particular the efforts of **eDeAN**. The main aim was to develop a common platform in order to promote **DfA** practices in the Information Society. **D4ALLnet** has developed the virtual networking platform (**HERMES**) for **eDeAN** in order to facilitate the data collection from member states and the dissemination of the accumulated knowledge and experience towards national contact centers.

- The Design for All for eInclusion

The **Design for All for eInclusion** (**DfA@eInclusion**) [142] aims to contribute towards the advancement of eInclusion in Europe through promoting the Design for All and in particular the **European Design for All e-Accessibility Network**. The objectives are to enhance the existing partnerships between research, user and committees, identify the problems for different user groups, to develop a knowledge based on **Design for All** (**DfA**) in the fields of eAccessibility, Design for All and eInclusion.

The expected results include the increment of awareness on DfA to the wider public, of support provided to end users and developers. Is it also expected the extended
collaboration and cooperation of both national and international organizations in order to share and exchange knowledge and experience concerning DfA.

- **EU4ALL**

According to the EU4ALL project [143] all citizens need to have access to learning to enable them to work. Technology has helped in order to achieve that. But when technology is inappropriate for people with disabilities, they are excluded from the fields of education and work. To address this problem, EU4ALL introduces the idea of Accessible Lifelong Learning.

The aim of EU4ALL is to develop an open service-oriented architecture for ALL and user-centered services that take into account the user’s needs. The user groups that will mostly benefit from the EU4ALL project are firstly the end-users, such as people with disabilities and secondly the system-users, such as the providers of eLearning systems, content and services. Furthermore, EU4ALL wishes to influence the standardization bodies in such a way, so as to extend the existing specifications or even provide them with new ones.
3 Market Survey

The aim of this chapter is to get an overview of the market environment, within which the future of ACCESSIBLE products are to be introduced. This is an important mandatory step, since each ACCESSIBLE system needs to be adoptable by the market, and this does not only require their integrity from the technological point of view. Concise exploitation plans need to be defined, to assure that the final outcome will be applied with success and that it will be assimilated by the relevant market sector.

The market survey presents what are the common trends followed so far, what are the barriers and the achievements and what is the maturity of the market as a whole, but also of each specific cluster. In this way, for ACCESSIBLE system, it is indicated, according to which principles, the implementation is oriented, for ACCESSIBLE system to offer an added value and be, at the same time, easily and cost-effectively commercialised and combined to the currently followed solutions.

3.1 Survey of tools

Users with disabilities, and the elderly, may experience problems in accessing content on the World Wide Web. These problems however can be solved by using a series of assistive technologies. An assistive technology can be defined as any product, instrument, equipment or technical system used by a person with a disability, which prevents, compensates for, supervises, alleviates or neutralises the effects of the disability when accessing web content. Such assistive technologies facilitate processes of interaction and access to page content and also help to get the most out of the browser utilities used.

A web browser is a software application enabling the user to download, display and execute different types of documents from web servers throughout the world via the Internet: hypertext documents (HTML, XHTML, XML), graphics (JPG, PNG, GIF and others), video clips (WMA, AVI and others), sound (MIDI, MP3 and others), animations (Flash, SVG and others) and other various programmes (Java, JavaScript and others).

Today's browsers not only interpret web server content to display it correctly, but they also offer a wide range of options to tailor web content to the end user's preferences. In the case of persons with disabilities, the browser's adaptation capabilities will be a determining factor in gaining access to web content and therefore the careful selection of a browser and taking advantage of its technical possibilities will influence the final performance of the application.

For certain web users the proper selection of browser software is not enough. This selection must be further supplemented by assistive technologies (screen readers, screen magnifiers, Braille display, voice recognition software, etc.) enabling these users to effectively access information retrieved by the browser.

Thanks to assistive technologies, persons with disabilities are able to process web content (providing that the latter is accessible) without their disability limiting access
to information. In this chapter the tools that assess the accessibility of a web page and also the tools that simulate a web page, are presented.

### 3.2 Market survey Template

In order to provide a record of accessibility tools during the course of the ACCESSIBLE project, the “Accessibility tools Gathering Template” was filled up. This template consists of following 10 fields:

<table>
<thead>
<tr>
<th>Name</th>
<th>Latest version</th>
<th>Description:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Language:</td>
<td>Guidelines:</td>
<td>Assistance:</td>
</tr>
<tr>
<td>Automatic checking:</td>
<td>Repair options:</td>
<td>Formats:</td>
</tr>
<tr>
<td>Browsers:</td>
<td>Operating system:</td>
<td>Online service:</td>
</tr>
<tr>
<td>Reports:</td>
<td>License:</td>
<td>Figure</td>
</tr>
</tbody>
</table>

In the beginning, the name of the tools is presented and a short description of it follows. After this short description the languages that the tools can be launched are presented and then the Guidelines that it follows, as well as the kind of assistance it provides to the users-developer. Also the kind of the automatic check that the tool applies is noted and the formats that can be assessed by it. In addition, the tool’s browser and the operating system are noted. Finally, the possible on-line services, the reports and the tool’s licence are presented. In the end a figure of the tools overview can also be illustrated.

The aim of this template is to produce a list of key relevant accessibility assessment and simulation tools related to ACCESSIBLE. The results of the survey about the state of the art in the accessibility assessment tools are presented in Annex B, in which 114 tools are included, and the results of the state of the art in the accessibility simulation tools are presented in Annex C, in which 14 simulation tools are included.

During the market survey, two more templates were launched in order to identify the market needs for the systems that are developed in the ACCESSIBLE project and to collect structured data on actual state of art of the benchmarking accessibility tools market. Those two templates were circulated to all partners as well as to external experts.

The first template, which is presented in Annex D, is the “Template for Initial Data Gathering” and consists of fields that refer to all ACCESSIBLE partners. This template is to be filed by the developers of the ACCESSIBLE system to collect up-to-date information, and the results of this survey will be further analysed in the next chapter.
Finally, a second template is going to be launched to all partners, for the a posteriori market analysis. Templates will be also sent to the end users of the tools with the view to studying their willingness to have (WTH) and willingness to pay (WTP) for these tools from the user’s point of view.

The aim of the a posteriori analysis is to provide guidance on the level of success of the investment.

### 3.3 Accessibility assessment tools

Web accessibility assessment tools can be used to investigate the accessibility of a Web site and to implement accessibility features. There are several types of assessment tools which provide different features and characteristics. Many different requirements may play a role when selecting suitable assessment tools. The nature of the Web site and the organization developing it may be most significant factors. Sometimes, a single tool may be adequately able to address the requirements of the developers but there are also circumstances where it may be suitable to select more than one tool.

There are several types of tools which can assist in the development of accessible Web sites. These tools can generally provide one or more of the following features:

1. **Evaluation**: analysis of Web pages against a set of guidelines.
2. **Repair**: automated or semi-automated enhancement of the Web page markup to incorporate accessibility features.
3. **Transformation**: modify the presentation of Web pages to assist Web users, but can also be used to identify potential barriers.

Web accessibility assessment tools are usually stand-alone applications but sometimes they can be plug-ins for authoring tools (such as editors, content management systems, or word processors), or Web browsers. A few assessment tools can also be configured to run on an ongoing basis to monitor the status of Web sites.

#### 3.3.1.1 Results for accessibility assessment tools

In this chapter the six most widespread and matching to the ACCESSIBLE needs are presented and discussed.

1. **AccRepair**

AccRepair®[^34] for use with Flash™ MX 2004 and Flash 8 AccRepair for Flash aim to help users to create *rich multimedia Web experiences* that are accessible. AccRepair for Flash aims at fast and efficient testing and remediation of the accessibility of Flash multimedia.

It steps users through several tests that allow them to validate that their Flash presentation is accessible, providing a facility for developers to correct accessibility issues in an interactive manner. The solution provides an interactive interface through which Flash developers can create presentations that will conform to recommended accessibility guidelines. HiSoftware AccRepair® for use with Macromedia Flash MX 2004 aims to reduce the time, cost, and complexity associated with building, testing, repairing and deploying accessible flash content.

AccRepair® includes AccVerify®, to provide an on Demand Developers Desktop test management system, that enables users to validate and repair content as part of the development life-cycle, for compliance with standards-based and organizational policies for Web accessibility, privacy, content defects, usability testing, search engine effectiveness, site inventory and site maintenance. It provides a unified approach, by allowing organization's experts and/or policy managers to define organizational policies and then provide a solution to validate compliance with these policies, so that the users know exactly why their content has passed or failed.

AccRepair provides digital dashboard, that incorporates streamlined report viewers and preview modes, so users can test their pages for performance under variable end-user scenarios. The reporting system provides easy access to executive level summary reports, so that IT managers can obtain quick status reports within the application interface. Detailed analysis for developers and quality assurance teams is available using the same customizable interface.

Preview modes provide users with facility to test pages for functionality; html validation, without images, without color, without style sheet support, and in a "linear" fashion. Preview modes are managed through both an embedded browser as well as through the user's system default browser.

Database recorders enhance team development and collaboration. Test results are recorded and include a history that allows the user to identify the "pass-fail" status of a project on-demand for a specific point in time, or to track the progress of the project over time. One can identify "phases" of the project by author, time, date, department, and more and create reports based on information in the database too. Users can work collaboratively to manage their testing efforts through shared Recorder databases.

AccVerify provides "out-of-the-box" testing and reporting for standards-based accessibility, privacy, metadata and usability compliance factors. It also allows users to define and conduct custom tests. The result is a report on the accessibility, quality and policy compliance status of content that has been tested.

AccRepair users can:

- Test for Accessibility and Usability: Section 508, WCAG 1.0, WCAG 2.0, CLF, XAG and any standard derived from WCAG or Section 508; Section 208; Operational Security Standard (OPSEC).
- Test for compliance with custom guidelines and policies for content HTML, XHTML, SVG, XML. Custom validation is also supported for: CSS, XSL, SVG, JavaScript, VBScript, and other text or element based content.
- Ships with Reports for: Accessibility, Privacy Policy, Searchability, Metadata Policy and Usability.

The Custom Checkpoint Editor and Custom Report Editor allow users to define specific accessibility, usability, searchability, privacy and other custom content quality factors validation. This extends the validation system provided in AccVerify to meet specific needs not covered by a publicly available standard or guideline. Test features, formats and customization can be pre-configured by an organization’s experts and/or policy managers, so that developers, quality assurance professionals and other content creators within the organization, using AccRepair, can run these...
programmatic tests and receive a result, without requirement for software configuration.

AccRepair guides the user through steps to achieve accessibility for Web content. Using a wizard format, AccRepair locates inaccessible Web elements and then prompts the user to correct them. The Wizard also includes a spell-check feature.

HiSoftware uses database technology to repair Web elements. When the user repairs a Web element using AccRepair, the information is stored in the library database. This database allows AccRepair to "remember" the element and repair it automatically. Many users can contribute to the same database, and can share the database to repair Web files. User collaboration through sharing of the library database increases the power of the program, while the user workload is cut to a fraction.

The Table Utility lets the user make tables accessible without requiring him/her to edit the source code. The utility includes: identification of each table as a data or layout table, help with adding the summary attribute and caption tag, Headers ID List Wizard for adding the id attribute to header cells, Headers Wizard for adding the headers attribute to header cells, Axis Wizard for adding the axis attribute to categorize cells, Scope Wizard for adding the scope attribute to row/column headers, and row grouping for head, body, and foot sections.

![AccRepair assessment tool overview.](image)

Figure 13: AccRepair assessment tool overview.

2. **Bobby WorldWide Web Accessibility Tool**

Bobby™ was first released in September, 1996. Also, up until the end of 2001, Bobby was free from CAST, the Centre for Applied Special Technology. The new version, announced in December, 2001, is called Bobby Worldwide (Version 3.3). The downloadable accessibility checker costs $99.00 for a single user license. There are site and server licenses as well at considerably more cost.

Bobby™ 5.0 by Watchfire® is a web accessibility desktop testing tool designed to aid webmasters in creating standard compliant web sites and increase the accessibility degree of a website. It helps expose barriers to accessibility and encourage compliance with existing accessibility guidelines, including Section 508 of the U.S. Rehabilitation Act and the W3C's Web Content Accessibility Guidelines (WCAG). Bobby spiders through a website and tests to see if it meets accessibility requirements, including readability by screen readers, the provision of text equivalents for all images, animated elements and audio and video displays. During a scan, Bobby checks HTML against select accessibility guidelines and then reports on the accessibility of each web page.

Bobby’s lengthy online report consists in 3 sections, each having a different priority level.

- **Priority 1 Accessibility** problems seriously affect the usability of the page by users and should be addressed first. Fixing these problems will get a website a Bobby Approved rating.

- **Priority 2 Accessibility** problems while not as vital as priority 1 problems do affect the accessibility of a website. Addressing both priority 1 and priority 2 problems is considered the preferred minimum conformance level for an accessible web site.

- **Priority 3 Accessibility** problems include other errors which, if corrected, can get a website the AAA Bobby approved level.

The first part of the report describes the overall status of the evaluation. If no non-compliance issues are found, then the Bobby Approved Logo is offered subject to the list "manual checks" either triggered by some specific content on the page (part 3) or manual checks that are always required. If noncompliance issues are detected, like missing alt text, the user is warned in this summary with a greyed approval icon, indicating that Repair is Required.

The second part of the Bobby report displays the original page with the addition of two icons at all places where problems occur. The Bobby hat (!) indicates a specific non-compliance issue on the page. The Question icon (?) indicates a point where there may be an issue and a manual check is required. The Bobby hat and question mark icons appear for WCAG priority 1 issues and for all 508 issues; they do not appear for WCAG priority 2 and 3 problems so as to keep the number of these at a manageable level. Each item in the list of errors or questions (manual checks) is a link that opens the help document for that issue. That help information is very complete and accurate. Code examples are common and each item includes the rationale for the provision and a reference to the source in the Section 508 and/or WAI documents.

If the user clicks on either icon, focus is taken to the item in the accessibility errors list (the third section of the report) corresponding to the problem or question. This very helpful feature is available only on this web trial version. It is not available with the downloadable product. The following screen shot shows JimThatcher.com marked up by the Bobby tool.
Because it covers all accessibility guidelines, Bobby can identify problems which are ultimately easy to fix but often overlooked. It's often the case where there was no one to point them out. At the end of the process webmasters will see that by thoroughly going through the report and making minor or less minor changes to their website, the degree of accessibility of their website will have improved significantly.

3. IBM Rule-based Accessibility Validation Environment (RAVEN)
The IBM Rule-Based Accessibility Validation Environment (RAVEN)\textsuperscript{36} is a new suite of tools for inspecting Java and web rich-client graphical user interfaces (GUIs) and validating them for accessibility. Non-invasive techniques, like Aspect Oriented Programming (AOP), Introspection, and the Java Reflection API, are used to validate pre-existing GUIs at execution time rather than by examining source-code. This tool provides the ability to: Validate your static web content and some DHTML content for accessibility; Inspect and validate your Eclipse plug-in in the current Eclipse workbench; Inspect and validate your plug-ins (and/or Eclipse itself) in an Eclipse workbench running in a separate JVM; Inspect and validate your Java applications running in a separate JVM; Validate GUI components under development from the Java Perspective; Launch, test, and use RAVEN to validate Eclipse plug-ins from your development environment using the Runtime Workbench; Define own validation rules via external XML files; Persist validation reports.

4. LIFT
LIFT\textsuperscript{37} tool is an extended version of the freely available accessibility validator for Dreamweaver. LIFT allows the user to test the accessibility of a web site and prompt on accessibility issues as one builds a website. LIFT's support is both thorough and descriptive providing explanations on the accessibility guidelines recommended. LIFT references a range of available standard guidelines, including WAI Web Content Accessibility Guidelines (WCAG 1.0). Therefore, before using LIFT it is advisable to have an understanding of the accessibility guidelines which exist.

\textsuperscript{36} http://www.alphaworks.ibm.com/tech/raven
\textsuperscript{37} http://ncsu.edu/it/access/software/lift/index.php
5. Sheriff Accessibility Module
HiSoftware Compliance Sheriff™\(^{38}\) provides a suite of solutions that enable users to create and manage corporate Web standards for accessibility, privacy, security, search engine optimization (SEO), site quality and performance, branding, competitive intelligence and application transaction testing (AppTest). Part of the Compliance Sheriff™ solutions suite, the Accessibility module empowers content managers to work collaboratively with developers and Web site architects to monitor and verify corporate Web standards for accessibility. The Accessibility module provides automated reporting solutions to determine whether the information on a Web site, public or private, complies with accessibility. It has verifying compliance with both Section 508 and W3C standards. The Accessibility module scans a Web site for over 172 accessibility checks, such as images, forms, and dynamic content interactions, plus 17 Alt text quality checks. The results are then available in report, which includes the exact locations of Web elements so one can take corrective action, and alerts to elements that can only be verified by looking at a Web-based document. Test results are recorded and include a History that allows the user to identify the "pass-fail" status of a project on demand for a specific point in time, or to track the progress of the project over time. One can identify "phases" of the project by author, time, date, department, and more. One can create reports based on information in the database too. Users can work collaboratively to manage their testing efforts through shared Recorder databases.

The diagram below illustrates the full capabilities of the solution of the ACCESSIBLE interest are only Step 1 and the accessibility assessment part of Step 2. Compliance Sheriff offers complete flexibility, allowing choosing the modules that fit to each users needs.

\(^{38}\) http://www.hisoftware.com/products/compliancesheriffoverview.htm
6. **WebKing**

Parasoft WebKing is an automated testing solution for creating, executing and managing functional and regression test suites. Parasoft WebKing is now available with support for AJAX development initiatives. AJAX is a Web development technique for creating highly interactive Web applications. Parasoft WebKing has been built specifically to handle AJAX applications. It features the following capabilities:

JavaScript code can have many bugs that are hard to find. Parasoft WebKing 6.0 provides unprecedented support for delivering correct and consistent JavaScript. JavaScript is unfamiliar to many developers yet crucial in the creation of AJAX applications. Since it is not compiled, it is very easy for developers to inadvertently introduce errors that are not found until runtime. Parasoft WebKing 6.0 assists in preventing errors from reaching the code by allowing policy creation and enforcement for corporate governance and solution consistency.

Parasoft WebKing 6.0 provides automated functional testing. WebKing isolates and tests individual application components for correct functionality across multiple browsers without requiring scripts. Additionally, dynamic data can be stubbed out with constant data to reduce test case noise. Validations can be performed at the page object level as well as the HTTP message level. WebKing verifies the client-side
JavaScript engine under expected and unexpected conditions through asynchronous HTTP message stubbing. Test cases are flexible and can be easily reused and shared.

Short or nonexistent release cycles increasingly require close collaboration between development and QA. Less technical users can create test cases in an intuitive, easy-to-use interface and convert those tests cases into a developer-accessible, source-code based unit test that reproduces the behaviour. This significantly reduces the rework loop. The generated unit tests will use a version of the open source HttpUnit library that has been enhanced for AJAX applications.

WebKing is packaged and licensed in the following editions designed to separate functionality to specific roles and processes in the typical software development environment:

- WebKing Professional Edition
- WebKing Enterprise Edition

3.3.1.2 Conclusions for the accessibility simulation tools

According to the State of the art that has been previously executed, there are 127 accessibility tools, of which 114 for assessment and 14 for simulation. From all these accessibility assessment tools, the 6 more important and widespread have been presented and analysed in the above chapter.

All the 114 assessment tools are for the accessibility assessment of web pages and services follow widely known guidelines that have already been presented in Chapter 2 of the current Deliverable and in Annex A. Because most of the assessment tools cover the majority of the existing accessibility guidelines, they can identify problems which are ultimately easy to fix, but often overlooked. It's often the case where there was no one to point them out. At the end of the process webmasters will see that by thoroughly going through the report and making minor or less minor changes to their website, the degree of accessibility of their website will have improved significantly.

The Charts that follow illustrate analytically the percentage of the founded assessment tools that follow each standardization body guidelines. From the total of the 114 assessment tools we know the standards that the 80 of them use. The majority of the tools use the WCAG1.0 guidelines, as it is illustrated in the chart too, either individually used or in combination with others. The second most commonly used guidelines is the Sections 508 standards that are also used in many tools on their own or in combination, most usually with the WCAG1.0 guidelines. It is very important to notice that none of the tools uses WCAG2.0 guidelines that are the most updated standards in the accessibility market right now. Thus ACCESSIBLE project intends to include them in its products design among with other guidelines to. The first Chart present which standards are used by each tool individually or combinations of them, while the second charts illustrates how many tools use each standard alone.
Chart 1: Accessibility assessment tools guidelines and combinations.
Also, about the accessibility assessment tools there are only 15 of the 114 that we
know the browser that operate with. From these 15 only 2 work with Internet Explorer
only, while 7 work only with Mozilla/Firefox, only one work with both Internet
Explorer and Mozilla/Firefox, 4 work with Internet Explorer, Safari and
Mozilla/Firefox and finally there is one accessibility assessment tool that operates
with Internet Explorer, Opera and Mozilla/Firefox. Those results are illustrated in that
chart below.

