



# eAccessibility of public sector services in the European Union



### **European Public Administration network**

The European Public Administration network (EPAN) currently chaired by the UK as part of the UK's Presidency of the European Council, strives to improve both the internal workings of public administrations and the quality of public service delivery through informal co-operation and collaboration across EU Member States and European institutions. We are grateful to the members of the EPAN e-Government Working Group for their co-operation and advice in the production of this report.

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### **eAccessibility of public sector services in the European Union**

This report is available online at [www.cabinetoffice.gov.uk/e-government/eaccessibility](http://www.cabinetoffice.gov.uk/e-government/eaccessibility) along with related information about the project.

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# Foreword

The use of ICT is transforming how our governments across the European Union interact with businesses and citizens. As European governments work to improve their public services through the innovative use of ICT, we have to ensure that all citizens, who wish to, can access and use what public administrations offer as far as is reasonably possible.

This means that the channels we use and the content we provide and the electronic services we offer have to be responsive to people's needs. This is not just beneficial for the individual, but equally so for society at large. When inclusion is built-in to public service design from the outset, individual opportunities in education, employment, health and social life are enhanced and this, in turn, has the potential to bring about a significant economic impact in Europe. This aspiration is, as this EU-wide research project shows, a real, yet surmountable challenge that we all face.

I am pleased that this research project into eAccessibility has uncovered many examples of good practice across the European Union from which we can all learn. It also shows, however, that we have some way to go before we substantially reduce the barriers that are experienced by many users. This project has analysed a number of these barriers and offers recommendations for various stakeholders, which, if adopted, could significantly improve the accessibility of our online public services.



Jim Murphy MP  
Parliamentary Secretary  
UK Cabinet Office

# Synopsis

## Section 1 Introduction

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eAccessibility is a critical requirement for any public service that is available online because it ensures that the benefits of service delivery are translated into reality for those groups of people who may face difficulty using, or even be excluded from, government information and services. This study breaks new ground in aiming to test how well the 25 Member States of the European Union (EU) and the European Commission meet this requirement in 2005, using the most appropriate combination of manual and automatic testing techniques.

## Section 2 The policy survey

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The project has conducted a policy survey from Member States and the European Commission about possible factors that may influence accessibility such as national strategy, legal frameworks, monitoring arrangements, awareness, training and tools and other issues. The results have identified a wide range of policies for engaging practitioners in improving eAccessibility.

## Section 3 Summary of result across EU

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This project conducted automatic testing of the accessibility of 436 government websites across the EU supported by manual testing across a sample of these. Consistent with similar studies that have taken place, the results found relatively few sites that achieve even Limited Pass Level A conformance with the W3C Web Content Accessibility Guidelines (WCAG 1.0). The project researched correlations between eAccessibility and policy, using information on the many potential factors for influencing success captured in the policy survey. The potential link between eAccessibility and online sophistication was also explored.

## Section 4 Detailed analysis of results

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The testing of websites has identified clear examples of good practice, describing the approach that others should emulate if the accessibility of online public services across EU member states is to improve. It has also uncovered the common reasons why many websites are falling short of the required standards, firstly at Level A and secondly at Level Double-A. From this information a list of priorities has been developed that will achieve the greatest impact for disabled users with the most efficient use of resources.

## Section 5 Conclusions

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The findings from the survey are clear. Online public services have a long way to go before they are fully accessible and inclusive. However, this research indicates that policy engagement is linked to the eAccessibility of government services and that rapid improvement is achievable through coordinated effort by those who are best placed to effect change — the public policy-makers in the EU, web managers and developers in public sector organisations and web designers in the software industry. We provide 21 detailed recommendations to be adopted by these key stakeholders.

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# Key findings

- 3% of the 436 online public service websites assessed achieve Level A conformance with the W3C Web Content Accessibility Guidelines (WCAG 1.0) passing the full suite of both automated and manual checks.
- A further 10% of services fully passed all the automated checks, but showed a material failure on one or more of the manual checks — in this report referred to as a Limited Pass Level A.
- Another 17% of sites failed one or more of the automated checks, but this failure was limited in extent or scope — referred to as a Marginal Fail Level A.
- Finally, the remaining 70% of sites showed relatively pervasive failure against one or more of the automated checks — referred to as a Fail Level A.
- No site that achieved Level A conformance was found to achieve the higher standard of Level Double-A conformance.
- The policy survey identified ten potential factors that might influence web accessibility. These were combined into an index of engagement for cause and effect analysis between eAccessibility and policy approaches across the Member States. The results indicate that general levels of policy engagement in this area are linked to improved results. The single most significant influencing factor was found to be the existence of legal incentives.
- Eight out of 25 Member States reached Limited Pass Level A (or at least Marginal Fail Level A) in at least 40% of online public service websites. These states tend to have a higher than average index of engagement.
- No correlation was found between web accessibility and the level of sophistication of online government services as measured by the annual European Commission/Cap Gemini e-government benchmarking exercise.
- The testing highlighted three examples of consistently good practice across all automated and manual checks (one from Spain, one from a European institution and one from the UK) and these are analysed in detail. Many other services, across other Member States, have been found demonstrating good practice in specific areas of the guidelines.
- Research into best practice outside the EU identifies three countries (Australia, Canada and Hong Kong) that are as advanced in eAccessibility of public services as the most advanced Member States of the EU.
- An analysis of the common reasons for failure points demonstrably to an action plan for improvement that could lead in a short time to 30% achieving at least Level A conformance. Recommendations to achieve this step change in performance are presented.

# 1 Introduction

eAccessibility is a critical requirement for any public service that is available online because it ensures that the benefits of service delivery are translated into reality for those groups of people who may face difficulty using, or even be excluded from, government information and services. This study breaks new ground in aiming to test how well the 25 Member States of the European Union (EU) and the European Commission meet this requirement in 2005, using the most appropriate combination of manual and automatic testing techniques.