A very important component of the accessibility assessment tools is the level of
assistance they provide to the user. There are four kinds of assistance or combinations
of those assistant modules that an accessibility assessment tools can provide. The kind of assistance that an accessibility assessment tool can provide, are the ones that follow:

1. Generating report
2. Step by step evaluation
3. In page feedback
4. Page transformation

The way that the tools provide assistance to the user is known for 97 of the 114 tools that were founded from the state of the art. Most of the accessibility assessment tools give assistance to the user with just providing Generating report. There are also tools that give assistance to the user by providing a combination of the aforementioned assistance methods and there are also tools that provide all the aforementioned assistance methods, those tools are the commercial ones. In the chart below the results of the assistance methods for the 97 accessibility assessment tools, are illustrated.
Chart 4: Accessibility assessment tools assistance.
From the above chart is clear that most of the accessibility assessment tools provide assistance with generating reports, while the most complete way of assistance that is to provide all four kinds is given only form the 6% of all the tools.

From all the 114 accessibility assessment tools there is variability according the licence of their use. The nature of the way of licensing is known for the 100 of the 114 founded tools. Most of them are Free Software, but there are also lots that are Commercial or enterprise or combination of them. In the chart below, the exact results are illustrated with the percentage of the tolls that correlates to the respective way of licence.

![Chart 5: Accessibility assessment tools licence.](chart)

The above presented chart shows a great majority of the accessibility assessment tools that are free Software, and the ones that follow are the commercial ones. These results can also be used in the market survey in order to define the way that the ACCESSIBLE product could be licensed.

### 3.3.3 Accessibility simulation tools

It is usually difficult for web developers to understand the problems users with disabilities face when accessing web pages that are not designed with their needs in mind. In order to have a better view of their needs, web developers use *simulation tools*. The main objective of *simulation tools* is to provide an opportunity for users to experience a web page using simulated disabilities. It is obvious that *simulation tools* cannot simulate all kinds of disabilities and cannot provide the exact impact they have to web content, but they provide certainly information and help web designers make their web content more accessible.
3.3.3.1 Results for accessibility simulation tools

In this chapter the most well-known and widely used simulation tools are mentioned, along with their basic characteristics.

1. Accessibility Colour Wheel

The Accessibility Colour Wheel\(^40\) is an on-line tool that was developed by an individual, in order to help in the choice of a colour pair when working a web page. Web pages should be accessible also to people with visual impairments, therefore the text and background colour of a web site should be clear enough.

The purpose of this tool is to simulate three different kinds of vision deficiencies. As a result, users will have the opportunity to understand how colour-blind people see a web site.

A user can choose colours for background and foreground and can check their contrast either by using Contrast/brightness difference (WCAG 1.0) or the Contrast ratio (WCAG 2.0 recommended). If the contrast between the two colours is sufficient the message “OK!” appears and the user can safely use these two colours when creating a web page. Moreover, this tool can simulate three kinds of vision deficiencies, namely Deuteranope, Tritanope and Protanope.

![Accessibility Colour Wheel](http://gmazzocato.altervista.org/colorwheel/wheel.php)

**Figure 16:** Accessibility color wheel simulation tool overview.

\(^{40}\) [www.gmazzocato.altervista.org/colorwheel/wheel.php](http://gmazzocato.altervista.org/colorwheel/wheel.php)
2. aDesigner

The aDesigner [215] is a disability simulator that helps Web designers to ensure that their pages are accessible and usable by the visually impaired. Web developers can use aDesigner in order to test the accessibility and usability of Web pages for low-vision and blind people. aDesigner is mostly oriented in testing the degree of colour contrast on the page, the ability of users to change the font size and the existence of alternate text for images. Moreover, aDesigner can check the conformance of the page to some accessibility guidelines. Namely, these guidelines are WCAG 1.0, Section 508, JIS and IBM Web Accessibility Checklist. Consequently, aDesigner can act also as an evaluation tool.

The latest version of the aDesigner was launched by IBM, in 7 July 2004, in English and in Japanese.

3. ART Simulator

The ART Simulator [216] simulates a web site in different ways to help developers gauge how easily the disabled can use the site. The simulator serves two critical purposes: It enables site owners and developers to both experience first-hand the barriers to accessibility faced by the disabled and to better understand how to improve disabled users experience. ART Simulator "simulates" the site using the following conditions that closely-mimic some of the disabilities that users might have:

- **Style sheet and scripts** simulations mimic technologies for people with disabilities that do not support style sheets and scripts.
- **Image and multimedia simulations** help test the usability of the site when relying solely on text (text on sites can be converted into speech or Braille).
- **The reading disabilities simulation** makes reading a site slower and more complex. This simulation typifies the experience of a user with dyslexia, for instance. Long unnecessary text becomes difficult and frustrating.
4. **ColorDoctor**

ColorDoctor [217] is a simulator that can check color accessibility. It converts any images displayed on the screen such as websites and other presentation contents into gray scale or colors that can be perceived by people with color blindness. ColorDoctor not only simulates website display, it is also possible to simulate real-time display of proposals, presentations, and moving images such as Flash by selecting the "Transparent" mode. ColorDoctor shows the display content through four conversion filters: Grayscale, Protanopia, Deuteranopia and Tritanopia. The simulation result can be stored in various file formats, including BMP, JPEG, PNG, TIFF, and GIF.

This software was awarded the universal design award 08.

![ColorDoctor simulation tool overview.](image)

5. **Etre**

Etre [218] is a company funded in London and it provides on its official web page an online tool that simulates how an image will look like to a user with different kinds of colour blindness disabilities. More specifically, the Colour Blindness Simulator can show how an image will look to a user suffering either from protanopia (difficulty in distinguishing between colours in the green-yellow-red section of the spectrum), deuteranopia (difficulty in distinguishing between colours in the green-yellow-red section of the spectrum) or tritanopia (a very rare blue-yellow colour blindness).

When using the Colour Blindness Simulator [219], web developers can upload a JPEG image and then compare how the image looks a user with normal vision and to another with one of the above mentioned colour vision deficiencies.

There are a number of colour blindness conditions, including the three simulated by this tool, which are the following:

- People with protanopia lack the long-wavelength sensitive retinal cones that are required to distinguish between colors in the green-yellow-red section of the spectrum.
- People with dueteranopia lack medium-wavelength retinal cones and are therefore also unable to distinguish between colors in the green-yellow-red section of the spectrum.
- People with colour blindness involving the inactivation of the short-wavelength sensitive cone system have tritanopia, a very rare blue-yellow colour blindness.

An example of the deuteranopia simulation is presented in the figure below.
6. VIS
Visual Impairment Simulator (VIS) for Microsoft Windows [220] is an educational tool that simulates what it is like to use Microsoft Windows with a visual impairment. When the program runs, it manipulates the images on the user’s screen so that it seems like the user has a visual impairment. Users can choose which impairment they wish to simulate from a drop down menu.

The impairments that can be simulated are: Cataract, Color Blindness, Diabetic Retinopathy, Glaucoma, Hyperopia, Macular Degeneration, Magnifier and Retinitis Pigmentosa. For all the above mentioned visual impairments, different visual settings can be chosen, that refer to the level of the impairment. Figure 20 shows the simulation provided for a user with Cataract. Figure 21 shows the drop down menu from which the different impairments can be chosen.

Figure 19: Colour Blindness Simulator tool overview with an example of deuteranopia.
Figure 20: VIS for Microsoft Windows.

Figure 21: VIS dropdown menu for visual impairments.

7. Vischeck

Vischeck [221] was created, in order to help web developers check their work for color blind visibility.

Vischeck was developed from Bob Dougherty and Alex Wade at Stanford University. It is a computer simulation that can be divided into three stages:

- First Stage: includes the physical properties of the display devices.
- Second Stage: describes the transformation of optical image on the retina into a neural representation of that image in the optic nerve.
- Third Stage: a model of human cortical vision. The final image is created according to the information assembled for the problems that people with different visual disabilities face.
Vischeck can be downloaded so as to run to the user’s computer or can also test online image files or web pages. An example of how people with visual disabilities perceive images is shown in Figure 22. The first image is the normal view and the other two are for a person with deuteranopia (red/green color deficit) and for a person with tritanopia (blue/yellow).

![Figure 22: An example of deuteranopia and tritanopia](image)

8. WebAIM

The Web Accessibility in Mind (WebAIM) [222] is a non-profit organization and its main goal is to help make the web more accessible to people with disabilities. To promote this goal, WebAIM provides a great amount of tools and knowledge. In the official site of WebAIM, apart from the tools, a lot of information can be found concerning standards and guidelines, potential disabilities as well as tips for designing an accessible web page.

WebAIM provides four simulations tools, Screen Reader Simulation, Low Vision Simulation, Dyslexia Simulation and Distractibility Simulation.

i. WebAIM Screen Reader Simulator

The WebAIM Screen Reader Simulator [223] provides the user with the experience to see what is like to use a screen reader. A web site is used as an example and is presented as a screen reader should present it. Moreover, the user is provided with shortcuts that help him/her navigate throughout the site, because using the mouse is not allowed. The objective of this simulation tool is to show how difficult and frustrating it can be for blind users to access web sites.

ii. WebAIM Low Vision Simulator

The WebAIM Low Vision Simulator [243] will provide users with the opportunity to experience a web page as a user with visual disabilities. A view of this simulation tool is provided in Figure 23. As it can be discerned, users can see the specified web page as if they suffer from Macular Degeneration, Cataract or Glaucoma.
iii. WebAIM Dyslexia Simulator

The WebAIM Dyslexia Simulator [225] provides information to the user concerning some common symptoms of dyslexia. The user is given 60 seconds so as to read aloud a paragraph. In this paragraph a lot of spelling mistakes are made, though in purpose. Moreover, the letters are reversed or inverted or transposed. For example, mistakes that occur are: *d* instead of *b*, *tip* instead of *pit*, *felt* for *left*, etc. After the end of 60 seconds, two questions need to be answered. With this way, it is shown to the users how difficult it is for users with dyslexia to read the content from a web page.

iv. WebAIM Distractibility Simulator

The WebAIM Distractibility Simulator shows the difficulty that people with a cognitive impairment face when trying to access a web site. It should be mentioned that this simulation attempts to demonstrate the effects of a cognitive impairment. These effects include disorientation and confusion. In order to achieve this goal, the user should be able to navigate throughout a site and simultaneously execute also other distracting tasks. A view of this simulation tool is provided in Figure 24.
3.3.3.2 Conclusions for the accessibility simulation tools

The accessibility simulation tools that have been presented in Annex C after the extend literature, web and contribution based survey are not as much as the assessment tools are and they not vary in lots components. Most of them refer and simulate visual impairments like Grayscale, Proantanopia, Deuteranopia, Tritanopia, Cataract, Diabetic, Retinopathy, Glaucoma and other. Only one tool can simulate cognitive impairment and another two can simulate learning impairment, like dyslexia (Chart 7). So, this makes obvious the fact that there is a great technological gap to the accessibility simulation tools that simulate other impairments that ACCESSIBLE project deals with. More analytically the exact type of impairment that each tool simulates is presented in the Table that follows.
<table>
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<th>Deuteranope</th>
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</tr>
</tbody>
</table>
| Table 1: Type of impairment each tool simulates.
Finally most of the accessibility simulation tools are provided open source or provided free to the users. Although the percentage of them that is Trial or Demo, or has commercial licence is by no means ignorable.

### 3.4 Survey of devices

Owing to the rapid development of electronic technologies, it tends to be common to access Web sites outside the traditional field of a desktop PC and a computer screen (e.g., PDAs, mobile phones, assisting devices, etc.). This has brought more specific assistive technologies to improve interactivity for users with disabilities, as well as broad personal preferences [170]. This includes the ability of coping with diverse input/output modalities combination within interactive scenarios. Since the diversity of these technologies is high (e.g., display resolution, images colouring, multimedia process, etc.), the way accessibility is assessed for software applications must also cope with these differences [171]. In this chapter of the market survey, a short presentation of the assistive devices is taking place.

#### 3.4.1 Screen Readers

Software used by individuals who are blind or who have dyslexia that interprets what is displayed on a screen and directs it either to speech synthesis for audio output, or to refreshable braille for tactile output. Some screen readers use the document tree (i.e., the parsed document code) as their input. Older screen readers make use of the rendered version of a document, so that document order or structure may be lost (e.g., when tables are used for layout) and their output may be confusing.

Some examples of the Screen readers are the following devices:

1. **Apple_Voice Over**

VoiceOver [130] is a screen reader built into Apple Inc.'s Mac OS X operating system since version 10.4. By using VoiceOver, the user can access his or her Macintosh by using speech and the keyboard. The feature is designed to increase accessibility blind
and low-vision users and users with dyslexia. A variant of VoiceOver is also included on the latest versions of Apple’s iPod Shuffle, iPod Nano and iPod Touch, as well as the iPhone 3GS.

![VoiceOver Utility](image)

**Figure 25:** Apple_Voice Over overview.

2. **Code Factory**

Code Factory’s Mobile Speak line of screen readers [131] consists of software applications installed on a mobile phone or personal digital assistant (PDA), which allow the user to use the device even if he/she cannot read the visual screen. Information displayed on the screen is rendered in synthesized speech output generated using text-to-speech (TTS) technology and routed through the device’s speaker or a headset. Screen contents can also be presented in Braille if the mobile phone or PDA is connected to a Braille device with a refreshable Braille display.

![Code Factory Mobile Speak](image)

**Figure 26:** Code factory mobile speak application overview.

3. **Fire vox**
Fire Vox is a free and open source extension for the Mozilla Firefox web browser that transforms it into a self-voicing application. Since its debut in 2005, Fire Vox has garnered an increasing amount of interest in the accessibility community. It has several features not found in commercial screen readers, such as the ability to handle CSS 3 Speech Properties (resulting in it being cited as "the only implementation of aural style sheets"[132]). It has also received mentions in several articles related to Firefox and/or web accessibility and even a mention in a techniques document from the W3C. As of February 2007, Fire Vox supports WAI-ARIA markup for AJAX live regions. [133]

3.4.2 Braille

Braille is a system using six to eight raised dots in various patterns to represent letters and numbers that can be read by the fingertips. Braille systems vary greatly around the world. Some "grades" of braille include additional codes beyond standard alpha-numeric characters to represent common letter groupings (e.g., "th," "ble" in Grade II American English braille) in order to make braille more compact. An 8-dot version of braille has been developed to allow all ASCII characters to be represented. Refreshable or dynamic braille involves the use of a mechanical display where dots (pins) can be raised and lowered dynamically to allow any braille characters to be displayed. Refreshable braille displays can be incorporated into portable braille devices with the capabilities of small computers, which can also be used as interfaces to devices such as information kiosks.

Some representative Braille devices are the following:
1. Alva Braille Display
   The ALVA Satellite [134] is a series of Braille displays providing blind and visually impaired people full access to the world of communication and information. The Alva spacious front-panel allows the user to move the Braille line across the computer screen - by using nothing more than your thumbs.

The ALVA Satellite series is available in three different models:
1. Alva 544 Satellite Traveller
2. Alva_544 Satelite_Pro
3. Alva_BC640

![Figure 27: ALVA Satellite series overview.](image)
3.4.3 Alternative Keyboards or Switches

Alternate keyboards or switches are hardware or software devices used by people with physical disabilities that provide an alternate way of creating keystrokes that appear to come from the standard keyboard. Examples include keyboard with extra-small or extra-large key spacing, keyguards that only allow pressing one key at a time, on-screen keyboards, eyegaze keyboards, and sip-and-puff switches. Web-based applications that can be operated entirely from the keyboard, with no mouse required, support a wide range of alternative modes of input.

Some indicative examples of alternative keyboards or switches are the following:

1. Goldtouch Adjustable Keyboard
Goldtouch Adjustable Keyboard [135] is a leading recommendation among Risk Managers, Certified Professional Ergonomists, Physical Therapists and Occupational Therapists. Goldtouch keyboard is designed to fit the range of body types, not just an average, the standard Goldtouch Adjustable Keyboard is the only keyboard designed to properly straighten the wrists and arms while aligning with the shoulders to achieve a neutral typing posture.

![Figure 28: Goldtouch Adjustable Keyboard overview.](image)

2. Kinesis Maximum
Kinesis Maxim is an award winning adjustable ergonomic computer keyboard.[136]

![Figure 29: Kinesis Maxim Adjustable Keyboard overview.](image)

3. Microsoft Natural keyboard
The Microsoft Natural Keyboard [137] is a computer keyboard that was introduced by Microsoft in 1994. The keyboard was a split keyboard with each half of the keyboard separated and tilted upwards and down from the center of the keyboard. This key arrangement was ergonomically designed to prevent carpal tunnel syndrome and other...
repetitive strain injuries associated with typing for long periods of time. The keyboard also helps to ensure correct posture while sitting at the computer.

Figure 30: Microsoft Natural Keyboard Elite overview.

3.4.4 Screen Magnifiers

Screen magnification is software used primarily by individuals with low vision that magnifies a portion of the screen for easier viewing. At the same time screen magnifiers make presentations larger, they also reduce the area of the document that may be viewed, removing surrounding context. Some screen magnifiers offer two views of the screen: one magnified and one default size for navigation.

Some indicative examples of screen magnifiers are the following:

1. BigShot Screen Magnifier
   BigShot, the first screen magnifier designed specifically to relieve eyestrain and for individuals with mild visual impairments.[137]

2. ZoomWare Screen Magnifier
   ZoomWare is screen magnifier designed for those who squint at the computer screen and lean in to read the fine print. ZoomWare provides a gentle boost of magnification (up to 2 times) so that hard to read text is larger, clearer and easier to see. You can also apply a soft tint to white areas of the screen or reverse all colors to eliminate that familiar blinding glare. [138]

3.4.5 Scanning Software

Scanning software is adaptive software used by individuals with some physical or cognitive disabilities that highlights or announces selection choices (e.g., menu items, links, phrases) one at a time. A user selects a desired item by hitting a switch when the desired item is highlighted or announced.

3.4.6 Speech Devices

3.4.6.1 Speech recognition

Speech (or voice) recognition is used by people with some physical disabilities or temporary injuries to hands and forearms as an input method in some voice browsers. Applications that have full keyboard support can be used with speech recognition.

3.4.6.2 Speech synthesis

Speech synthesis or speech output can be generated by screen readers or voice browsers, and involves production of digitized speech from text. People who are used to using speech output sometimes listen to it at very rapid speeds.
3.4.6.3 **Visual notification**

Visual notification is an alternative feature of some operating systems that allows deaf or hard of hearing users to receive a visual alert of a warning or error message that might otherwise be issued by sound.

3.4.6.4 **Voice browsers**

Voice browsers are systems which allow voice-driven navigation, some with both voice-input and voice-output, and some allowing telephone-based Web access.

3.4.7 **Listening Devices**

Assistive listening devices (ALDs) include a large variety of devices designed to improve audibility in specific listening situations. Some are designed to be used with hearing aids or cochlear implants (CIs), while others are designed to be used alone. Many that are used in conjunction with hearing aids require a telecoil (T-switch).

Some indicative examples of listening devices are the following:

1. **Com link Personal Sound Enhancer**
2. **Direct Ear Personal Infrared Television Listening**
3. **Motiva Personal FM System**

3.4.8 **Text Browsers**

Text browsers such as Lynx are an alternative to graphical user interface browsers. They can be used with screen readers for people who are blind. They are also used by many people who have low bandwidth connections and do not want to wait for images to download.

Some indicative examples of text browsers are the following:

1. **Elinks**
   - ELinks is a free text-based console web browser for Unix-like operating systems. It began in late 2001 as an Experimental fork by Petr Baudiš of the Links Web browser, hence the name. Since then, the ‘E’ has come to stand for Enhanced or Extended, and on 1 September 2004. [139]
   - Lynx

2. **Lynx**
   - Lynx is a free open-source, text-only Web browser for use on cursor-addressable character cell terminals. Supported protocols are Gopher, HTTP, HTTPS, FTP, WAIS, and NNTP. [140]

3.5 **Market survey Results**

After the completion of the aforementioned Templates, an extend market survey will be realised according to the needs of Task 8.4 “Market Analysis & Business Plan” and Task 8.5 “Cost Benefit & Cost Effectiveness Analysis”.

One very important step that has been made in the current Deliverable and will provide the Tasks 8.4 & 8.8 is classification of tools by a very significant factor that matters to all budget conscious web designers, developers, or evaluators and is the cost. There are many excellent free evaluation tools, but we have to weigh the specific needs of ACCESSIBLE project and the features the users we refer to need and look at
the tools that have the same characteristics with the ones wanted in ACCESSIBLE project during this procedure would also be important to keep in mind:

- Who will be using the tool. The evaluation tool, and its associated cost, will depend a great deal on the accessibility knowledge of the one using it. Free tools often assume a greater understanding and spend less time educating their user.

- The size of the site being examined. Those tasked with maintaining or creating a very large web site will need accessibility tools that spider through the site so they don't have to check the site one page at a time. Often times it is the commercially available tools that have this feature. Free tools often limit their scope to checking just one page at a time.

- The information that must be collected. This varies depending on your situation. Some developers may be required to provide detailed reports on the accessibility of many different types of web documents. Commercially available tools often produce more detailed and specific reports.

After those procedures a Cost-Benefit Analysis (CBA) and a Cost Effectiveness Analysis will take place. CBA is the method that will be used in ACCESSIBLE project for assessing the life cycle costs and benefits of competing alternative approaches. This method aims to perform economic evaluation of the expected project results in terms of assessing the viability and cost and benefits of specific ACCESSIBLE applications, services, and tools. The comparative assessment of CBA outcomes for the various project results is expected to support exploitation activities, resource allocation decisions and business plan. CBA has a central role in any private sector business case where there is the need to assess value for money; for public sector investment CBA considers gains and losses to all members of society by valuing impacts in terms of a single familiar scale of money. The Cost-effectiveness analysis (CEA) on the other hand, is a form of economic analysis that compares the relative expenditure (costs) and outcomes (effects) of two or more courses of action.
4 General Conclusions

In the scope of ACCESSIBLE project, the domain of standards, tools and devices is of a great importance. In order to be able to help the main user group of the project, which is the developers and designers group; to develop more accessible applications with an easy to understand and to implement way, we need to have a close and thorough view of all the existing standards and guidelines in all ACCESSIBLE fields. At this end, in this Deliverable a structured survey of standards, tools and devices has been established. In order, though to be updated in all projects duration, this document will be a living document that will be updated during the project.

The executed survey had resulted in 37 standards that are related to the ACCESSIBLE project. In this point, the standards that have been included in this document reflect the current technological developments and trends that are relevant to ACCESSIBLE project. Of course, by the end of the project, when the next Deliverable with standardisation issues, that is the Deliverable 4.3 “A set of guidelines for the validation and integration of the implemented tools and methodologies”, will be available, new standards might be released. These will be considered, and their compliance in ACCESSIBLE will be also examined by the end of the development parts of the projects and the pilot tests. In case of not abiding to a standard, the reasoning will be provided (e.g. change of technological solution adopted).

Within the scope of this Deliverable, an in depth survey of the existing tools and devices has also been done, that resulted to the presentation of the markets top accessible technologies, that are launched by the accessibility market leaders, like Sun Microsystems and IBM. Those technologies and guidelines will comprise the bases for the development of the ACCESSIBLE system.

Also a series of 127 accessibility assessment and simulation tools has been presented from which the 6 most widespread and common assessment tools and 8 of the simulation tools were analytically illustrated and analysed. From the analysis of those tools, useful information such as the level of assistance the tools provide and the kind of impairment they refer to emerged, as well as market information such as the licence of each tool.
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Annex A: “Standards Gathering Template”
“Standards Gathering Template”

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<td>Authoring Tool Accessibility Guidelines (ATAG) Overview, ATAG 1.0</td>
<td>W3C</td>
<td><a href="http://www.w3.org/TR/UAAG10/">http://www.w3.org/TR/UAAG10/</a></td>
</tr>
<tr>
<td>Accessible Rich Internet Applications (WAI-ARIA) 1.0</td>
<td>Protocols and Formats Working Group (PFWG), part of the World Wide Web Consortium (W3C) Web Accessibility Initiative (WAI)</td>
<td><a href="http://www.w3.org/TR/wai-aria/">http://www.w3.org/TR/wai-aria/</a></td>
</tr>
<tr>
<td>Standard</td>
<td>Relevant Body</td>
<td>References</td>
</tr>
<tr>
<td>------------------------------------------------------------------------</td>
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<td>---------------------------------------------------------------------------</td>
</tr>
<tr>
<td>(ISO/DIS 9241-171:2006)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EN 1332 Machine readable cards, related device interfaces and operations. Part 2 Dimension and location of tactile identifier for ID-1 cards. Part 4 Coding of user requirements for people with special needs.</td>
<td>CEN</td>
<td><a href="http://www.cen.eu/cenorm/homepage.htm">http://www.cen.eu/cenorm/homepage.htm</a></td>
</tr>
<tr>
<td>ISO 7165-5 Wheelchairs - Part 5 Determination of overall dimensions, mass and turning space.</td>
<td>ISO</td>
<td></td>
</tr>
<tr>
<td>Electronic Commerce Modelling Language (ECML) version 2.0</td>
<td>IETF Trade working group</td>
<td><a href="http://ietfreport.isoc.org/rfc/rfc3505.txt">http://ietfreport.isoc.org/rfc/rfc3505.txt</a></td>
</tr>
<tr>
<td>SOAP Version 1.2</td>
<td>W3C XML Protocol Working Group</td>
<td><a href="http://www.w3.org/TR/soap12-part0/">http://www.w3.org/TR/soap12-part0/</a> <a href="http://www.w3.org/TR/soap12-part1/">http://www.w3.org/TR/soap12-part1/</a></td>
</tr>
<tr>
<td>Standard</td>
<td>Relevant Body</td>
<td>References</td>
</tr>
<tr>
<td>-------------------</td>
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<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Ergonomic requirements for office work with visual display terminals.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Device Description Repository Simple API</td>
<td>W3C</td>
<td><a href="http://www.w3.org/TR/2008/REC-DDR-Simple-API-20081205/">http://www.w3.org/TR/2008/REC-DDR-Simple-API-20081205/</a></td>
</tr>
<tr>
<td>W3C mobileOK Basic Tests 1.0</td>
<td>W3C</td>
<td><a href="http://www.w3.org/TR/2008/REC-mobileOK-basic10-tests-20081208/">http://www.w3.org/TR/2008/REC-mobileOK-basic10-tests-20081208/</a></td>
</tr>
<tr>
<td>ISO/IEC DTR 19766 Information Technology Guidelines for the design of icons and symbols accessible to all users, including the elderly and persons with disabilities.</td>
<td>ISO</td>
<td><a href="http://www.iso.org/iso/catalogue_detail.htm?csnumber=42128">http://www.iso.org/iso/catalogue_detail.htm?csnumber=42128</a></td>
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<tr>
<td>ISO/IEC 24755 Information Technology Screen icons and symbols for personal mobile communication device.</td>
<td>ISO</td>
<td><a href="http://www.iso.org/iso/catalogue_detail.htm?csnumber=41525">http://www.iso.org/iso/catalogue_detail.htm?csnumber=41525</a></td>
</tr>
<tr>
<td>ISO 9241-11 Ergonomic requirements for office work with visual display terminals (VDTs) -- Part 11: Guidance on usability</td>
<td>ISO</td>
<td><a href="http://www.iso.org/iso/catalogue_detail.htm?csnumber=16883">http://www.iso.org/iso/catalogue_detail.htm?csnumber=16883</a></td>
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<tr>
<td>ISO 13407 Human-centred design processes for interactive systems</td>
<td>ISO</td>
<td><a href="http://www.iso.org/iso/catalogue_detail.htm?csnumber=21197">http://www.iso.org/iso/catalogue_detail.htm?csnumber=21197</a></td>
</tr>
<tr>
<td>Standard</td>
<td></td>
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<tr>
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<td></td>
</tr>
<tr>
<td>ISO/AWI 23973 Software ergonomics for World Wide Web user interfaces</td>
<td>ISO</td>
<td></td>
</tr>
<tr>
<td>ISO 14915-1:2002 Software ergonomics for multimedia user interfaces -- Part 1: Design principles and framework</td>
<td>ISO</td>
<td></td>
</tr>
<tr>
<td>JavaFX 1.0 API Sun Microsystems</td>
<td><a href="http://java.sun.com/javafx/1/docs/api/">http://java.sun.com/javafx/1/docs/api/</a></td>
<td></td>
</tr>
<tr>
<td>Java Accessibility API (JAAPI) Sun Microsystems</td>
<td><a href="http://java.sun.com/j2se/1.5.0/docs/api/java/accessibility/package-tree.html">http://java.sun.com/j2se/1.5.0/docs/api/java/accessibility/package-tree.html</a></td>
<td></td>
</tr>
<tr>
<td>Java accessibility checklist - version 3.6 IBM</td>
<td><a href="http://www-03.ibm.com/able/guidelines/java/accessjava.html">http://www-03.ibm.com/able/guidelines/java/accessjava.html</a></td>
<td></td>
</tr>
<tr>
<td>GNOME Human Interface Guidelines (1.0) GNOME Usability Project</td>
<td><a href="http://developer.gnome.org/projects/gup/hig/1.0/">http://developer.gnome.org/projects/gup/hig/1.0/</a></td>
<td></td>
</tr>
<tr>
<td>ADA and ABA Accessibility Guidelines United States Access Board</td>
<td><a href="http://www.access-board.gov/ada-ab/ada-final.cfm">http://www.access-board.gov/ada-ab/ada-final.cfm</a></td>
<td></td>
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<tr>
<td>X 8341-3 JIS</td>
<td><a href="http://www.comm.twcu.ac.jp/~nabe/data/2006/CSUN_JIS/">http://www.comm.twcu.ac.jp/~nabe/data/2006/CSUN_JIS/</a></td>
<td></td>
</tr>
<tr>
<td>ISO/IEC 18021 Information technology -- User interfaces for mobile tools for management of database communications in a client-server model</td>
<td>ISO</td>
<td></td>
</tr>
<tr>
<td>Standard</td>
<td>Relevant Body</td>
<td>References</td>
</tr>
<tr>
<td>----------</td>
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<td>------------</td>
</tr>
<tr>
<td>Mobile Web Best Practices</td>
<td>W3C</td>
<td><a href="http://www.w3.org/TR/mobile-bp/">http://www.w3.org/TR/mobile-bp/</a></td>
</tr>
</tbody>
</table>
Annex B: “Accessibility Assessment Tools Gathering Template”
A-Checker (http://checker.atrc.utoronto.ca/index.html)
ATRC University Of Toronto, 1 January 2006
Description: A-Checker is an online accessibility checker tool that tests web pages for conformance to various accessibility guidelines. The accessibility checker evaluates your Web page and produces a report of all accessibility problems for your selected guideline. The checker identifies 3 types of problems; known problems, likely problems and potential problems.
Language: English, Italian
Guidelines: WCAG 1.0, Section 508, Stanca Act, BITV
Assistance: Generating Reports, Step-by-step evaluations
Automatic checking: Single pages, Restricted pages
Repair options:- Formats: HTML, XHTML
Browser:- Operating system:- Online service: Online checker
Reports: HTML
License: Free Software, Open Source

Figure 31: A-Checker assessment tool overview.

A-Prompt (http://www.aprompt.ca/)
ATRC University Of Toronto, 1 December 2004
Description: A-Prompt (Accessibility Prompt) is a software tool designed to help Web authors improve the usability of Web pages created in HTML format. A-Prompt first evaluates an HTML Web page to identify barriers to accessibility by people with disabilities. A-Prompt then provides the Web author with a fast and easy way to make the necessary repairs. The tool's evaluation and repair checklist is based on accessibility guidelines created and maintained by the Web Accessibility Initiative of the World Wide Web Consortium.
Language: English, French, German, Korean
Guidelines: WCAG 1.0, Section 508, BITV
Assistance: Generating Reports, Step-by-step evaluations
**Automatic checking**: Single pages
**Repair options**: Code modification
**Formats**: HTML, XHTML
**Browsers**:
**Operating system**: Windows
**Online service**:
**Reports**: HTML
**License**: Free Software

![Figure 32: A-Prompt assessment tool, file selection and text prompt dialogue box overview.](image)

24 August 2006

**Description**: Acc - an Accessibility Evaluator is a developing Firefox Extension, which is capable of evaluating and reporting some accessibility criteria. Acc - an Accessibility Evaluator can spot some basic explicit HTML-coding flaws like other tools, but it includes features like: Visual layout extraction implementation; Basic scalability test; deeply nested layout tables test; Skip to Main Content link check; Navigation consistency check compared to previous page; and Scripted page evaluation.

**Language**: English
**Guidelines**:
**Assistance**: Generating Reports, In-page feedback
**Automatic checking**: Single pages
**Repair options**:-
**Formats**: CSS, HTML, XHTML
**Browsers**: Mozilla/Firefox
**Operating system**:-
**Reports**: HTML
**License**: Free Software

AccessKeys.org, 10 August 2006
### Description:
AccessColor tests the color contrast and color brightness between the foreground and background of all elements in the DOM to make sure that the contrast is high enough for people with visual impairments. Assuring that you provide enough color contrast between foreground and background colors takes time and we hope that this tool will help web developers to build accessible websites by visually flagging the section(s) of a page with problematic color combinations. AccessColor will find the relevant colour combinations within your HTML and CSS documents rather than requiring you to find each value to input yourself in order to test the contrast between each colour combination.

<table>
<thead>
<tr>
<th>Language:</th>
<th>English</th>
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</thead>
<tbody>
<tr>
<td>Guidelines:</td>
<td>WCAG 1.0</td>
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<tr>
<td>Assistance:</td>
<td>Generating Reports</td>
</tr>
<tr>
<td>Automatic checking:</td>
<td>Single pages</td>
</tr>
<tr>
<td>Repair options:</td>
<td>-</td>
</tr>
<tr>
<td>Formats:</td>
<td>CSS, HTML</td>
</tr>
<tr>
<td>Browsers:</td>
<td>-</td>
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<td>Operating system:</td>
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</tr>
<tr>
<td>Online service:</td>
<td>Online checker</td>
</tr>
<tr>
<td>Reports:</td>
<td>HTML</td>
</tr>
<tr>
<td>Licence:</td>
<td>-</td>
</tr>
</tbody>
</table>


Etre's Accessibility Check evaluates web pages against subset of the WAI guidelines. These guidelines form the basis of most global legislation relating to accessibility.

<table>
<thead>
<tr>
<th>Language:</th>
<th>English</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guidelines:</td>
<td>WCAG 1.0</td>
</tr>
<tr>
<td>Assistance:</td>
<td>Generating Reports</td>
</tr>
<tr>
<td>Automatic checking:</td>
<td>Single pages</td>
</tr>
<tr>
<td>Repair options:</td>
<td>-</td>
</tr>
<tr>
<td>Formats:</td>
<td>CSS, HTML, XHTML</td>
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<td>Browsers:</td>
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<td>Operating system:</td>
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<td>Online service:</td>
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<tr>
<td>Reports:</td>
<td>-</td>
</tr>
<tr>
<td>Licence:</td>
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</tr>
</tbody>
</table>


The Accessibility Wizard is a tool for web developers and project teams. It breaks down the WAI Checkpoints into individual tasks for each job role in a development team. Every member of a development team is directed to implement the WAI Checkpoints at a specified conformance level (A,AA or AAA). This is a sure way of meeting accessibility conformance. A web client that supports the Flash 6 (or higher) plugin is the minimum requirement to use the wizard.

<table>
<thead>
<tr>
<th>Language:</th>
<th>English</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guidelines:</td>
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</tr>
<tr>
<td>Assistance:</td>
<td>Step-by-step evaluations</td>
</tr>
<tr>
<td>Automatic checking:</td>
<td>-</td>
</tr>
</tbody>
</table>
Repair options:
Formats: 
Browsers: 
Operating system: 
Online service: 
Reports: 
License: Free Software

AccessValet ([http://valet.webthing.com/access/](http://valet.webthing.com/access/))
WebThing Ltd
**Description:** Analyses HTML and XHTML pages. Reports deprecated and invalid markup, and violations of accessibility guidelines. Supports a choice of detailed report formats for developers (including full cross-referencing of warnings to the markup and to the guidelines tested), and executive summary reports for management/QA.

**Language:** English
**Guidelines:** WCAG 1.0, Section 508
**Assistance:** Generating Reports, In-page feedback
**Automatic checking:** Single pages
**Repair options:** Code modification
**Formats:** HTML, XHTML

Browsers: 
Operating system: Windows, Linux
Online service: Online checker, Server installation
Reports: HTML, XML, EARL
License: Trial or Demo, Commercial

HiSoftware
**Description:** AccRepair by HiSoftware provides for the verification and correction of Accessibility policy and standards required for Web sites. AccRepair supports the WCAG Guidelines at all three levels, as well as Section 508, and through the Usability Test Manager provides usability testing. AccRepair is designed to work as a standalone client or integrated with Microsoft FrontPage, Microsoft Office 2000 and XP. AccRepair includes a Repair Library Editor allowing for team services and automated repairs of common accessibility errors, and all the verification functions of AccVerify, as well as Hi-Caption and metadata management. A developer's kit including API's and sample source code is available to allow extension or integration with other products. AccRepair provides out-of-the-box testing and reporting for Accessibility, Privacy, Metadata and Usability standards. It also allows users to define and conduct custom tests.

**Language:** English
**Guidelines:** WCAG 1.0, Section 508
**Assistance:** Generating Reports, Step-by-step evaluations, In-page feedback, Page transformation
**Automatic checking:** Single pages, Page groups, Restricted pages
**Repair options:** Code modification
**Formats:** CSS, HTML, XHTML, PDF, SVG
**Browsers:**
Operating system: Windows
Reports: HTML, XML, EARL, CSV
License: Commercial, Enterprise

Figure 33: AccRepair assessment tool overview.

**AccVerify**
HiSoftware
**Description:** AccVerify implements programmatic verification and reports all errors/non-compliance with the standards, plus checklist for criteria that can't be verified programmatically. Verifies the all else fails text version and differentiates between 508 and WCAG. It allows for a variety of report formats, including EARL, and provides an API for developers to incorporate it in other projects. AccVerify can run as a standalone product for Microsoft Windows, or as an extension to Mercury TestDirector and Microsoft's FrontPage, Office, and .NET server products. AccVerify provides ability to test transactional pages through script building technology. AccVerify provides out-of-the-box testing and reporting for Accessibility, Privacy, Metadata and Usability standards. It also allows users to define and conduct custom tests.

**Language:** English

**Guidelines:** WCAG 1.0, Section 508

**Assistance:** Generating Reports, Step-by-step evaluations, In-page feedback, Page transformation

**Automatic checking:** Single pages, Page groups, Restricted pages

**Repair options:** Code modification

**Formats:** CSS, HTML, XHTML, PDF, SVG

**Browsers:**

**Operating system:** Windows

**Online service:**

**Reports:** HTML, XML, EARL, CSV

**License:** Commercial, Enterprise

---

**Acrobat 7.0 Professional**
Adobe

**Description:** Acrobat 7.0 Professional has a variety of accessibility checks for PDF accessibility: 1) the Acrobat "quick check" examines a PDF file for structure and tags to see if it has the information necessary to make it accessible as well as checking for
inappropriate protection settings; 2) the Acrobat "full check" list errors and provides suggestions for how to fix them; 3) using the "read out loud" feature assists an assessment of access to all appropriate content and that the information is presented in an understandable order.

**Language:** English  
**Guidelines:**  
**Assistance:**  
**Automatic Checking:**  
**Repair options:**  
**Formats:** PDF  
**Browsers:**  
**Operating system:** Windows  
**Online service:**  
**Reports:**  
**License:** Commercial

### Adobe PDF conversion


**Description:** This conversion service will convert to Adobe PDF files that are in English and most West European languages to text or HTML. A URL for the PDF files needs to be provided. Alternatively, local PDF documents can be emailed to Adobe: to pdf2txt@adobe.com for conversion to plain text; to pdf2html@adobe.com for conversion to HTML.

**Language:** English  
**Guidelines:**  
**Assistance:**  
**Automatic Checking:**  
**Repair options:** PDF to HTML  
**Formats:**  
**Browsers:**  
**Operating system:**  
**Online service:** Hosted service  
**Reports:**  
**License:** Free Software

### AnyBrowser (http://www.anybrowser.com/)

**Description:** Tools relevant for accessibility include viewing in various screen sizes and viewing with images are replaced by ALT text. Also available are HTML validation, link checking, search engine tools, and other browser compatibility tests.

**Language:** English  
**Guidelines:**  
**Assistance:** Page transformation  
**Automatic Checking:**  
**Repair options:**  
**Formats:** HTML  
**Browsers:**  
**Operating system:**  
**Online service:** Online checker
<table>
<thead>
<tr>
<th>Reports:</th>
<th>License: Free Software</th>
</tr>
</thead>
</table>


**UB Access**, 30 March 2004

**Description**: The ART Guide - ART reviews sites for compliance with the international accessibility standards of the World Wide Web Consortium (W3C). ART also assesses sites against the accessibility requirements that the U.S. and other national governments demand for their Websites and for those of their vendors. Going beyond current technologies, ART also proposes clear and simple-to-implement solutions to possible violations of these standards.

**Language**: English

**Guidelines**: WCAG 1.0, Section 508

**Assistance**: Generating Reports

**Automatic checking**: Single pages

**Repair options**: 

**Formats**: HTML, XHTML

**Browsers**: 

**Operating system**: 

**Online service**: Online checker

**Reports**: 

**License**: Free Software

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Watchfire, 14 March 2005

Watchfire® Bobby™ 5.0 is a web accessibility desktop testing tool designed to help expose barriers to accessibility and encourage compliance with existing accessibility guidelines, including Section 508 of the U.S. Rehabilitation Act and the W3C's Web Content Accessibility Guidelines (WCAG). Bobby spiders through a website and tests to see if it meets accessibility requirements, including readability by screen readers, the provision of text equivalents for all images, animated elements and audio and video displays. During a scan, Bobby checks HTML against select accessibility guidelines and then reports on the accessibility of each web page.

**Language**: English

**Guidelines**: WCAG 1.0, Section 508

**Assistance**: Generating Reports

**Automatic checking**: Single pages, Page groups, Restricted pages

**Repair options**: 

**Formats**: HTML, XHTML

**Browsers**: 

**Operating system**: Windows

**Online service**: 

**Reports**: 

**License**: Commercial
**CC for Flash component** ([http://ncam.wgbh.org/webaccess/ccforflash/](http://ncam.wgbh.org/webaccess/ccforflash/))

The Carl and Ruth Shapiro Family National Center for Accessible Media at WGBH, 21 June 2007

**Description:** The CC for Flash component is a free tool that developers can add to their Flash projects to provide the display of searchable, multi-language captions that are synchronized to Flash video, animation, or sound objects. The component works in the following authoring environments: Flash MX 2004, Flash 8, and Flash CS3 (ActionScript 2.0 projects only).

**Language:** English

**Guidelines:**

**Assistance:** -

**Automatic checking:** -

**Repair options:** Captioning

**Formats:** HTML, XHTML

**Browsers:** -

**Operating system:** Windows

**Online service:** -

**Reports:** -

**License:** Free Software

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**ccMP3Player** ([http://ncam.wgbh.org/webaccess/ccforflash/ccmp3playermain.html](http://ncam.wgbh.org/webaccess/ccforflash/ccmp3playermain.html))

The Carl and Ruth Shapiro Family National Center for Accessible Media at WGBH, 21 June 2007
**Description:** ccMP3Player is a free Flash-based MP3 player that can be embedded in Web pages to play back MP3 audio files along with their corresponding captions. External caption files can be formatted in either DFXP or QTtext. Accessibility features have been built in for screen-reader users and those requiring keyboard access. ccMP3Player is viewable in browsers containing the Flash Player 8 (or higher) plug-in.

**Language:** English

**Guidelines:**

**Assistance:** -

**Automatic checking:** -

**Repair options:** Captioning

**Formats:**

**Browser:** Internet Explorer, Mozilla/Firefox, Safari

**Operating system:** Windows

**Online service:** -

**Reports:** -

**License:** Free Software

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**ccPlayer** ([http://ncam.wgbh.org/webaccess/ccforflash/ccplayermain.html](http://ncam.wgbh.org/webaccess/ccforflash/ccplayermain.html))

The Carl and Ruth Shapiro Family National Center for Accessible Media at WGBH, 21 June 2007

**Description:** ccPlayer is a free Flash video player that can be embedded in Web pages in order to display Flash video along with its corresponding captions. Captions can either be embedded in the video or contained in external DFXP- or QTtext-formatted files. ccPlayer also allows viewers to change to other caption languages that may be available in DFXP caption files. Accessibility features have been [built in] for [screen-reader] users and those requiring keyboard access. ccPlayer is viewable in browsers containing the Flash Player 8 (or higher) plug-in.

**Language:** English

**Guidelines:**

**Assistance:** -

**Automatic checking:** -

**Repair options:** Captioning

**Formats:**

**Browser:** Internet Explorer, Mozilla/Firefox, Safari

**Operating system:** -

**Online service:** -

**Reports:** -

**License:** Free Software

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**Color Filter** ([http://colorfilter.wickline.org/](http://colorfilter.wickline.org/))

**AWARE**

**Description:** Several filters to manipulate images and other file types to see how they may appear for other users.

**Language:** English

**Guidelines:**

**Assistance:** -

**Automatic checking:** -

**Repair options:** -
Color Laboratory (http://colorfilter.wickline.org/)
AWARE Center
Description: This colour laboratory allows you to select colors and see how they appear next to one another, and in various foreground/background combinations. It also allows you to see those colors as they might appear to color-blind users.
Language: English
Guidelines:
Assistance:
Automatic checking:
Repair options:
Formats:
Browser: -
Operating system: -
Online service: Online checker
Reports:-
License: -

ColorSelector (http://www.fujitsu.com/global/accessibility/assistance/cs/)
Fujitsu Limited, 18 January 2008
Description: ColorSelector can evaluate whether the selected color combinations between text and background are easily viewed by people with cataracts or color blindness at the term of developing websites and other presentation contents. Furthermore, it can display the most appropriate combination. In this manner, it assists in the creation of visual contents with a high level of accessibility. You can select any color on the display by simply using the "Dropper" function. You can also enter the RGB values of a color and judge its legibility. These functions are useful for checking the coloration of proposals and presentations as well as websites.
ColorSelector examines the specified combination of background and text colors, judges them as "Regular", "Cataract", "Protanopia", "Deuteranopia" or "Tritanopia" and displays the judgment. This software was awarded the universal design award 08.
Language: Chinese (Simplified), English, Japanese, Korean
Guidelines: WCAG 1.0, Section 508, JIS
Assistance:
Automatic checking:
Repair options:
Formats:
Browser:
Operating system: Windows, MacOS
Online service: -
Reports:
License: Free Software
Colour Blindness Check  
Q42, 11 March 2002  
**Description:** Colour Blind Check is a little tool for people to test their webpages with. It re-colorizes any webpage you like into a palette that closely resembles the typical palette available to a person having a red/green color vision deficiency. (It approximates to Protanopia.)  
**Language:** English  
**Guidelines:** WCAG 1.0  
**Assistance:** Page transformation  
**Automatic checking:** -  
**Repair options:** -  
**Formats:** -  
**Browser:** -  
**Operating system:** Windows, MacOS  
**Online service:** Online checker  
**Reports:** -  
**License:** Free Software

etre, 1 December 2005  
**Description:** Etre's Colour Check determines the colour difference and contrast between any two colours to maximise readability.  
**Language:** English  
**Guidelines:** WCAG 1.0  
**Assistance:** Generating Reports  
**Automatic checking:** -  
**Repair options:** -  
**Formats:** -  
**Browser:** -  
**Operating system:** -  
**Online service:** -
Colour Contrast Analyser
(http://juicystudio.com/services/luminositycontrastratio.php)
Juicy Studio, 24 June 2003
Description: This colour contrast analyser is provided to allow you to check the contrast of two colours using the W3C's colour contrast algorithm (http://www.w3.org/TR/AERT#color-contrast) by specifying the colours directly. It calculates the difference in colour and the difference in brightness of the foreground and background colours, and indicates if they meet the threshold requirements.
Language: Brazilian Portuguese, English, Japanese, Spanish
Guidelines: WCAG 1.0
Assistance: Generating Reports
Automatic checking: -
Repair options: -
Formats: -
Browser: -
Operating system: -
Online service: Online checker
Reports: -
License: Free Software

Vision Australia & WAT-C, 4 February 2005
Description: The Colour Contrast Analyser is a tool for checking foreground & background colour combinations to determine if they provide good colour visibility for conformance with Checkpoint 2.2 of the Web Content Accessibility Guidelines 1.0. It determines colour visibility based on algorithms suggested by the W3C - Two colors are considered to provide good colour visibility if the brightness difference and the colour difference between the two colors are greater than a set range. In addition to analyzing contrast for normal vision it also calculates results for three types of colour blindness (Protanopia, Deuteranopia and Tritanopia).
Language: Brazilian Portuguese, Bulgarian, Chinese (Simplified), Chinese (Traditional), Czech, Dutch, English, Finnish, French, German, Italian, Japanese, Polish, Spanish
Guidelines: WCAG 1.0, Section 508, BITV
Assistance: In-page feedback
Automatic checking: -
Repair options: -
Formats: -
Browser: -
Operating system: Windows
Online service: -
Reports: -
License: Free Software

Colour Contrast Analyser (http://www.paciellogroup.com/resources/contrast-analyser.html)
WAT-C, 15 May 2007
Description: It is primarily a tool for checking foreground & background colour combinations to determine if they provide good colour visibility. It also contains functionality to create simulations of certain visual conditions such as colour blindness.
Language: English, French, Italian
Guidelines:
Assistance: Generating Reports
Automatic checking:
Repair options: -
Formats: CSS, HTML, XHTML, PDF, Images, SMIL, SVG
Browser:-
Operating system: Windows
Online service: -
Reports: Text
License: Free Software

Juicy Studio, 12 February 2006
Description: The Colour Contrast Analyser Firefox extension lists colour combinations used in the document in a table that summarises the foreground colour, background colour, luminosity contrast ratio, and the colour difference and brightness difference used in the algorithm suggested in the 26th of April 2000 working draft for Accessibility Evaluation and Repair Tools (AERT). Each element is also listed with its parent elements, and class and id attribute values when specified to make it easier to locate the elements.
Language: English
Guidelines: WCAG 1.0
Assistance: Generating Reports
Automatic checking: Single pages
Repair options: -
Formats: CSS, HTML, XHTML
Browser: Mozilla/Firefox
Operating system: -
Online service: -
Reports:
License: Free Software, Open Source

Figure 36: Colour Contrast Analyser Firefox Extension Accessibility assessment tool overview.

Pierre Frederiksen, 5 June 2007

**Description:** The toolbar is an add-on to FireFox and can be used to: reveal "headers" and "id" complex data table mark-up; create such mark-up either manually or automatically; and create a linear version of the data table content. Complex data table mark-up is needed for screen reader users in order to make sense of a complex data table. Screen readers support (in varying degree) complex mark-up.

**Language:** English

**Guidelines:**

**Assistance:** Step-by-step evaluations, In-page feedback, Page transformation

**Automatic checking:**

**Repair options:** Code modification

**Formats:** HTML, XHTML

**Browser:** Mozilla/Firefox

**Operating system:** -

**Online service:** -

**Reports:** HTML

**License:** Free Software

---


**Description:** The CLF Self-Assessment Guide has been developed by the Treasury Board Secretariat for departments and agencies to determine the compliance level of their Internet Web sites with the Common Look and Feel Standards.

**Language:** English

**Guidelines:** WCAG 1.0

**Assistance:** -

**Automatic checking:**

**Repair options:**

**Automatic checking:**

**Formats:** HTML, XHTML

**Browser:** -

**Operating system:** -

**Online service:** -

**Reports:**

**License:** -

---

**CommonLook Website Testing Tool** ([http://www.commonlook.com/](http://www.commonlook.com/))

**Description:** NetCentric Technologies' CommonLook family of software products is designed to greatly simplify the process of verifying the compliance of websites and PDF documents with accessibility and a wide variety of other standards (including Section 508, Common Look and Feel and W3C standards). 'Out of the box' and without customization they provide an immediate solution.

**Language:** English, French

**Guidelines:** WCAG 1.0

**Assistance:** Generating Reports

**Automatic checking:**

**Repair options:** -
**Automatic checking:** Single pages  
**Formats:** CSS, HTML, XHTML, PDF  
**Browser:**  
**Operating system:** Windows  
**Online service:**  
**Reports:**  
**License:** Commercial

### Contrast Checker
Q42, 20 August 2004
**Description:** The Q42 contrast checker tool enables you to compare the contrast in a web page. This is done by comparing the text color with its background for each element with contents. The contrast is determined by comparing the brightness of the foreground and background color, and the absolute color difference. Note that this is only a tool for improving accessibility, not a strict guideline. If you're not sure about the results, you should consult other methods. There are two ways to integrate the contrast checker into your browser - as a bookmarklet (also known as a favelet) to your browser, or on the context menu (this will provide you with tight browser integration, even enabling you to run the contrast checker in frames).  
**Language:** English  
**Guidelines:** WCAG 1.0  
**Assistance:** Generating Reports  
**Automatic checking:**  
**Repair options:**  
**Automatic checking:**  
**Formats:** CSS, HTML, XHTML  
**Browser:** Internet Explorer  
**Operating system:**  
**Online service:**  
**Reports:**  
**License:** Free Software

### CSS Analyser ([http://juicystudio.com/services/csstest.php](http://juicystudio.com/services/csstest.php))
JuicyStudio, 1 June 2004
**Description:** This service has been provided to allow you to check the validity of your CSS against the W3C's validation service, along with a colour contrast test, and a test to ensure that relevant sizes are specified in relative units of measurement.  
**Language:** English, Spanish  
**Guidelines:** WCAG 1.0  
**Assistance:** Generating Reports  
**Automatic checking:** Single pages  
**Repair options:**  
**Formats:** CSS  
**Browser:** -  
**Operating system:** -  
**Online service:** Online checker  
**Reports:** HTML  
**License:** Free Software
Deque Inc., 27 January 2005  
**Description:** Deque Ramp Ascend is a Web accessibility evaluation and repair tool. It checks for compliance against W3C-WCAG 1.0 and Section 508 standards. It combines robust algorithms with user input during evaluation. Evaluation can be configured to suit individual accessibility policies/practices. Guided/automated remediation covers all violations including n-dimensional tables, forms, skip navigation, missing alt tags and SMIL captioning. Reports are several and include listings of individual violations as well as summaries across checkpoints/Section 508 rules. Ramp is accessible with JAWS For Windows and has plug-ins for FrontPage, Dreamweaver and HomeSite.  
**Language:** English  
**Guidelines:** WCAG 1.0, Section 508  
**Assistance:** Generating Reports, Page transformation  
**Automatic checking:** Single pages, Page groups, Restricted pages  
**Repair options:** Code modification, Captioning  
**Formats:** CSS, HTML, XHTML  
**Browser:** -  
**Operating system:** Windows, MacOS, Linux, Solaris  
**Online service:** Online checker  
**Reports:** HTML, XML  
**License:** Commercial, Enterprise

Deque Inc., 27 January 2005  
**Description:** Deque Ramp Grade is a Web accessibility evaluation tool. It checks for compliance against W3C-WCAG 1.0 and Section 508 standards. It combines robust algorithms with user input during evaluation. Evaluation can be configured to suit individual accessibility policies/practices. Reports are several and include listings of individual violations as well as summaries across checkpoints/Section 508 rules. Ramp Grade is accessible with JAWS For Windows and has plug-ins for FrontPage, Dreamweaver and HomeSite.  
**Language:** English  
**Guidelines:** WCAG 1.0, Section 508  
**Assistance:** Generating Reports, Page transformation  
**Automatic checking:** Single pages, Page groups  
**Repair options:**  
**Formats:** CSS, HTML, XHTML  
**Browser:** -  
**Operating system:** Windows, MacOS, Linux, Solaris  
**Online service:**  
**Reports:** HTML, XML  
**License:** Commercial, Enterprise |}

Deque Inc., 27 January 2005  
**Description:** Deque Ramp Personal Edition (PE) offers a Low cost way to learn about accessibility and test web pages for W3C WAI WCAG and Section 508 compliance one Web page at a time. This accessible tool has the same algorithms for evaluation as |
<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Deque Inc., 3 June 2005</td>
<td></td>
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<tr>
<td><strong>Description:</strong> Undoc for PDF is the right tool for you if you are responsible for turning a PDF™ documents into an HTML file which you can then easily make accessible or a format you can work with and reuse or edit. It decodes PDF files into the textual content and creates an easily reusable XML rendition and separates the presentation markup and creates an editable HTML presentation. If you have content locked up in PDF files and you cannot find the original source, Undoc for PDF. can help you avoid having to retype and recreate the material from scratch.</td>
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<tr>
<td><strong>Language:</strong> English</td>
<td></td>
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<td><strong>Guidelines:</strong> Section 508</td>
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<td><strong>Assistance:</strong> Page transformation</td>
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<tr>
<td><strong>Automatic checking:</strong> Single pages</td>
<td></td>
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<tr>
<td><strong>Repair options:</strong> PDF to HTML</td>
<td></td>
</tr>
<tr>
<td><strong>Formats:</strong> CSS, HTML, XHTML, PDF</td>
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<td><strong>Browser:</strong> -</td>
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<td><strong>Operating system:</strong> Windows, MacOS, Linux</td>
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<tr>
<td><strong>Online service:</strong> -</td>
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<tr>
<td><strong>Reports:</strong> HTML, XML</td>
<td></td>
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<td><strong>License:</strong> Commercial</td>
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<tr>
<td>Deque Inc., 11 October 2005</td>
<td></td>
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<tr>
<td><strong>Description:</strong> Worldspace is the ideal tool for teams responsible for high-quality, compliant web-sites or web-applications. Worldspace is a web-based enterprise tool that automates testing for Accessibility (Section 508 and WCAG), Privacy, Quality, and Security so the team can spend time on creating a compelling on-line experience and less time worrying about compliance. It provides actionable reports for management and developers alike. Worldspace can be easily integrated into the content development process and your existing tools so that managers have confidence that compliance is a standard part of the release process and so that developers don’t feel burdened by compliance requirements.</td>
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<tr>
<td><strong>Language:</strong> English</td>
<td></td>
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<tr>
<td><strong>Guidelines:</strong> WCAG 1.0, Section 508</td>
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<tr>
<td><strong>Assistance:</strong> Generating Reports, Page transformation</td>
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<tr>
<td><strong>Automatic checking:</strong> Single pages</td>
<td></td>
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<tr>
<td><strong>Repair options:</strong> -</td>
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<tr>
<td><strong>Formats:</strong> CSS, HTML, XHTML, PDF</td>
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<td><strong>Browser:</strong> -</td>
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<td><strong>Operating system:</strong> Windows, MacOS, Linux</td>
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<td><strong>Online service:</strong> -</td>
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<td><strong>Reports:</strong> HTML, XML</td>
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<tr>
<td><strong>License:</strong> Free Software, Commercial</td>
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</tbody>
</table>
Language: English
Guidelines: WCAG 1.0, Section 508
Assistance: Generating Reports, Page transformation
Automatic checking: Single pages, Page groups, Restricted pages
Repair options: Code modification, Captioning
Formats: CSS, HTML, XHTML, PDF
Browser: -
Operating system: Windows, Linux, Solaris
Online service: Server installation
Reports: HTML, XML
License: Commercial, Enterprise

Doctor HTML
Imagiware, Inc.
Description: Doctor HTML is a Web page analysis tool which retrieves an HTML page and reports on any problems that it finds. The primary focus of this tool is to provide a clear, easy-to-use report of information that is relevant for improving your Web page.
Language: English
Guidelines:-
Assistance: -
Automatic checking: -
Repair options:-
Formats: CSS, HTML
Browser: -
Operating system:-
Online service: Online checker
Reports: HTML
License:-

drempelvrij.nl toolbar (http://www.drempelvrij.nl/toolbar/index.html)
Stichting Bartimeus Accessibility (with Vision Australia), 6 June 2005
Description: The drempelvrij.nl toolbar is a free and very useful tool which can be used to check the accessibility of a website. The toolbar can be used in combination with a step-by-step online guide and a checklist to check each of the 16 guidelines of the Quality Mark drempelvrij.nl.
Language: Dutch
Guidelines: WCAG 1.0
Assistance: Generating Reports, Step-by-step evaluations, In-page feedback, Page transformation
Automatic checking: Single pages
Repair options:-
Formats: CSS, HTML, XHTML
Browser: Internet Explorer
Operating system:-
Online service: Online checker
Reports: HTML
License: Free Software
**EvalAccess**  
Laboratory of HCI for Special Needs - UPV/EHU, 9 February 2006  
**Description:** EvalAccess 2.0 is an on-line web accessibility evaluation tool which has been developed using Web Service technology. Due to its architecture it can be easily integrated into other applications such as authoring tools. This tool provides different methods for evaluating web accessibility: evaluation of a single web page, evaluation of a web site and evaluation of HTML mark-up. It returns a complete report of errors as a result of the evaluation.  
**Language:** English  
**Guidelines:** WCAG 1.0  
**Assistance:** Generating Reports  
**Automatic checking:** Single pages, Page groups  
**Repair options:**  
**Formats:** HTML  
**Browser:**  
**Operating system:**  
**Online service:** Online checker  
**Reports:** HTML, XML  
**License:** Free Software

<table>
<thead>
<tr>
<th>EvalAccess</th>
<th>Laboratory of HCI for Special Needs - UPV/EHU, 9 February 2006</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description:</strong></td>
<td>EvalAccess 2.0 is an on-line web accessibility evaluation tool which has been developed using Web Service technology. Due to its architecture it can be easily integrated into other applications such as authoring tools. This tool provides different methods for evaluating web accessibility: evaluation of a single web page, evaluation of a web site and evaluation of HTML mark-up. It returns a complete report of errors as a result of the evaluation.</td>
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<td><strong>Language:</strong></td>
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<td><strong>Guidelines:</strong></td>
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<td><strong>Assistance:</strong></td>
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</tr>
<tr>
<td><strong>Automatic checking:</strong></td>
<td>Single pages, Page groups</td>
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<tr>
<td><strong>Repair options:</strong></td>
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<td><strong>Formats:</strong></td>
<td>HTML</td>
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<td><strong>Browser:</strong></td>
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<td><strong>Operating system:</strong></td>
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<td><strong>Online service:</strong></td>
<td>Online checker</td>
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<tr>
<td><strong>Reports:</strong></td>
<td>HTML, XML</td>
</tr>
<tr>
<td><strong>License:</strong></td>
<td>Free Software</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>EveryEye (<a href="http://www.everyeye.co.uk/">http://www.everyeye.co.uk/</a>)</th>
<th>EveryEye Ltd</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description:</strong></td>
<td>EveryEye is a software tool for accessible design. If you are an interactive, software, or media content designer or publisher you can use EveryEye to see your designs the way older and colour-blind people see them. You can quickly see the difficulties they will experience and make sure you get them right for an extra 28% of the population.</td>
</tr>
<tr>
<td><strong>Language:</strong></td>
<td>English</td>
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<tr>
<td><strong>Guidelines:</strong></td>
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<tr>
<td><strong>Assistance:</strong></td>
<td>Page transformation</td>
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<td><strong>Automatic checking:</strong></td>
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<td><strong>Repair options:</strong></td>
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<td><strong>Browsers:</strong></td>
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<td><strong>Operating system:</strong></td>
<td>Windows</td>
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<td><strong>Online service:</strong></td>
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<td><strong>Reports:</strong></td>
<td>-</td>
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<tr>
<td><strong>License:</strong></td>
<td>Commercial</td>
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</tbody>
</table>
Figure 37: EveryEye Accessibility assessment tool overview.

**Flicker Rate Test for Gif Images** ([http://tools.webaccessible.org/test/check.aspx](http://tools.webaccessible.org/test/check.aspx))
Renzo Giust - Crosscode, 15 June 2005

**Description:** The Flicker Test checks images in a web page for flickering, rate of flickering and colour contrast. This particularly affects people with Photosensitive Epilepsy. A URI can be entered in an input field and a report is generated with detailed reports on each image.

**Language:** English, Italian, Spanish

**Guidelines:** WCAG 1.0, Section 508, JIS, Stanca Act, BITV

**Assistance:** Generating Reports, Step-by-step evaluations

**Automatic checking:** Single pages

**Repair options:**

**Formats:** CSS, HTML, XHTML

**Browsers:**

**Operating system:**

**Online service:** Online checker

**Reports:** HTML

**License:** Free Software

**Foreground/Background Color Contrast Analyzer** ([http://tools.cactusflower.org/analyzer/](http://tools.cactusflower.org/analyzer/))
cactusflower.org, 22 April 2006

**Description:** Calculates Foreground and Background color contrast and difference per W3C algorithms. This is a web-based, platform independant tool. It requires that Javascript is enabled in your browser.
<table>
<thead>
<tr>
<th>Language:</th>
<th>English</th>
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</thead>
<tbody>
<tr>
<td>Guidelines:</td>
<td>WCAG 1.0</td>
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<tr>
<td>Assistance:</td>
<td>Generating Reports</td>
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<td>Automatic checking:</td>
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<td>Repair options:</td>
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<td>Formats:</td>
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<td>Browsers:</td>
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<td>Operating system:</td>
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<tr>
<td>Online service:</td>
<td>Online checker</td>
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<tr>
<td>Reports:</td>
<td>HTML</td>
</tr>
<tr>
<td>License:</td>
<td>Free Software</td>
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</table>

**Functional Accessibility Evaluator** ([http://fae.cita.uiuc.edu/](http://fae.cita.uiuc.edu/))

University of Illinois at Urbana/Champaign, 25 November 2005

**Description:** The Functional Accessibility Evaluator analyzes web resources for markup that is consistent with the use of DRES/CITES HTML best practices for development of functionally accessible web resources and resources that support interoperability. The HTML best practices are not a new standard, but rather a statement of techniques for implementation of the W3C Web Content Accessibility Guidelines and United States Federal Government Section 508 standards that not only improve accessibility for people with disabilities, but also the interoperability of web resources for everyone so all people benefit by having more options to access and use web resources.

<table>
<thead>
<tr>
<th>Language:</th>
<th>English</th>
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<tbody>
<tr>
<td>Guidelines:</td>
<td>WCAG 1.0, Section 508</td>
</tr>
<tr>
<td>Assistance:</td>
<td>Generating Reports, In-page feedback, Page transformation</td>
</tr>
<tr>
<td>Automatic checking:</td>
<td>Single pages, Page groups</td>
</tr>
<tr>
<td>Repair options:</td>
<td></td>
</tr>
<tr>
<td>Formats:</td>
<td>CSS, HTML, XHTML</td>
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<tr>
<td>Browsers:</td>
<td>-</td>
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<tr>
<td>Operating system:</td>
<td>Windows, MacOS, Linux, Solaris, BSD Unix</td>
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<tr>
<td>Online service:</td>
<td>Online checker</td>
</tr>
<tr>
<td>Reports:</td>
<td>HTML, XML</td>
</tr>
<tr>
<td>License:</td>
<td>Free Software, Open Source</td>
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</table>

**Hera** ([http://www.sidar.org/hera/](http://www.sidar.org/hera/))

Fundación Sidar, 1 January 2005

**Description:** A web-based system that performs some automated WCAG 1.0 testing, then guides a user through tests which need to be done or confirmed manually. Hera is multilingual (you can change on the fly), and a translation interface is available to easily add new languages. Hera development is ongoing, and is mostly in Spanish. The system is written in PHP and is available for adaptation under the GPL open-source license.

<table>
<thead>
<tr>
<th>Language:</th>
<th>Danish, English, French, Galician, German, Italian, Portuguese, Romanian, Serbian, Spanish</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guidelines:</td>
<td>WCAG 1.0</td>
</tr>
<tr>
<td>Assistance:</td>
<td>Generating Reports, Step-by-step evaluations, In-page feedback, Page transformation</td>
</tr>
<tr>
<td>Automatic checking:</td>
<td>Single pages</td>
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<tr>
<td>Repair options:</td>
<td></td>
</tr>
</tbody>
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January 2010

-121- CS
Hermish
Gareth Slinn, 18 November 2005
Description: Hermish is a tool that can be used to quickly scan the accessibility of a web page on-line. This means that all checkpoints that can be measured on-line using a tool are checked. In practice this amounts to about 4 checkpoints of the first 16 checkpoints, although Hermish gives the impression that there are more.
Language: English
Guidelines: WCAG 1.0, Section 508
Assistance: Generating Reports
Automatic checking: Single pages
Repair options:-
Formats: CSS, HTML
Browser:-
Operating system:-
Online service: -
Reports:-
License: Free Software

HiSoftware, 20 December 2005
Description: From HiSoftware. Hi-Caption Studio 8 provides users with the ability to create, test and manage captioning for their Windows Media, RealOne Player, and QuickTime productions. It also integrates the ability to test, remediate and caption Macromedia Flash MX 2004 and Macromedia Flash Professional 8 (now part of Adobe), presentations directly within the Flash authoring tool. Also available in Spanish (Castellano)
Language: English, Spanish
Guidelines: -
Assistance: -
Automatic checking:-
Repair options: Captioning
Formats: SMIL
Browser:-
Operating system: Windows
Online service: -
Reports: HTML, XML
License: Commercial

HiSoftware Page Tester
HiSoftware, 1 June 2005
Description: The portal based testing service, powered by AccMonitor Compliance Server, allows customers to get an immediate and ongoing "status" of their Web page
| **Description:** The HiSoftware Cynthia Says Web portal is a web content accessibility validation solution, it is designed to identify errors in your content related to Section 508 standards and/or the WCAG guidelines. Unlike HiSoftware's Desktop Software, AccVerify, this online test only validates one page at a time. | **Language:** English |
| **Guidelines:** WCAG 1.0, Section 508 | **Assistance:** Generating Reports |
| **Automatic checking:** Single pages | **Operating system:** |
| **Repair options:** | **Online service:** Online checker |
| **Formats:** HTML, XHTML | **Reports:** HTM |
| **Browser:** | | **License:** Free Software |

| **Description:** HTML Validator is a Mozilla extension that adds HTML validation inside Firefox and Mozilla. The number of errors of a HTML page is seen on the form of an icon in the status bar when browsing. The details of the errors are seen when looking the HTML source of the page. The extension is based on Tidy. | **Language:** English, French, German, Japanese, Spanish |
| **Guidelines:** WCAG 1.0 | **Assistance:** Generating Reports, Step-by-step evaluations |
| **Automatic checking:** Single pages | **Repair options:** Code modification |
| **Formats:** HTML, XHTML | **Browser:** Mozilla/Firefox |
| **Operating system:** Firefox | **License:** Free Software |
Online service: -

Reports:-

License: Free Software, Open Source

**HTMLValidator**

Mark up Validation Service

- Home
- About
- News
- Docs
- Help & FAQ
- Feedback

Result: Failed validation, 15 errors

File: upload/Form Submission

Encoding: utf-8

Doxtype: HTML 4.01 Transitional

**This page is not Valid HTML 4.01 Transitional!**

Below are the results of attempting to parse this document with an SGML parser.

1. **Error** Line 12 column 17, document type does not allow element "P" here, missing one of "APPLET", "OBJECT", "MAP", "IFRAME", "BUTTON" start-tag.

```html
&lt;font size="2"&gt;&lt;p&gt; abc&lt;/p&gt;&lt;/font&gt;
```

The mentioned element is not allowed to appear in the context in which you've placed it, the other mentioned elements are the only ones that are both allowed there and can contain the element mentioned. This might mean that you need a containing element, or possibly that you have forgotten to close a previous element.

One possible cause for this message is that you have attempted to put a block-level element inside a P element (i.e., an element such as "UL", "OL", "DIV", "TABLE", or "BLOCKQUOTE").

**Version 0.8.0**

Figure 38: HTML Validator for Firefox and Mozilla assessment tool overview.

**HTMLShlEx** [http://html.idena.jp/program/ShlEx.html](http://html.idena.jp/program/ShlEx.html)

**Wrong HTML, 1 February 2004**

**Description:** This tool is Windows shell extension for HTML Documents. After it is installed, a page's html file can be up-loaded to some validators from the right-click menu.

**Language:** Japanese

**Guidelines:** -

**Assistance:** -

**Automatic checking:** -
**IBM Rule-based Accessibility Validation Environment (RAVEn)**

(http://www.alphaworks.ibm.com/tech/raven)

IBM, 28 February 2007

**Description:** The IBM Rule-Based Accessibility Validation Environment (RAVEN) is an innovative suite of tools for inspecting Java and web rich-client graphical user interfaces (GUIs) and validating them for accessibility. Non-invasive techniques, like Aspect Oriented Programming (AOP), Introspection, and the Java Reflection API, are used to validate pre-existing GUIs at execution time rather than by examining source-code. This tool provides the ability to: Validate your static web content and some DHTML content for accessibility; Inspect and validate your Eclipse plug-in in the current Eclipse workbench; Inspect and validate your plug-in (and/or Eclipse itself) in an Eclipse workbench running in a separate JVM; Inspect and validate your Java application running in a separate JVM; Validate GUI components under development from the Java Perspective; Launch, test, and use RAVEN to validate Eclipse plug-ins from your development environment using the Runtime Workbench; Define your own validation rules via external XML files; Persist validation reports.

**Language:** English

**Guidelines:** -

**Assistance:** Generating Reports, Step-by-step evaluations

**Automatic checking:** Single pages

**Repair options:**-

**Formats:** HTML, XHTML

**Browser:**-

**Operating system:** Windows

**Online service:** -

**Reports:** -

**License:** Free Software

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**Illinois Accessible Web Publishing Wizard**

University of Illinois at Urbana/Champaign, 1 January 2005

**Description:** The Illinois Accessible Web Publishing Wizard for Microsoft® Office provides a simple way to create highly accessible and standards compliant web versions of Microsoft Office documents (Word, PowerPoint, Excel) that are more accessible and usable by everyone, including people with disabilities. The HTML generated by the Wizard supports everyone from legacy browsers and slow Internet connections to the needs of blind users with screen readers. The Wizard does this through the support of W3C XHTML, CSS, & Web Content Accessibility Guidelines (WCAG) and the US federal government's Section 508 accessibility requirements.

**Language:** English

**Guidelines:** -

**Assistance:** -
<table>
<thead>
<tr>
<th>Automatic checking:</th>
<th>Repair options: Word to HTML, Excel to HTML, Powerpoint to HTML</th>
</tr>
</thead>
<tbody>
<tr>
<td>Browser:</td>
<td>Operating system: Windows</td>
</tr>
<tr>
<td>Online service:</td>
<td>License: Trial or Demo, Commercial</td>
</tr>
</tbody>
</table>

**Image Analyser** ([http://juicystudio.com/services/image.php](http://juicystudio.com/services/image.php))
Juicy Studio, 14 July 2003

**Description:** This service examines all images found on a web page to check for any accessibility issues. The width, height, alt, and longdesc attributes are examined for appropriate values.

**Language:** English
**Guidelines:** WCAG 1.0
**Assistance:** Generating Reports

<table>
<thead>
<tr>
<th>Automatic checking:</th>
<th>Repair options:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formats:</td>
<td>HTML, XHTML</td>
</tr>
<tr>
<td>Browser:</td>
<td>Operating system:</td>
</tr>
<tr>
<td>Online service:</td>
<td>License: Free Software</td>
</tr>
</tbody>
</table>

**imergo®** ([http://imergo.com/home](http://imergo.com/home))
Fraunhofer Institute for Applied Information Technology (FIT), 1 October 2004

**Description:** imergo® is a standards compliance and quality assurance tool targeted to industrial Internet portals from the public and private sector. It offers: Reliable persistence backend: rules, evaluated documents and project configuration files are stored in a RDBMS database; Project management: project progress can be monitored in combination with the implemented reporting capabilities; Large scale validation of XML and (X)HTML documents for big Internet portals. The tool validates also CSS (Cascading Style Sheets); Powerful, flexible and configurable crawler; Identification of broken links; Easy implementation and configuration of evaluation rules, flexible composition of evaluation rule-sets; Integration into Content Management Systems.

**Language:** English, German, Spanish
**Guidelines:** WCAG 1.0, Section 508, BITV
**Assistance:** Generating Reports

<table>
<thead>
<tr>
<th>Automatic checking:</th>
<th>Repair options:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formats:</td>
<td>CSS, HTML, XHTML</td>
</tr>
<tr>
<td>Browser:</td>
<td>Operating system: Windows, MacOS, Linux</td>
</tr>
<tr>
<td>Online service:</td>
<td>Reports: HTML, XML, EARL</td>
</tr>
<tr>
<td>API interface:</td>
<td>License: Commercial, Enterprise</td>
</tr>
</tbody>
</table>
InFocus Desktop (https://www.ssbbartgroup.com/)
SSB & BART Group, 30 September 2002
Description: Accessibility testing software that assists in repairing content.
Language: English
Guidelines: WCAG 1.0, Section 508
Assistance: Generating Reports, Step-by-step evaluations
Automatic checking: Single pages
Formats: HTML
Browser:-
Operating system: Windows
Online service:-
Reports: HTML
License: Commercial

InFocus Enterprise (https://www.ssbbartgroup.com/amp/infocus.php)
SSB & BART Group, 30 September 2002
Description: InFocusT Enterprise is an automated web accessibility manager for
administrators and compliance managers. Its simple but powerful web client delivers
detailed reports for scheduled or on-demand tests.
Language: English
Guidelines: WCAG 1.0, Section 508
Assistance: Generating Reports, Step-by-step evaluations, In-page feedback
Automatic checking: Single pages, Page groups, Restricted pages
Formats: CSS, HTML, XHTML
Browser:-
Operating system: Windows, MacOS, Linux, Solaris
Online service: Server installation
Reports: HTML
License: Commercial, Enterprise

Kontrasttest (http://www.rohschnitt.de/drag_queen.htm)
23 April 2004
Description: Checks color difference and brightness difference according to
http://www.w3.org/TR/AERT#color-contrast. Colors adjustable with sliding
controllers (scroll bars). Can be used with both mouse and keyboard. Direct input of
hexadecimal values possible. Requires Javascript. Works with IE >= 5.0, IE Mac
(5.2), Geckos >= 1.02; Opera >= 7, Safari >= 1.2, Konqueror. German explanation,
but easy to understand without.
Language: German
Guidelines: WCAG 1.0, BITV
Assistance: In-page feedback
Automatic checking: -
Formats: -
Browser:-
Operating system: Windows, MacOS, Linux
Online service: Online checker
Reports:-
License: Open Source
Figure 39: Kontrasttest assessment tool overview.

LIFT (http://ncsu.edu/it/access/software/lift/index.php)
UsableNet, 8 December 2005
**Description:** This tool is an extended version of the freely available accessibility validator for Dreamweaver. It is an extremely comprehensive tool which will provide you with a means of making decisions about usability and accessibility. LIFT allows you to test the accessibility of your site and will prompt you on accessibility issues as you build your site. LIFT’s support is both thorough and descriptive providing explanations on the accessibility guidelines recommended. LIFT references a range of available standard guidelines, including WAI Web Content Accessibility Guidelines (WCAG 1.0). Therefore, before using LIFT it is useful to have an understanding of the accessibility guidelines which exist.

**Language:** English

**Guidelines:** WCAG 1.0, Section 508

**Assistance:** Generating Reports

**Automatic checking:** Single pages

**Repair options:**

**Formats:** HTML

**Browsers:**

**Operating system:** Windows, MacOS

**Online service:**

**Reports:**

**License:** Commercial

Lift For Front Page
### UsableNet, 8 December 2005
**Description:** Accessibility testing integrated with FrontPage.
**Language:** English
**Guidelines:** WCAG 1.0, Section 508
**Assistance:** Generating Reports
**Automatic checking:** Single pages
**Repair options:**
**Formats:** HTML
**Browsers:**
**Operating system:** Windows
**Online service:**
**Reports:**
**License:** Commercial

UsableNet, 8 December 2005
**Description:** LIFT Machine is a server-based application that automatically scans internal and external websites for over 140 quality, accessibility, and usability issues.
**Language:** English
**Guidelines:** WCAG 1.0, Section 508
**Assistance:** Generating Reports
**Automatic checking:** Single pages, Page groups, Restricted pages
**Repair options:**
**Formats:** HTML
**Browsers:**
**Operating system:** Linux, Solaris
**Online service:** Server installation
**License:** Commercial, Enterprise

### Lift Online ([http://www.usablenet.com/](http://www.usablenet.com/))
UsableNet, 8 December 2005
**Description:** Accessibility and Usability testing solution
**Language:** English
**Guidelines:** WCAG 1.0, Section 508
**Assistance:** Generating Reports
**Automatic checking:** Single pages
**Repair options:**
**Formats:** HTML
**Browsers:**
**Operating system:** Windows, MacOS, Linux, Solaris, BSD Unix
**Online service:** Hosted service
**Reports:** HTML
**License:** Commercial

UsableNet, 8 December 2005
**Description:** Creates a text equivalent of an HTML page.
**Language:** English
Guidelines:
Assistance: Page transformation
Automatic checking: -
Repair options: -
Formats: HTML, XHTML
Browsers: -
Operating system: MacOS, Linux, Solaris, BSD Unix
Online service: -
Reports: -
License: Commercial

Luminosity Contrast Ratio Analyser
(http://juicystudio.com/services/luminositycontrastratio.php)
Juicy Studio, 13 November 2005
Description: The Luminosity Contrast Ratio Analyser (Beta) enables allow foreground and background colour combinations to be tested against the suggested luminosity contrast ratio algorithm
(http://juicystudio.com/article/luminositycontrastratioalgorithm.php) being considered by the W3C for WCAG 2.0.
Language: English
Guidelines: WCAG 1.0
Assistance: Generating Reports, In-page feedback
Automatic checking: -
Repair options: -
Formats: -
Browsers: -
Operating system: -
Online service: Online checker
Reports: -
License: Free Software

Lynx Simulator
Infoaxia, 25 August 2004
Description: Lynx Simulator is an online free transformation tool which allows users to simulate a web page and see how it would look when rendering by a text browser Lynx. In terms of accessibility, you can use this simulator for checking accessibility aspects such as alternative text and reading order. You'll be able to find some critical issues without screen readers.
Language: Japanese
Guidelines: -
Assistance: Page transformation
Automatic checking: -
Repair options: -
Formats: HTML, XHTML
Browsers: -
Operating system: -
Online service: Online checker
Reports: -
License: Free Software
**Lynx Viewer**
DJ Delorie, 26 December 1999

**Description:** Lynx is a text-only Web browser. It is an excellent place to start when you begin analyzing a particular Web page. What Lynx will do is show you where alternative text is lacking. Wherever you see the word [Link], alt text needs to be added to an image. Another thing you will notice is the flow of the text. If the page can be read in a natural manner as Lynx displays it, you can be reasonably sure that Jaws will speak the page in much the same way. Go to the following Web site and type or paste your Web site address in the text field.

**Language:** English, French

**Guidelines:**
- **Assistance:** Page transformation
- **Automatic checking:** -
- **Repair options:** -
- **Formats:** -
- **Browsers:** -
- **Operating system:** -
- **Online service:** Online checker
- **Reports:** -

**License:** Free Software, Open Source

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**Media Access Generator (MAGpie)** ([http://ncam.wgbh.org/webaccess/magpie/](http://ncam.wgbh.org/webaccess/magpie/))
The Carl and Ruth Shapiro Family National Center for Accessible Media at WGBH, 21 June 2007

**Description:** MAGpie is a free JAVA-based application for creating captions and audio descriptions for QuickTime, Real, Flash (DFXP-format), and Windows Media content. MAGpie is available for use on both the Windows and Mac OS X platforms.

**Language:** English

**Guidelines:**
- **Assistance:** -
- **Automatic checking:** -
- **Repair options:** Captioning
- **Formats:** -
- **Browsers:** -
- **Operating system:** Windows, MacOS
- **Online service:** -
- **Reports:** -

**License:** Free Software

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**Mozilla/Firefox Accessibility Extension** ([http://firefox.cita.uiuc.edu/index.php](http://firefox.cita.uiuc.edu/index.php))
University of Illinois at Urbana/Champaign, 25 November 2005

**Description:** The Mozilla/Firefox Accessibility Extension adds features to Mozilla or Firefox to make it easier for people with disabilities to view and navigate web content based on the structural markup used to create the web page. The Mozilla/Firefox accessibility extension can be used directly by everyone to navigate the structure of a HTML web resource. It can be used by authors to check their structural markup to make sure it matches the actual content structure of the resource.

**Language:** English, Spanish
**Guidelines:** WCAG 1.0, Section 508  
**Assistance:** In-page feedback, Page transformation.  
**Automatic checking:** -  
**Repair options:** -  
**Formats:** HTML, XHTML  
**Browser:** Mozilla/Firefox  
**Operating system:** -  
**Online service:** -  
**Reports:** -  
**License:** Free Software, Open Source

**NetMechanic** ([http://www.netmechanic.com/](http://www.netmechanic.com/))  
**Keynote NetMechanic**  
**Description:** Using Keynote NetMechanic services you can improve the functional integrity of your Web site and optimize your site to be reached by more potential customers.  
**Language:** English  
**Guidelines:** -  
**Assistance:** Page transformation  
**Automatic checking:** -  
**Repair options:** -  
**Formats:** HTML  
**Browser:** -  
**Operating system:** -  
**Online service:** Online checker  
**Reports:** HTML  
**License:** -

**NIST, 1 February 2003**  
**Description:** Usability and accessibility testing tools for websites: Web Static Analyzer Tool (WebSAT) - checks HTML against typical usability guidelines. Web Category Analysis Tool (WebCAT) - helps a usability engineer with web category analysis/card sort, Web Variable Instrumenter Program (WebVIP) instruments a website to log of user interaction, Framework for Logging Usability Data (FLUD) - a file format and parser for representation of user interaction logs, FLUDViz - produces a 2D visualization of a single user session, VisVIP - produces a 3D visualization of user navigation paths, TreeDec - adds navigation aids to website pages. Note: WebMetrics project is no longer actively supported.  
**Language:** English  
**Guidelines:** -  
**Assistance:** Generating Reports  
**Automatic checking:** Single pages  
**Repair options:** -  
**Formats:** HTML  
**Browser:** Internet Explorer, Mozilla/Firefox  
**Operating system:** Windows, Linux  
**Online service:** -  
**Reports:** -  
**License:** Open Source
**Ocawa** (http://www.ocawa.com/en/Test-your-Web-Site.htm)  
Urbilog/France-Telecom, 1 October 2002  
**Description:** Ocawa runs accessibility tests based on the W3C Web Content Accessibility Guidelines using a built-in expert system. The Ocawa website offers free single or multiple page site audits with output reports indicating all inaccessible aspects of a page via precise highlighting of the page source. For large clients and intranet facilities, an Ocawa Server can be installed for unlimited testing. Shortly, a new version of Ocawa (V2.5) will display the French ADAE rules or the WAI rules more explicitly in the reports. Ocawa was developed by Urbilog and France Telecom R & D.  
**Language:** English, French  
**Guidelines:** WCAG 1.0  
**Assistance:** Generating Reports, In-page feedback  
**Automatic checking:** Single pages, Page groups  
**Repair options:** -  
**Formats:** HTML  
**Browser:** -  
**Operating system:** -  
**Online service:** Online checker, Hosted service, Server installation  
**Reports:** HTML  
**License:** Trial or Demo, Commercial

**Office 2000 HTML Filter**  
Microsoft, 1 January 2000  
**Description:** The Office HTML Filter is a tool you can use to remove Office-specific markup tags embedded in Office 2000 documents saved as Hypertext Markup Language (HTML). Once you have completed editing an HTML document in Word 2000 or Excel 2000, you can use the Office HTML Filter to remove the Office-specific markup tags from the final copy of the HTML document. Features of V2.0 include: control over which types of markup tags are removed; export a cascading style sheet file based on a Word 2000 document; copy any fragment of a Word document as HTML.  
**Language:** English  
**Guidelines:** -  
**Assistance:** -  
**Automatic checking:** -  
**Repair options:** Word to HTML  
**Formats:** HTML  
**Browser:** -  
**Online service:** -  
**Reports:** -  
**License:** Free Software

**Page Valet** (http://valet.webthing.com/page/)  
WebThing Ltd  
**Description:** Formal validation of HTML and XML, based on an Apache module (available under the GPL). Choice of report formats including cross-referencing errors
to the code. Backend parsers supported are OpenSP (SGML/HTML, the same as the W3C validator) and Xerces (offering full XML support).

**Language:** English

**Guidelines:**

**Assistance:** Generating Reports

**Automatic checking:** Single pages, Restricted pages

**Repair options:**

**Formats:** HTML, XHTML, SMIL, SVG

**Browser:**

**Operating system:**

**Online service:** Online checker, Server installation

**Reports:** HTML, XML, EARL

**License:** Free Software, Open Source

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**PEAT - Photosensitive Epilepsy Analysis Tool** ([http://trace.wisc.edu/peat/](http://trace.wisc.edu/peat/))

Trace R & D Center, University of Wisconsin-Madison, 13 April 2006

**Description:** Photosensitive Epilepsy Analysis Tool (PEAT) is a free, downloadable tool, available from the Trace Center at the University of Wisconsin-Madison that allows web content to be tested for compliance with these guidelines. The tool creates a recording of a computer monitor as you use it. With this screen capture as input, PEAT conducts luminance flash and red flash evaluations to determine risk of seizure-provoking content. The analysis uses algorithms developed specifically for web and computer applications by the Trace Center, Dr. Graham Harding, and Cambridge Research Systems working together, and is based on Dr. Harding’s extensive research on photosensitive seizure disorders.

**Language:** English

**Guidelines:**

**Assistance:** Generating Reports

**Automatic checking:** Single pages

**Operating system:** Windows

**Repair options:**

**Formats:**

**Browser:**

**Operating system:**

**Online service:**

**Reports:**

**License:** Free Software
Figure 40: PEAT assessment tool overview.


Peter Krantz, 9 September 2005

**Description:** A simple tool where you can calculate a readability index score for a text of your choice. The calculator uses the following formulas: English: Flesch-Kincaid reading ease and grade level; Spanish: Fernandez Huerta; French: Kandel & Moles; Swedish, Danish: LIX.

**Language:** Danish, Dutch, English, French, Spanish

**Guidelines:** WCAG 1.0, Section 508

**Assistance:** Generating Reports, Step-by-step evaluations, In-page feedback

**Automatic checking:** Single pages
Readability index calculator
Paste your sample text in the field below. A longer text provides a more accurate measurement. Select measurement method and click 'calculate score' to see the score for your text. The result is displayed below the form.

Do you have a readability formula for a different language? Please post an article comment and I'll add it here.

* Text:

Method: Flesch-Kincaid (English)

Calculate score

Figure 41: Readability index calculator assessment tool overview

Readability Test (http://juicystudio.com/services/luminositycontrastratio.php)
Juicy Studio, 20 January 2003
Description: The Readability Test uses the Gunning Fog, Flesch Reading Ease, and Flesch-Kincaid reading level algorithms to help you determine how readable your content is. Reading level algorithms only provide a rough guide, as they tend to reward short sentences made up of short words. However, they can give a useful indication as to whether you've pitched your content at the right level for your intended audience.
Language: English
Guidelines: WCAG 1.0
Assistance: Generating Reports, In-page feedback
Automatic checking: -
Repair tools: -
Formats: XHTML
Browsers: -
Operating system: -
Online service: Online checker
Reports: -
License: Free Software

Reading Effectiveness Tool
(http://www.eastendliteracy.on.ca/clearlanguageanddesign/readingeffectivenessstool/)
Clear Language and Design (CLAD)
Description: The tool helps to to find out if a draft manuscript is at the right Grade Reading Level for the intended audience, by asking a series of questions. It is based on the Simple Measure Of Gobbledygook (SMOG) readability formula.
Language: English
Guidelines:-
Assistance: Generating Reports
Automatic checking: -
Repair tools:-
Online service: Online checker
Formats:-
Browsers:-
Operating system: -
Online service:-
Reports: HTML
License:-

Reading Level Calculator
Linda Wasmer Andrews
Description: The Reading Level Calculator is a web tool based on the SMOG readability formula. This form relies on client-side scripting to calculate the reading level.
Language: English
Guidelines:-
Assistance: Generating Reports
Automatic checking: -
Repair tools:-
Online service: Online checker
Formats:-
Browsers:-
Operating system: -
Online service:-
Reports: HTML
License:-

Relaxed HTML Validator
Petr Nlevka, 8 December 2005
Description: "Relaxed" is an easy to use HTML validator implementation which doesn't use the official W3C DTD's. It rather validates HTML documents using it's own schema definitions written in Relax NG with embedded Schematron patterns. This is an extremely expressive combination of languages which enables validation of additional restrictions which can not be expressed using DTD. This includes most restrictions specified in the W3C HTML 4.01 and the W3C XHTML 1.0
recommendation and some restrictions from WAI WCAG 1.0 Guidelines. "Relaxed" features also basic support for compound documents validation e.g. XHTML1.0+SVG1.1, XHTML1.0+MathML2.0 and XHTML1.0+MathML2.0+SVG1.1.

**Language:** English  
**Guidelines:** WCAG 1.0  
**Assistance:** Generating Reports  
**Automatic checking:** -  
**Repair tools:** -  
**Online service:** -  
**Formats:** HTML, XHTML, SVG  
**Browsers:** -  
**Operating system:** -  
**Online service:** Online checker  
**Reports:** XML  
**License:** Open Source

**Sheriff Accessibility Module**  
(http://www.hisoftware.com/products/compliancesheriffoverview.htm)  
HiSoftware, 1 January 2005  
**Description:** HiSoftware Compliance Sheriff™ provides a complete suite of solutions that enable you to create and manage corporate Web standards for accessibility, privacy, security, search engine optimization (SEO), site quality and performance, branding, competitive intelligence and application transaction testing (AppTest).  
**Language:** English  
**Guidelines:** WCAG 1.0, Section 508  
**Assistance:** Generating Reports, Step-by-step evaluations, In-page feedback, Page transformation  
**Automatic checking:** Single pages, Page groups, Restricted pages  
**Repair options:** Code modification  
**Online service:** -  
**Formats:** CSS, HTML, XHTML, PDF, SVG  
**Browsers:** -  
**Online service:** Server installation  
**Operating system:** Windows  
**Reports:** HTML, XML, EARL, CSV  
**License:** Commercial, Enterprise
Silvinha - Accessibility Validator and Repair Tool (http://www.dasilva.org.br/)
Acessibilidade Brasil, 17 August 2006

Description: The Silvinha software is a powerful multiplatform tool that checks accessibility of your HTML/XHTML pages using the W3C-WAI (WCAG) and e-GOV (Brazilian government accessibility rules for web) conformance. It can be installed inside any corporation network and able to perform full web server scan (any pages, groups of pages, full domains and tree level access) indicating errors that must be corrected and warnings which should be avoided. It also offers the fix and repair tool option (automatic and manual when the interference of the user is needed, ex. image alternative text) for all evaluated pages. Silvinha provides web updates (the user must have an internet connection) and full support during the period of one year, which can be extended for all our customers. We are upgrading the Silvinha tool to validate not only WCAG1 but as soon as possible, the next release of WCAG2(2006).

Language: Brazilian Portuguese, English, French

Guidelines: WCAG 1.0

Assistance: Generating Reports, Step-by-step evaluations, In-page feedback, Page transformation

Automatic checking: Single pages, Page groups, Restricted pages

Repair options: Code modification

Formats: HTML, XHTML

Browsers: -

Operating system: Windows, MacOS, Linux, Solaris, BSD Unix

Online service: -

Figure 42: Sheriff Accessibility Module features overview.
| **Site Valet** ([http://valet.webthing.com/2.0/](http://valet.webthing.com/2.0/))  
WebThing Ltd  
**Description:** Spiders sites checking validity, accessibility, metadata and link integrity, saving results to a SQL database. Incorporates monitoring, change detection, and audit trail. Supports a wide range of reports: on the spot analysis, database queries, and historical, in detailed (developer) and executive summary (management) formats.  
**Language:** English  
**Guidelines:** WCAG 1.0, Section 508  
**Assistance:** Generating Reports, Step-by-step evaluations  
**Automatic checking:** Single pages, Page groups, Restricted pages  
**Repair options:**  
**Formats:** HTML, XHTML  
**Browsers:**  
**Operating system:**  
**Online service:** Server installation  
**Reports:** HTML, XML, EARL  
**License:** Commercial, Enterprise |

| **SiteCheck** ([http://siteimprove.com/](http://siteimprove.com/))  
Siteimprove  
**Description:** SiteCheck checks your entire site for errors in such areas as spelling, linking and accessibility. SiteCheck provides clear indications of why and where issues occur, and clear recommendations on how to fix them.  
**Language:** Danish, English  
**Guidelines:** WCAG 1.0, Section 508  
**Assistance:** Generating Reports, Step-by-step evaluations, In-page feedback  
**Automatic checking:** Page groups  
**Repair options:**  
**Formats:** HTML, XHTML, Images  
**Browsers:**  
**Operating system:**  
**Online service:** Hosted service  
**Reports:** HTML, PDF  
**License:** Trial or Demo, Commercial |

| **SiteMorse** ([http://www.sitemorse.com/](http://www.sitemorse.com/))  
SiteMorse  
**Description:** SiteMorse offers a range of website testing services that require no setup, downloads or technical support to operate. SiteMorse measures performance, tests functions and checks compliance with web standards and accessibility. The service may be used as and when required, scheduled weekly/monthly, or used as a monitoring system running every few minutes 24/7.  
**Language:** English  
**Guidelines:** WCAG 1.0  
**Assistance:** Generating Reports |
**Automatic checking:** Single pages, Page groups, Restricted pages

**Repair options:**

**Formats:** HTML, XHTML

**Browsers:**

**Operating system:**

**Online service:** Online checker, Hosted service

**Reports:** HTML

**License:** Trial or Demo, Commercial, Enterprise

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Electrum, 14 January 2008

**Description:** SortSite checks entire sites for accessibility, usability, standards compliance, and quality issues. It's simple to use: just type in a URL and click Check. In addition to WCAG 1.0 and Section 508 accessibility, the tool also checks for usability; broken links and anchors; HTML and CSS validation; browser compatibility; and search engine guideline violations.

**Language:** English

**Guidelines:** WCAG 1.0, Section 508

**Assistance:** Generating Reports, In-page feedback

**Automatic checking:** Single pages, Page groups, Restricted pages

**Repair options:**

**Formats:** CSS, HTML, XHTML, PDF, Images

**Browsers:**

**Operating system:** Windows

**Online service:** Server installation

**Reports:** HTML, XML

**License:** Trial or Demo, Commercial

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**Style and Diction** ([http://www.gnu.org/software/diction/diction.html](http://www.gnu.org/software/diction/diction.html))

Michael Haardt, 30 November 2005

**Description:** Diction identifies wordy and commonly misused phrases. Style analyses surface characteristics of a document, including sentence length and other readability measures.

**Language:** English, German

**Guidelines:**

**Assistance:**

**Automatic checking:**

**Repair options:**

**Formats:**

**Browsers:**

**Operating system:** Linux, Solaris, BSD Unix

**Online service:**

**Reports:**

**License:** Free Software, Open Source

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**SWAP** ([http://www.ubaccess.com/swap.html](http://www.ubaccess.com/swap.html))

UB Access, 30 October 2004

**Description:** The SWAP Wizard - a next-generation turnkey technology enabling Website owners to quickly, efficiently and affordably ensure that their Websites are
seamlessly accessible to the disabled community, to users of PDAs and other mobile devices. SWAP employs advanced technology with features and functionality available in no other accessibility package. Yet SWAP requires no prior knowledge of disabled-access issues. SWAP is also available in an Enterprise version.

**Language:** English  
**Guidelines:** WCAG 1.0, Section 508  
**Assistance:** Step-by-step evaluations, In-page feedback, Page transformation  
**Automatic checking:** Single pages  
**Repair options:** Code modification  
**Formats:** CSS, HTML, XHTML, PDF, SVG  
**Browsers:** Internet Explorer  
**Operating system:** Windows, Linux  
**Online service:** -  
**Reports:** -  
**License:** Commercial

Juicy Studio, 18 January 2005  
**Description:** Table Inspector is a Mozilla - Firefox extension to reveal the hidden accessibility features of data tables, such as summary, headers, axis, scope, and abbr.  
**Language:** English  
**Guidelines:** WCAG 1.0  
**Assistance:** In-page feedback, Page transformation  
**Automatic checking:** -  
**Repair options:** -  
**Formats:** HTML, XHTML  
**Browser:** Mozilla/Firefox  
**Operating system:** -  
**Online service:** -  
**Reports:** -  
**License:** Free Software

**Tablin** ([http://www.w3.org/WAI/Resources/Tablin/](http://www.w3.org/WAI/Resources/Tablin/))  
W3C, 7 September 2000  
**Description:** Tablin is a filter program that can linearize HTML tables and render them accordingly to preferences set by the presentation layer (e.g. the screen reader end-user).  
**Language:** English  
**Guidelines:** -  
**Assistance:** In-page feedback  
**Automatic checking:** Single pages  
**Repair options:** Code modification  
**Formats:** HTML  
**Browser:** -  
**Operating system:** -  
**Online service:** Online checker  
**Reports:** HTML  
**License:** -
**TAW Online** (http://www.tawdis.net/taw3/cms/en)
Fundación CTIC, 17 November 2005
**Description:** TAW (Web Accessibility Test) is an online tool for the accessibility analysis of Web sites based on the W3C Web Content Accessibility Guidelines 1.0 (WCAG 1.0), which provides a useful in-page feedback. Its goal is to analyse the level of accessibility in the design and development of Web pages to allow access for all, regardless of their specific characteristics.
**Language:** English, Spanish
**Guidelines:** WCAG 1.0
**Assistance:** Generating Reports, In-page feedback
**Automatic checking:** Single pages
**Repair options:**
**Formats:** HTML, XHTML
**Browser:**
**Operating system:**
**Online service:** Online checker
**Reports:** HTML
**License:** Free Software

**TAW Standalone** (http://www.tawdis.net/taw3/cms/en)
Fundación CTIC, 17 November 2005
**Description:** This downloadable version of TAW is a multiplatform desktop software that complements and extends the functionality of TAW Online analyser performing several automatic tests and guiding users through those checks that require human judgement and must be evaluated manually. It follows the links of HTML documents so that it allows to examine a single page or the whole Web site. It is also possible to select the checkpoints to be verified and to create customized rules. Additionally, the tool can generate different types of test result reports.
**Language:** English, Spanish
**Guidelines:** WCAG 1.0
**Assistance:** Generating Reports, In-page feedback, Page transformation
**Automatic checking:** Single pages, Page groups, Restricted pages
**Repair options:**
**Formats:** HTML, XHTML
**Browser:**
**Operating system:** Windows, MacOS, Linux, Solaris, BSD Unix
**Online service:**
**Reports:** HTML, EARL
**License:** Free Software

**TAW with a click** (https://addons.mozilla.org/en-US/firefox/addon/1158?id=1158&application=firefox)
Fundación CTIC, 30 November 2005
**Description:** 'TAW with a click' is a Firefox extension that once installed will display an icon on your browser's status bar allowing you, by clicking the icon, to easily and quickly verify the accessibility of the Web sites visited, based in the W3C Web Content Accessibility Guidelines (WCAG 1.0), by means of the TAW Online service (www.tawdis.net).
**Language:** English, Spanish
**Guidelines:** WCAG 1.0

Dave Raggett, 26 October 2005

**Description:** A quorum of developers have pitched in on a SourceForge project to maintain and further develop Dave Raggett’s excellent HTML Tidy program. We have two primary goals. First, to provide a home where all the patches and fixes that folks contribute can be collected and incorporated into the program. Second, a library form of Tidy has been created to make it easier to incorporate Tidy into other software.

**Language:** English

**Guidelines:** WCAG 1.0

**Assistance:**

**Automatic checking:** Single pages

**Repair options:**

**Formats:** HTML, XHTML

**Browser:** Mozilla/Firefox

**Operating system:** -

**Online service:** -

**Reports:** HTML

**License:** Free Software

---

**Wrong HTML**

30 March 2004

**Description:** This tool is Japanese GUI front-end for HTML Tidy. In addition, this tool has some functions for confirmation of the HTML document.

**Language:** Japanese

**Guidelines:**

**Assistance:**

**Automatic checking:** Single pages

**Repair options:**

**Formats:** HTML, XHTML

**Browser:** -

**Operating system:** Windows

**Online service:** -

**Reports:** -

**License:** Free Software

---

**Torquemada** ([http://www.webxtutti.it/testa.htm](http://www.webxtutti.it/testa.htm))

Fondazione Ugo Bordoni, 30 May 2002

**Description:** Torquemada offers to website developers a complete methodology for accessibility analysis which uses a tool for page checking that makes it possible to...
quickly identify which parts of a page are in error and the HTML code corresponding to these parts.

**Language:** English, Italian  
**Guidelines:** WCAG 1.0  
**Assistance:** Generating Reports, In-page feedback  
**Automatic checking:** Single pages  
**Repair options:**  
**Formats:** CSS, HTML, XHTML  
**Browser:**  
**Operating system:**  
**Online service:** Online checker  
**Reports:** HTML  
**License:**

---

**Total Validator** ([http://www.totalvalidator.com/](http://www.totalvalidator.com/))  
Total Validator, 10 May 2005  
**Description:** Total Validator is a 5-in-1 validation tool, comprising of a HTML validator, an accessibility validator (WCAG and US508), a spell checker, a broken link checker, and the ability to take screenshots with different browsers on different platforms.  
**Language:** English  
**Guidelines:** WCAG 1.0, Section 508  
**Assistance:** In-page feedback  
**Automatic checking:** Single pages, Page groups, Restricted pages  
**Repair options:**  
**Formats:** HTML, XHTML  
**Browser:** Mozilla/Firefox  
**Operating system:** Windows, MacOS, Linux  
**Online service:** Online checker  
**Reports:** HTML  
**License:** Free Software, Commercial

---

**Truwex 2.0** ([http://www.erigami.com/truwex/](http://www.erigami.com/truwex/))  
Erigami, 30 August 2007  
**Description:** Truwex is a server application with a web interface. It is dedicated to web development teams and to corporate compliance managers. Truwex can be deployed on an individual computer, on a server, or rented as a hosted solution. Truwex is the only web quality management tool which uses a real instance of Internet Explorer to scan every page of a website automatically. Truwex shows detected issues on a web page screenshot and in the HTML code. Truwex validates web accessibility, privacy, quality.  
**Language:** English  
**Guidelines:** WCAG 1.0, Section 508  
**Assistance:** Generating Reports, Step-by-step evaluations, In-page feedback  
**Automatic checking:** Single pages, Page groups, Restricted pages  
**Repair options:**  
**Formats:** HTML, XHTML, Images  
**Browser:**  
**Operating system:** Windows  
**Online service:** Hosted service, Server installation
**Reports:** HTML
**License:** Trial or Demo, Commercial, Enterprise

<table>
<thead>
<tr>
<th>Uaw (<a href="http://www.sidar.org/uaw/">http://www.sidar.org/uaw/</a>)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fundación Sidar / Mireia Ribera Turró, 1 July 2005</td>
</tr>
<tr>
<td><strong>Description:</strong> A java tool incorporating the functionality of Tidy, and converting framesets to CSS-based layout. Uaw was developed by Mireia Ribera Turró. The system is written in Java and is available for adaptation under the GPL open-source license.</td>
</tr>
<tr>
<td><strong>Language:</strong> Spanish</td>
</tr>
<tr>
<td><strong>Guidelines:</strong></td>
</tr>
<tr>
<td>- <strong>Assistance:</strong> Generating Reports, Page transformation</td>
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<tr>
<td>- <strong>Automatic checking:</strong> Single pages</td>
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<tr>
<td>- <strong>Repair options:</strong> Code modification</td>
</tr>
<tr>
<td>- <strong>Formats:</strong> CSS, HTML, XHTML</td>
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<td>- <strong>Browser:</strong></td>
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<td>- <strong>Operating system:</strong> Windows, MacOS, Linux, Solaris, BSD Unix</td>
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<td>- <strong>Online service:</strong></td>
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<tr>
<td>- <strong>Reports:</strong> HTML</td>
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<tr>
<td>- <strong>License:</strong> Free Software, Open Source</td>
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</table>

<table>
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<tr>
<th>W3C CSS Validation Service (<a href="http://jigsaw.w3.org/css-validator/about.html">http://jigsaw.w3.org/css-validator/about.html</a>)</th>
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</thead>
<tbody>
<tr>
<td>W3C</td>
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<tr>
<td><strong>Description:</strong> W3C CSS Validation Service is a free service that checks Cascading Style Sheets (CSS) in (X)HTML documents or standalone for conformance to W3C recommendations.</td>
</tr>
<tr>
<td><strong>Language:</strong> English</td>
</tr>
<tr>
<td><strong>Guidelines:</strong></td>
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<tr>
<td>- <strong>Assistance:</strong> Generating Reports</td>
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<td>- <strong>Automatic checking:</strong> Single pages</td>
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<td>- <strong>Repair options:</strong></td>
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<td>- <strong>Browser:</strong></td>
</tr>
<tr>
<td>- <strong>Operating system:</strong></td>
</tr>
<tr>
<td>- <strong>Online service:</strong> Online checker</td>
</tr>
<tr>
<td>- <strong>Reports:</strong> HTML</td>
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<tr>
<td>- <strong>License:</strong></td>
</tr>
</tbody>
</table>

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<thead>
<tr>
<th>W3C Markup Validation Service (<a href="http://validator.w3.org/">http://validator.w3.org/</a>)</th>
</tr>
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<tr>
<td>W3C, 20 February 2006</td>
</tr>
<tr>
<td><strong>Description:</strong> a free service that checks Web documents in formats like HTML and XHTML for conformance to W3C Recommendations and other standards.</td>
</tr>
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<td><strong>Language:</strong> English</td>
</tr>
<tr>
<td><strong>Guidelines:</strong></td>
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<td>- <strong>Formats:</strong> HTML, XHTML</td>
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<td>Online service:</td>
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<td>Reports:</td>
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<td>License:</td>
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</table>

**WAEX online** ([http://www.it.uc3m.es/vlc/waex.html](http://www.it.uc3m.es/vlc/waex.html))

Vicente Luque-Centeno, 19 April 2006

**Description:** WAEX is a Web Accessibility Evaluator in a single XSLT file. Such XSLT file can be applied (with any XSLT platform) to generate accessibility reports. These reports also include constraint evaluation of the XHTML specification not expressed/expressible in the DTD/Schema of XHTML.

**Language:** English

**Guidelines:** WCAG 1.0

**Assistance:** Generating Reports

**Automatic checking:** Single pages

**Repair options:**

**Formats:** HTML, XHTML

**Browser:**

**Operating system:**

**Online service:** Online checker

**Reports:** HTML, XML, EARL

**License:** Free Software, Open Source

---

**WAEX standalone** ([http://www.it.uc3m.es/vlc/waex.html](http://www.it.uc3m.es/vlc/waex.html))

Vicente Luque-Centeno, 19 April 2006

**Description:** WAEX is a Web Accessibility Evaluator in a single XSLT file. Such XSLT file can be applied (with any XSLT platform) to generate accessibility reports. These reports also include constraint evaluation of the XHTML specification not expressed/expressible in the DTD/Schema of XHTML.

**Language:** English

**Guidelines:** WCAG 1.0

**Assistance:** Generating Reports

**Automatic checking:** Single pages

**Repair options:**

**Formats:** XHTML

**Browser:**

**Operating system:** Windows, MacOS, Linux, Solaris, BSD Unix

**Online service:** Online checker, Hosted service, Server installation

---

**Figure 43:** WAEX Accessibility Module features overview.
**WAhelper**
Brailcom, o.p.s., 11 January 2006
**Description:** WAhelper is a set of free software extensible tools for semiautomated checking of the accessibility features of web pages. It consists of an independent software library and an web based user interface for testing and making reports on web accessibility and managing web accessibility testing projects.
**Language:** English
**Guidelines:** WCAG 1.0, Section 508
**Assistance:** Generating Reports, Step-by-step evaluations
**Automatic checking:** Single pages, Page groups
**Repair options:**
**Formats:** CSS, HTML, XHTML
**Browser:**
**Operating system:**
**Online service:** Online checker, Hosted service, Server installation
**Reports:** HTML
**License:** Free Software, Open Source

**Wave** ([http://wave.webaim.org/](http://wave.webaim.org/))
WebAIM
**Description:** WAVE exposes errors and highlights content where accessibility considerations require human judgement (e.g. WAVE exposes alt text so a human evaluator can determine whether it is appropriate for the image). Icons are used as feedback elements within the web page being evaluated.
**Language:** English
**Guidelines:** WCAG 1.0, Section 508
**Assistance:** In-page feedback
**Automatic checking:** Single pages
**Repair options:**
**Formats:** CSS, HTML, XHTML
**Browser:** Internet Explorer, Mozilla/Firefox, Netscape
**Operating system:**
**Online service:** Online checker, Server installation
**Reports:** HTML, XML, EARL
**License:** Free Software, Open Source

Liam Quinn, 1 January 2005
**Description:** The WDG HTML Validator validates against W3C HTML DTD's. Own DTDs to support non-standard HTML features can be added such as the EMBED element or the LEFTMARGIN attribute on BODY.
**Language:** English, French
**Guidelines:**
**Assistance:** Generating Reports
**Automatic checking:**
Repair options:-
Formats: HTML
Browser:-
Operating system: Linux, Solaris, BSD Unix
Online service: Online checker
Reports:-
License: Open Source

Web Accessibility Inspector
(http://www.fujitsu.com/global/accessibility/assistance/wi/)
Fujitsu Limited, 18 January 2008
Description: Web Accessibility Inspector can determine whether your website can be
easily viewed by the elderly and those with visual impairments. The criteria of Web
Accessibility Inspector are based on W3C WCAG 1.0 and Fujitsu Web Accessibility
Guidelines. It can evaluate not just HTML but also CSS (Cascading Style Sheets), and
enables to diagnose at a high level of precision, including text size, line spacing, and
the color of texts and backgrounds. This software was awarded the universal design
award 08. The name of a Japanese version is WebInspector.
Language: Chinese (Simplified), English, Korean
Guidelines: WCAG 1.0, Section 508
Assistance: Generating Reports
Automatic checking: Single pages, Page groups
Repair options:-
Formats: CSS, HTML, XHTML
Browser:-
Operating system: Windows, MacOS
Online service:-
Reports: HTML, CSV
License: Free Software

Figure 44: Web Accessibility Inspector Accessibility Module features overview.
Web Accessibility Self-Evaluation Tool
(http://www.techdis.ac.uk/index.php?p=3_6_20051905120529)
TechDis, 23 May 2005

Description: This simple web accessibility self-evaluation tool has been designed to provide website developers with a simple and pragmatic step-by-step approach to conducting an internal or self-evaluation. This tool is suitable for use with institutional websites, personal academic homepages and other information sites. However, this tool is not suitable on its own as a tool for the evaluation of e-learning or e-resource material. This tool has been designed to provide developers with a simple holistic overview of the accessibility of a website. The tool takes advantage of free online automatic evaluation tools, heuristic evaluation methods (where the reviewer is required to evaluate a site against a guideline or principle), and takes a methodical approach to identifying potential issues.

Language: English
Guidelines: WCAG 1.0
Assistance: Step-by-step evaluations
Automatic checking: -
Repair options:-
Formats: -
Browser:-
Operating system: -
Online service:-
Reports: -
License: Free Software

Web Accessibility Toolbar (http://www.visionaustralia.org.au/ais/toolbar/)
Vision Australia & WAT-C, 27 October 2005

Description: The Web Accessibility Toolbar has been developed to aid manual examination of web pages for a variety of aspects of accessibility. It consists of a range of functions that: identify components of a web page, facilitate the use of 3rd party online applications, simulate user experiences and provide links to references and additional resources.

Language: Chinese (Simplified), Chinese (Traditional), Danish, Dutch, English, French, German, Italian, Japanese, Korean, Spanish
Guidelines: WCAG 1.0, Section 508, BITV
Assistance: Generating Reports, Page transformation
Automatic checking: Single pages
Repair options:-
Formats: CSS, HTML, XHTML
Browser: Internet Explorer
Operating system: -
Online service:-
Reports: HTML
License: Free Software

Figure 45: Web Accessibility Toolbar for Internet explorer overview.
**Web Accessibility Toolbar [For Opera]**
(http://www.paciellogroup.com/resources/wat-about.html)
Web Accessibility Tools Consortium, 15 December 2006

**Description:** The Web Accessibility Toolbar has been developed to aid manual examination of web pages for a variety of aspects of accessibility. It consists of a range of functions that: 1. identify components of a web page; 2. facilitate the use of 3rd party online applications; 3. provide links to references and additional resources.

**Language:** English

**Guidelines:** WCAG 1.0, Section 508

**Assistance:** Generating Reports, In-page feedback, Page transformation

**Automatic checking:** Single pages

**Repair options:**

**Formats:** CSS, HTML, XHTML

**Browser:** Opera

**Operating system:**

**Online service:**

**Reports:** HTML

**License:** Free Software, Open Source

![Web Accessibility Toolbar](image)

**Figure 46:** Web Accessibility Toolbar for Opera, overview.

---

**Web Accessibility Toolbox**
(http://www.infoaxia.com/tools/iawat/index.html)
Infoaxia, 2 March 2005

**Description:** Web Accessibility Toolbox is a free toolbar for Firefox which allows users to do manual examination of web pages for a variety of aspects of accessibility. You can select multiple checkpoints as you want and check a web page with the selected checkpoints at the same time.

**Language:** Japanese

**Guidelines:** WCAG 1.0, JIS

**Assistance:** In-page feedback, Page transformation

**Automatic checking:** Single pages

**Repair options:**

**Formats:** CSS, HTML, XHTML

**Browser:** Mozilla/Firefox

**Operating system:**

**Online service:**

**Reports:**

**License:** Free Software

---

**Web Compliance Manager**
(http://websolutions.opentext.com/enterprise-content-management-web-compliance.htm)
RedDot Solutions AG, 1 October 2004

**Description:** Web Compliance Manager is a product licensing imergo® technologies available as a stand-alone product, or integrated within RedDot's ECMS, which offers as well: Reliable persistence backend: rules, evaluated documents and project configuration files are stored in a RDBMS database; Project management: project
progress can be monitored in combination with the implemented reporting capabilities; Large scale validation of XML and (X)HTML documents for big Internet portals. The tool validates also CSS (Cascading Style Sheets); Powerful, flexible and configurable crawler; Identification of broken links; Easy implementation and configuration of evaluation rules, flexible composition of evaluation rule-sets.

**Language:** English, German, Spanish  
**Guidelines:** WCAG 1.0, Section 508, BITV  
**Assistance:** Generating Reports  
**Automatic checking:** Single pages, Page groups, Restricted pages  
**Repair options:**  
**Formats:** CSS, HTML, XHTML  
**Browser:**  
**Operating system:** Windows, MacOS, Linux  
**Online service:**  
**Reports:** HTML, XML, EARL  
**License:** Commercial, Enterprise

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**Web Developer Extension** (http://chrispederick.com/work/web-developer/)  
Chris Pederick, 31 January 2006  
**Description:** The Web Developer extension adds a menu and a toolbar to the browser with various web developer tools. It is designed for Firefox, Flock, Mozilla and Seamonkey, and will run on any platform that these browsers support including Windows, Mac OS X and Linux.  
**Language:** English  
**Guidelines:** WCAG 1.0, Section 508  
**Assistance:** Generating Reports, In-page feedback, Page transformation  
**Automatic checking:**  
**Repair options:**  
**Formats:** CSS, HTML, XHTML  
**Browser:** Mozilla/Firefox  
**Operating system:**  
**Online service:**  
**Reports:** HTML  
**License:** Open Source

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![Web Developer Extension](http://chrispederick.com/work/web-developer/)  
**Figure 47:** Web Developer Extension Accessibility Module features overview.
**webagogo**

Webagogo, 8 October 2006  
**Description:** Webagogo is a free online tool to test the quality of your website. It includes validators (for HTML, XHTML, CSS, RSS and P3P) and tests for accessibility, usability, speed, SEO, ... and a lot more! The stand-alone tools can be used to analyze single webpages.  
**Language:** English  
**Guidelines:** WCAG 1.0, Section 508, Stanca Act, BITV  
**Assistance:** Generating Reports  
**Automatic checking:** Single pages, Page groups  
**Repair options:** -  
**Formats:** HTML, XHTML  
**Browser:** -  
**Operating system:** -  
**Online service:** Online checker  
**Reports:** HTML  
**License:** Free Software, Commercial

**WebInspector** ([http://jp.fujitsu.com/about/design/ud/assistance/webinspector/](http://jp.fujitsu.com/about/design/ud/assistance/webinspector/))

Fujitsu Limited, 28 September 2007  
**Description:** WebInspector can determine whether your website can be easily viewed by the elderly and those with visual impairments. The criteria of WebInspector are based on JIS and Fujitsu Web Accessibility Guidelines For Japanese sites Version2.01. It can evaluate not just HTML but also CSS (Cascading Style Sheets), and enables to diagnose at a high level of precision, including text size, line spacing, and the color of texts and backgrounds. This software was awarded the universal design award 08. The name of a global version is Web Accessibility Inspector.  
**Language:** Japanese  
**Guidelines:** JIS  
**Assistance:** Generating Reports  
**Automatic checking:** Single pages, Page groups  
**Repair options:** -  
**Formats:** CSS, HTML, XHTML  
**Browser:** -  
**Operating system:** Windows, MacOS  
**Online service:** -  
**Reports:** HTML, CSV  
**License:** Free Software

**WebKing** ([http://www.parasoft.com/jsp/solutions/soa_solution.jsp;jsessionid=aaaaAIICWEORE4-?itemId=319](http://www.parasoft.com/jsp/solutions/soa_solution.jsp;jsessionid=aaaaAIICWEORE4-?itemId=319))

Parasoft, 7 October 2005  
**Description:** WebKing is a comprehensive Web verification tool that automates the most critical Web verification practices: static analysis, functional testing, security testing, and load testing. WebKing's wizards and automated technologies help you verify application functionality and reliability without writing a single script, plus its flexibility allows you to automatically verify even the most specialized requirements. You can start testing instantly, then easily extend and customize tests if needed.
| **Language:** English, Japanese |
| **Guidelines:** WCAG 1.0, Section 508 |
| **Assistance:** Generating Reports, Step-by-step evaluations, Page transformation |
| **Automatic checking:** Single pages |
| **Repair options:** Code modification |
| **Formats:** CSS, HTML, XHTML |
| **Browser:** |
| **Operating system:** Windows, Linux, Solaris |
| **Online service:** |
| **Reports:** HTML, XML, CSV |
| **License:** Commercial |


Watchfire, 14 March 2005

**Description:** WebXACT is a free online service that enables users to test single pages of web content for accessibility, quality and privacy issues. Can be integrated into the browser via favelet or similar technology.

| **Language:** English |
| **Guidelines:** WCAG 1.0, Section 508 |
| **Assistance:** |
| **Automatic checking:** Single pages |
| **Repair options:** |
| **Formats:** HTML, XHTML |
| **Browser:** |
| **Operating system:** |
| **Online service:** Online checker |
| **Reports:** HTML |
| **License:** Free Software |


Watchfire, 14 March 2005

**Description:** WebXM™ is the industry's only automated Online Risk Management solution that audits accessibility, quality, privacy, security, brand and compliance issues across corporate web properties. WebXM drives significant cost out of the online operation by automating manual processes and identifying and prioritizing issues for immediate remediation. The Accessibility module of WebXM scans your online web properties for over 170 accessibility checks and generates user-friendly dashboards and reports for website stakeholders. Non-compliance with the W3C's Web Content Accessibility Guidelines (WCAG), or government standards (such as the U.S. Government's Section 508) discriminates against individuals with disabilities and can negatively impact your corporate brand.

<p>| <strong>Language:</strong> English, Japanese |
| <strong>Guidelines:</strong> WCAG 1.0, Section 508 |
| <strong>Assistance:</strong> Generating Reports, Page transformation |
| <strong>Automatic checking:</strong> Single pages, Page groups, Restricted pages |
| <strong>Formats:</strong> HTML, XHTML |
| <strong>Browser:</strong> Internet Explorer |
| <strong>Online service:</strong> Server installation |
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<td><strong>License:</strong></td>
<td>Commercial, Enterprise</td>
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Annex C: “Accessibility Simulation Tools Gathering Template”
**Accessibility color wheel** ([http://gmazzocato.altervista.org/colorwheel/wheel.php](http://gmazzocato.altervista.org/colorwheel/wheel.php))

**Description:** A tool that helps in the choice of a color pair (text/background) to use in a web page. It simulates three kinds of colour blindness and it shows the result of w3c algorithms that compute contrast and difference of brightness, applied to the chosen colours. The accessibility color wheel shows if the color pair is "good" from an accessibility point of view.

**Language:** English

**Guidelines:** WCAG 1.0

**Assistance:** Step-by-step evaluations

**Automatic checking:**

**Formats:**

**Browser:**

**Online service:** Online checker

**Operating system:**

**Reports:**

**License:** Open Source

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**Figure 48:** Accessibility color wheel simulation tool overview.

IBM, 7 July 2004

**Description:** The aDesigner is a disability simulator that helps Web designers ensure that their pages are accessible and usable by the visually impaired. Web developers can use aDesigner to test the accessibility and usability of Web pages for low-vision and blind people. The tool looks at such elements as the degree of color contrast on the page, the ability of users to change the font size, the appropriateness of alternate text for images, and the availability of links in the page to promote navigability. The tool also checks the pages' compliance with accessibility guidelines. Namely, these guidelines are **WCAG 1.0, Section 508, JIS and IBM Web Accessibility Checklist**. Consequently, aDesigner can act also as an evaluation tool.

**Language:** English, Japanese

**Guidelines:** WCAG 1.0, Section 508, JIS

**Assistance:** Generating Reports

**Automatic checking:** Single pages

**Repair options:** Code modification

**Formats:** HTML, XHTML

**Operating system:** Windows

**Reports:** HTML, XML

**License:** Trial or Demo, Commercial

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![ADesigner simulation tool overview](image.png)

**Figure 49:** ADesigner simulation tool overview.
ART Simulator (http://www.ubaccess.com/artsimulator.html)
UB Access, 30 March 2004
Description: The ART Simulator - simulates a site in different ways to help developers gauge how easily the disabled can use the site. The simulator, the first tool of its type, serves two critical purposes: It enables site owners and developers to both experience first-hand the barriers to accessibility faced by the disabled and to better understand how to improve disabled users experience. ART Simulator will "simulate" the site using the following conditions that closely-mimic some of the disabilities that your users might have:
Style sheet and scripts simulations mimic technologies for people with disabilities that do not support style sheets and scripts.
Image and multimedia simulations help test the usability of the site when relying solely on text (text on sites can be converted into speech or Braille).
The reading disabilities simulation makes reading a site slower and more complex. This simulation typifies the experience of a user with dyslexia, for instance. Long unnecessary text becomes difficult and frustrating.
Language: English
Guidelines: WCAG 1.0
Assistance: Page transformation
Automatic checking:
Formats: CSS, HTML, XHTML
Browser: Online service: Online checker
Operating system: Reports:
License: Free Software

ColorDoctor (http://www.fujitsu.com/global/accessibility/assistance/cd/)
Fujitsu Limited, 18 January 2008
Description: ColorDoctor is a simulator that can check color accessibility. It converts any images displayed on the screen such as websites and other presentation contents into gray scale or colors that can be perceived by people with color blindness. ColorDoctor not only simulates website display, it is also possible to simulate real-time display of proposals, presentations, and moving images such as Flash by selecting the "Transparent" mode. ColorDoctor shows the display content through four conversion filters: "Grayscale," "Protanopia," "Deuteranopia," and "Tritanopia." The simulation result can be stored in various file formats, including BMP, JPEG, PNG, TIFF, and GIF. This software was awarded the universal design award 08.
Language: English, Japanese
Guidelines: WCAG 1.0, Section 508, JIS
Assistance:
Automatic checking:
Formats:
Browser: Online service:
Operating system: Windows
Reports:
License: Free Software
Figure 50: ColorDoctor simulation tool overview.

**Colorfield Insight**
Colorfield

**Description:** Colorfield Insight is a Photoshop plug-in that allows designers to predict image legibility for color deficient viewers by accurately simulating color blindness. Allows designers to model and predict image legibility for color deficient viewers.

**Language:** English

**Guidelines:**

**Assistance:**

**Automatic checking:**

**Formats:**

**Browser:**

**Online service:**

**Operating system:** MacOS

**Reports:**

**License:** Commercial

---

etre, 1 December 2005

**Description:** One in twenty people have some form of colour vision deficiency. Etre's Colour Blindness Simulator allows you to upload an image to experience it as colour blind users may.

**Language:** English

**Guidelines:** WCAG 1.0

**Assistance:** Generating Reports

**Automatic checking:**

**Formats:**

**Browser:**

**Online service:**

**Operating system:**

**Reports:**

**License:**

---

**Fangs: The Firefox Screen Reader Emulator** ([http://www.standards-schmandards.com/?show/fangs](http://www.standards-schmandards.com/?show/fangs))
Peter Krantz, 6 June 2005

**Description:** This Mozilla Firefox extension creates a textual representation of a web page similar to how the page would be read by a modern screen reader.
Language: English
Guidelines: WCAG 1.0, Section 508
Assistance: Generating Reports, Step-by-step evaluations, Page transformation
Automatic checking:
Repair options:
Formats: CSS, HTML, XHTML
Browser: Mozilla/Firefox
Operating system: -
Online service: -
Reports: HTML
License: Open Source

Vischeck (http://www.vischeck.com/)
Vischeck, Menlo Park, CA, 27 June 2001
Description: Vischeck is a way of showing you what things look like to someone who is color blind. You can try Vischeck online - either run Vischeck on your own image files or run Vischeck on a web page. You can also download programs to let you run it on your own computer.
Language: English, Japanese
Guidelines: WCAG 1.0, BITV
Assistance: Page transformation
Automatic checking:
Formats: CSS, HTML
Browser:
Online service: Online checker
Operating system:
Reports:
License: Free Software, Open Source

Visolve (http://www.ryobi-sol.co.jp/visolve/en/)
Ryobi System Solutions, 26 August 2005
Description: Visolve is software that transforms the computer display colors into the discriminable colors for various people with color blindness. One of its aims is to help people with color blindness guess a normal color. In addition to the color transformation, it provides the following two functions: the filtering darkens all colors other than the specified color, and the hatching draws different hatch patterns depending on color.
Language: English, Japanese
Guidelines:
Assistance: Page transformation
Automatic checking:
Formats:
Browser: Internet Explorer
Operating system: Windows, MacOS
Reports:
License: Free Software, Commercial
University of Illinois, 12 May 2005
**Description:** Provide almost real time full screen simulation of various visual impairments on Microsoft Windows 2000 or XP. Tool is useful for testing for the use of colors and learning about how people with visual impairments perceive information.
**Language:** English
**Guidelines:**
**Assistance:** Page transformation
**Automatic checking:**
**Formats:** CSS, HTML, XHTML, PDF, SVG
**Browser:**
**Online service:**
**Operating system:** Windows
**License:** Free Software

**Description:** This simulation provides a way to experience what it is like to use a screen reader.
**Language:**
**Guidelines:**
**Assistance:**
**Automatic checking:**
**Formats:**
**Browser:**
**Online service:**
**Operating system:**
**License:**

WebAIM Low Vision Simulator ([http://www.webaim.org/simulations/lowvision](http://www.webaim.org/simulations/lowvision))
**Description:** The low vision simulation has two parts. First, go to the above URL and follow the directions. Second, go to the Opera browser and enlarge a page using the % pull-down menu in the Opera window. You should look to see how difficult it is to have to scroll not only vertically, but horizontally as well. Also, note the differences between real text with clear, crisp edges and image text which becomes pixilated and out of focus the larger it gets.
**Language:**
**Guidelines:**
**Assistance:**
**Automatic checking:**
**Formats:**
**Browser:**
**Online service:**
**Operating system:**
**License:**
<table>
<thead>
<tr>
<th>License:</th>
</tr>
</thead>
</table>

**Description:** This simulation demonstrates some common symptoms of dyslexia. The user is given 60 seconds to read a paragraph aloud. The letters in this paragraph are reversed, inverted, transposed, and spelling is inconsistent. There will be two questions to answer at the end of the 60 seconds, so the user must decipher the words as best as possible.

**Language:**

**Guidelines:**

**Assistance:**

**Automatic checking:**

**Formats:**

**Browser:**

**Online service:**

**Operating system:**

**Reports:**

**License:**

<table>
<thead>
<tr>
<th>License:</th>
</tr>
</thead>
</table>

**Description:** This simulation demonstrates how difficult it can be to navigate even a simple site when operating under an intense cognitive load as someone with a cognitive disability might experience.

**Language:**

**Guidelines:**

**Assistance:**

**Automatic checking:**

**Formats:**

**Browser:**

**Online service:**

**Operating system:**

**Reports:**

**License:**
Annex D

“Template for initial data gathering” &

“WTH & WTP Questionnaire”
Annex D1: “Template for initial data gathering”
“Template for initial data gathering”

This section contains the data collection template that was sent out to partners for completion.

Template for initial data gathering to be completed by partners developing ACCESSIBLE System. The completed templates will be used to produce a priori Market Survey.

1. Name of partner / company:

2. Please list the exploitable products in which you are involved as part of ACCESSIBLE. Please clarify whether you develop or supply this product/service and, if applicable, briefly describe the current state of development and estimate the time you expect that this would be available.

<table>
<thead>
<tr>
<th>Exploitable ACCESSIBLE Products/ Services</th>
<th>Ready for use (yes/no)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3. What is your estimate of the market size for your ACCESSIBLE products/services?

4. Do you sell/supply your products/services as a stand alone? What is your selling policy (marketing)?

5. What is your total estimate of development cost, relating to your products/applications, during the ACCESSIBLE project? If you anticipate that further development costs are likely to incur following the end of the ACCESSIBLE project, what is your estimate of the additional cost and over how many months/years is this expected to be spread?

6. After development is complete, what is your total estimate of the running costs (ongoing costs) that you expect to have relating to your products/applications? This cost may include sales staff, support staff or maintenance of the technology/tool.
7. How are you going to sell your products/services (marketing)? At what price?

8. After development is complete, what is your current estimate of income (sales of products, sales of licenses etc) related to the ACCESSIBLE products/applications?
Annex D2

“WTH & WTP Questionnaire”
Project Description

ACCESSIBLE is an EU FP7 project spanning over 36 months, start date 1st September 2008, with the aim of improving the accessibility of software development products, by introducing an harmonised accessibility methodology into accessible software development processes, using significantly better measurement strategies, methodologies, etc. The ACCESSIBLE project will provide groundwork for the design and development of more accessible ICT systems. Typically, accessibility evaluation is considered late in the development process and is often conducted by outside experts, after the application is delivered and content is produced. This leads to issues being reported to developers late in the project, at a time when changes are more costly and time consuming. In order to make accessibility development efforts more efficient, the ACCESSIBLE project can support the integration and assessment of accessibility into all stages of an application development process, with as much automation as possible. Thus, ACCESSIBLE project focuses on the developer phase of the project and helps developers, with little or no accessibility knowledge, helping ensure that applications and services are fully accessible to persons with disabilities. Moreover, as ACCESSIBLE targets not just traditional software environments (i.e., Desktop computers), it will provide methodologies and tools that help leverage accessibility of web services and description languages as well. The envisaged improvement will enable large organisations, SMEs or individuals (developers, designers, etc.) to produce software products of superior accessibility and usability, accompanied with appropriate measures, technologies and tools that improve their overall quality.

Questionnaire for Developers

This questionnaire has been designed for initial data gathering of external Developers within the premises of the ACCESSIBLE EU FP7 project. Its evaluation will be the basis to implement appropriate tools and methodologies in order to increase awareness and need for accessibility as well as to monitoring the willingness of potential developers to use ACCESSIBLE tools and products in the future.

- The filling up of the questionnaire is optional.
- This questionnaire is completely anonymous.

Thank you in advance for your time and contribution. We believe that your valuable contribution will help us to extract project User needs and prepare a report which will be of great benefit in promoting Accessibility for software implementations throughout Europe.

For more information about the project please see at http://www.accessible-project.eu/. If you have any questions or issues, please don’t hesitate to contact us.

Your ACCESSIBLE-Team
**“WTH & WTP Questionnaire”**

<table>
<thead>
<tr>
<th>ACCESSIBLE</th>
<th>Would you be willing to use this product in the future?</th>
<th>Would you be willing to use this product in the future, if it is free of charge?</th>
<th>Would you be willing to use this product in the future, at a cost?</th>
<th>What are main factors that will influence your decision to use or not use this product in the future?</th>
<th>How much would you be willing to pay for purchase of the system, (€)?</th>
<th>How much would you be willing to pay subscription to service, per year?</th>
<th>How much would you be willing to pay for product, per use (by enquiry)?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y/N/ Maybe (explain)</td>
<td>Y/N</td>
<td>Y/N/ Maybe (explain)</td>
<td>A. Cost of licence</td>
<td>B. Cost of installation</td>
<td>C. Quality of service</td>
<td>D. Reliability</td>
<td>E. Maintenance</td>
</tr>
</tbody>
</table>

1.  
2.  
3.  
…  
…  
…  
…
Annex E

“IBM GUIDELINES”
<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>IBM Software Accessibility Checklist - Version 3.5.1</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td><strong>Keyboard access</strong></td>
<td>Yes No</td>
<td>Planned N/A</td>
</tr>
<tr>
<td>1.1</td>
<td>Provide keyboard equivalents for all actions.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.2</td>
<td>Do not interfere with keyboard accessibility features built into the operating system.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td><strong>Object information</strong></td>
<td>Yes No</td>
<td>Planned N/A</td>
</tr>
<tr>
<td>2.1</td>
<td>Provide a visual focus indicator that moves among interactive objects as the input focus changes. This focus indicator must be programmatically exposed to assistive technology.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.2</td>
<td>Provide semantic information about user interface objects. When an image represents a program element, the information conveyed by the image must also be available in text.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.3</td>
<td>Associate labels with controls, objects, icons and images. If an image is used to identify programmatic elements, the meaning of the image must be consistent throughout the application.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.4</td>
<td>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.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td><strong>Sounds and multimedia</strong></td>
<td>Yes No</td>
<td>Planned N/A</td>
</tr>
<tr>
<td>3.1</td>
<td>Provide an option to display a visual cue for all audio alerts.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.2</td>
<td>Provide accessible alternatives to significant audio and video.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.3</td>
<td>Provide an option to adjust the volume.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td><strong>Display</strong></td>
<td>Yes No</td>
<td>Planned N/A</td>
</tr>
<tr>
<td>4.1</td>
<td>Provide text through standard system function calls or through an API (application programming interface) which supports interaction with assistive technology.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.2</td>
<td>Use color as an enhancement, not as the only way to convey information or indicate an action.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.3</td>
<td>Support system settings for high contrast for all user interface controls and client area content.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.4</td>
<td>When color customization is supported, provide a variety of color selections capable of producing a range of contrast levels.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.5</td>
<td>Inherit system settings for font, size, and color for all user interface controls.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.6</td>
<td>Provide an option to display animation in a non-animated presentation mode.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td><strong>Timing</strong></td>
<td>Yes No</td>
<td>Comments</td>
</tr>
</tbody>
</table>
### IBM Software Accessibility Checklist - Version 3.5.1

<table>
<thead>
<tr>
<th></th>
<th>Planned</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>5.1</td>
<td>Provide an option to adjust the response times on timed instructions or allow the instructions to persist.</td>
<td>N/A</td>
</tr>
<tr>
<td>5.2</td>
<td>Do 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.</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Verify accessibility</td>
<td>Yes No Planned N/A Comments</td>
</tr>
<tr>
<td>6.1</td>
<td>Test for accessibility using available tools.</td>
<td></td>
</tr>
</tbody>
</table>

### IBM Web accessibility checklist - version 3.5

<table>
<thead>
<tr>
<th>Checkpoint</th>
<th>Yes No</th>
<th>Planned</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Images and animations. Use the alt=&quot;text&quot; attributes to provide text equivalents for images. Use alt=&quot;&quot; for images that do not convey important information or convey redundant information.</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Image maps. Use client-side image maps and alternative text for image map hot spots. If a server-side map is needed, provide equivalent text links.</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Graphs and charts. Summarize the content of each graph and chart, or use the longdesc attribute to link to the description or data.</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Multimedia. Provide captions or transcripts of important audio content. Provide transcripts or audio descriptions of important video content.</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Scripts. Ensure the functionality of scripts is keyboard accessible. If the content affected by scripting is not accessible, provide an alternative.</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Applets, plug-ins, and non-HTML content. When an applet, plug-in or other application is required to be present, provide a link to one that is directly accessible, or provide alternate content for those which are not directly accessible.</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Forms. Make forms accessible to assistive technology.</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Skip to main content. Provide methods for skipping over navigation links to get to main content of page.</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Frames. Provide a title for each FRAME element and frame page. Provide an accessible source for each frame.</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Table headers. Use the TH element to mark up table heading cells. Use the headers attribute on cells of complex data tables.</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Cascading style sheets. Web pages should be readable without requiring style sheets.</td>
<td>N/A</td>
<td></td>
</tr>
</tbody>
</table>
### IBM Web accessibility checklist - version 3.5

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>Color &amp; contrast. Ensure that all information conveyed with color is also conveyed in the absence of color.</td>
</tr>
<tr>
<td>13</td>
<td>Blinking, moving or flickering content. Avoid causing content to blink, flicker, or move.</td>
</tr>
<tr>
<td>14</td>
<td>Timed responses. When a timed response is required, alert the user, and give sufficient time to indicate more time is required.</td>
</tr>
<tr>
<td>15</td>
<td>Text-only page. If accessibility cannot be accomplished in any other way, provide a text-only page with equivalent information or functionality. Update the content of the text-only page whenever the primary page changes.</td>
</tr>
<tr>
<td>16</td>
<td>Verify accessibility. Test the accessibility using available tools.</td>
</tr>
</tbody>
</table>

### IBM Java accessibility checklist - version 3.6

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><strong>Keyboard access</strong></td>
</tr>
<tr>
<td>1.1</td>
<td>Provide keyboard equivalents for all actions.</td>
</tr>
<tr>
<td>1.2</td>
<td>Do not interfere with keyboard accessibility features built into the operating system.</td>
</tr>
<tr>
<td>2</td>
<td><strong>Object information</strong></td>
</tr>
<tr>
<td>2.1</td>
<td>Implement the Java Accessibility API by:</td>
</tr>
<tr>
<td></td>
<td>- using the Java Foundation Classes (JFC) / Swing components and/or</td>
</tr>
<tr>
<td></td>
<td>- following the guidelines for &quot;Building Custom Components&quot; when extending the Java Foundation Classes and when implementing the Java Accessibility API on custom components.</td>
</tr>
<tr>
<td>2.2</td>
<td>Set the focus.</td>
</tr>
<tr>
<td>2.3</td>
<td>Set the name on all components and include the description on icons and graphics. If an image is used to identify programmatic elements, the meaning of the image must be consistent throughout the application.</td>
</tr>
<tr>
<td>2.4</td>
<td>Associate labels with controls, objects, and icons.</td>
</tr>
<tr>
<td>2.5</td>
<td>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.</td>
</tr>
<tr>
<td>3</td>
<td><strong>Sound and multimedia</strong></td>
</tr>
<tr>
<td>3.1</td>
<td>Provide an option to display a visual cue for all audio alerts.</td>
</tr>
<tr>
<td>3.2</td>
<td>Provide accessible alternatives to significant audio and video.</td>
</tr>
<tr>
<td>3.3</td>
<td>Provide an option to adjust the volume.</td>
</tr>
<tr>
<td>4</td>
<td><strong>Display</strong></td>
</tr>
<tr>
<td>4.1</td>
<td>Use color as an enhancement, not as the only way to convey information or indicate an action.</td>
</tr>
<tr>
<td>4.2</td>
<td>Support system settings for high contrast for all user interface controls and client area content.</td>
</tr>
</tbody>
</table>
| 4.3 | When color customization is supported, provide a variety of
### IBM Java accessibility checklist - version 3.6

<table>
<thead>
<tr>
<th>4.4</th>
<th>Support system settings for size, font and color for all user interface controls.</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.5</td>
<td>Provide an option to display animation in a non-animated presentation mode.</td>
</tr>
</tbody>
</table>

#### 5 Timing

<table>
<thead>
<tr>
<th>5.1</th>
<th>Provide an option to adjust timed responses or allow the instruction to persist.</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.2</td>
<td>Avoid the use of blinking text, objects, or other elements.</td>
</tr>
</tbody>
</table>

#### 6 Verify accessibility

<table>
<thead>
<tr>
<th>6.1</th>
<th>Test for accessibility using available tools.</th>
</tr>
</thead>
</table>

#### Totals

<table>
<thead>
<tr>
<th></th>
<th>Summary of checklist</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Yes Responses</td>
<td></td>
</tr>
<tr>
<td>Number of No Responses</td>
<td></td>
</tr>
<tr>
<td>Number of Planned Responses</td>
<td></td>
</tr>
</tbody>
</table>

---

### Lotus Notes Application Accessibility Checklist - Version 3.2

<table>
<thead>
<tr>
<th>1</th>
<th>Navigation.</th>
<th>Yes No Planned N/A</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1</td>
<td>Provide keyboard equivalents for all navigator actions.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.2</td>
<td>Provide methods for skipping over navigation links to get to the main content of the Web page.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.3</td>
<td>Provide a title for each frame.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2</th>
<th>Buttons.</th>
<th>Yes No Planned N/A</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1</td>
<td>Include all action buttons in the appropriate menu.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.2</td>
<td>Provide text labels for all buttons.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3</th>
<th>Graphics, Image maps and Links.</th>
<th>Yes No Planned N/A</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1</td>
<td>Provide alternate text for important graphics.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.2</td>
<td>Provide alternate text for image maps and image map hotspots.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.3</td>
<td>Make text pop-ups directly accessible or provide an alternative.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No.</td>
<td>Section</td>
<td>Description</td>
<td></td>
</tr>
<tr>
<td>-----</td>
<td>---------</td>
<td>-----------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Views.</td>
<td>Include views in the View menu if the application uses navigators.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Use color as an enhancement, not as the only way to convey information or indicate an action.</td>
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<td></td>
<td></td>
<td>Provide a visible selector for embedded outlines and views.</td>
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<tr>
<td></td>
<td></td>
<td>Enable the allow customizations option in views.</td>
<td></td>
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<tr>
<td>5</td>
<td>Forms.</td>
<td>Include forms in the appropriate action menu.</td>
<td></td>
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<td></td>
<td></td>
<td>Associate labels with editable fields on forms using field help or HTML TITLE.</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Provide a descriptive title for each form and page.</td>
<td></td>
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<td></td>
<td></td>
<td>Avoid the use of animated tables.</td>
<td></td>
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<td></td>
<td></td>
<td>Use the TH element to mark up table heading cells on Web pages. Use the headers attribute on cells of complex data tables on Web pages.</td>
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<tr>
<td></td>
<td></td>
<td>Avoid the use of rich text lite fields.</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Applets, JavaScript and Style Sheets</td>
<td>Provide alternate content for Java applets which are not accessible.</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Provide content for JavaScript which is keyboard accessible. If the content is not accessible, provide an alternative.</td>
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<td></td>
<td></td>
<td>Web pages must be readable without requiring style sheets.</td>
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<td></td>
<td></td>
<td>When HTML content is added to Domino applications, follow the IBM Web Accessibility Checklist guidelines.</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Documentation.</td>
<td>Provide documentation on all accessibility features including keyboard access.</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Verify Accessibility.</td>
<td>Test for accessibility using available tools.</td>
<td></td>
</tr>
</tbody>
</table>

Table 4: Accessibility Requirements

<table>
<thead>
<tr>
<th>No.</th>
<th>Yes/No</th>
<th>Planned</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Yes</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Yes</td>
<td>N/A</td>
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<tr>
<td>6</td>
<td>Yes</td>
<td>N/A</td>
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<tr>
<td>7</td>
<td>Yes</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Yes</td>
<td>N/A</td>
<td></td>
</tr>
</tbody>
</table>