# 1 Introduction

## 1.1 Aims of the study

The purpose of this report is to present results from a comprehensive assessment of the eAccessibility of government online services across the European Union (EU).

The improvement of public services across the developed world is greatly facilitated by the use of information and communication technologies (ICT), and in particular the use of the internet. The web is unique in its facility for opening up government to a wide range of people who have some form of disability in using the standard PC and keyboard. If websites can be designed to be accessible to these disadvantaged groups, then public services become available to large groups of citizens who have previously been excluded or at least seriously hampered, and those services become more useable for everyone.

## 1.2 Importance of eAccessibility

Over the past five years there has been a major drive to put government services online supported by significant investments by Member States and European institutions. This has exposed services to the problems of the digital divide, with technology invariably being viewed as part of the problem, and not the solution. So the focus has, in recent years, shifted to integrating the online service offering into the right mix of channels best suited to the target user audience, with a priority given to designing inclusive services from the outset. However, this approach has not diminished the importance of the online channel. In a multi-channel environment, it has the clear potential to increase accessibility and inclusiveness of a service to those excluded from traditional forms of interaction with public authorities — and to deliver real benefits to those who use public services the most.

	 Web	 Phone	 Face to face	 Digital TV
Impairment				
Visual	●	●	■	▲
Hearing	●	▲	■	▲
Motor	●	■	▲	■
Cognitive	▲	■	■	▲
<p>● OK with assistive facilities ■ OK for some ▲ Problems for many</p>				

Chart 1 **Accessibility by channel for different types of impairment**

## 1 Introduction

This chart illustrates the advantages and disadvantages of various channels of communication for citizens with a range of disabilities. The face to face channel can be effective for service delivery, but is the least efficient of the channels. Furthermore, travelling to, and using a face to face channel is often problematical for those with motor, visual or hearing impairment. Telephone is inaccessible to the hearing-impaired and difficult to operate for those with certain physical disabilities. Digital TV has limited accessibility to the visually impaired and can present difficulties for the deaf and hard of hearing if suitable captioning or signing avatars are not available. Again, this can be costly.

Web-based services have the potential to be accessible to a wider range of citizens if used correctly. Widespread adoption of web-based services designed for use on the PC has led to efficiency advantages in delivering services via fewer channels. If the Web Accessibility Initiative (WAI) Guidelines from the World Wide Web Consortium (W3C) are followed, websites can be made accessible to a very wide variety of people with disabilities and the delivery of inclusive government services in a multi-channel context becomes a more achievable objective through an accessible internet channel.

Consideration of eAccessibility is, therefore, a key component of designing and developing inclusive services, and is an essential policy issue to address for administrations seeking to transform public services for their user base. Furthermore, there is evidence that eAccessibility improves the usability of online service for all users, not just a niche audience, and as such engagement in this agenda has the potential to contribute to an increase in the take-up of services in general.

The latest estimates of internet usage in the European Union (EU) show that nearly 48.1% (nearly 222m of the 460m population) have access to the internet, varying from 73.6% in Sweden to 20.3% in Lithuania. (Source: [www.internetworldstats.com/stats4.htm](http://www.internetworldstats.com/stats4.htm)).

“It is difficult to estimate how many people are affected by web accessibility, because countries use different methods and categories to determine the number of people with disabilities. Additionally, not all disabilities affect access to the web (for example, difficulty walking does not affect access to the web, though difficulty moving one’s hands does). Also, common conditions (such as colour blindness) may not be considered disabilities in many countries, but do affect access to the web.” (Source: [www.w3.org/WAI/bcase/soc](http://www.w3.org/WAI/bcase/soc))

Information is much less reliable about the proportion of those who have some disability preventing them from using the internet. In the UK, for example, it is estimated that some 8.6m people (15% of the population) have some form of vision impairment, and this excludes other groups such as those with dyslexia, usually estimated around 19% of the population. The same source (CSR Europe) estimates that 39 million of the EU population are disabled. However, statistics on disability are difficult to compare internationally.

In many countries, being prevented access to online services through poor design is illegal, and in others it would be considered discriminatory, if this were to occur. The moral case for eAccessibility is also supported by the business case. Many disadvantaged people depend on public services for support (e.g. for various state benefits), but until now have often found it difficult to gain access physically to sources of help and advice. The web opens up new

possibilities that not only benefit individuals greatly but can also make it more efficient for the state to do business with them.

Seen in a wider perspective, accessibility and usability of internet-based services and products play a key role in allowing every citizen to achieve their full potential and to participate fully in society. This is not just beneficial for the individual, but equally so for society at large: it enhances an individual's opportunities in education and employment, as well as health and social life, therefore having a significant potential economic impact.

This report tests how well public services across Europe have been designed to meet this important objective.

### 1.3 Methodology used

The study comprises two parts. The first part relates to a survey carried out in May and June 2005 of policies towards accessibility of online public services in each of the 25 Member States of the EU and the European Commission. This policy survey invited policy advisers in each Member State to answer questions about national strategy; legal frameworks; monitoring arrangements; awareness, training and tools and other issues such as certification systems. Section 2 of this report covers the results of the policy survey.

The second part of the study relates to work carried out in June and July 2005 comprising a detailed assessment of a wide selection of government service websites across Europe using a combination of automated and manual evaluation techniques. Section 3 describes in detail the results of the website evaluation.

This study breaks new ground in a number of ways. It is the first time that large numbers of public sector websites across the EU have been evaluated in this way; there have been surprisingly few previous surveys, given the importance of the topic, and most of these have been country-specific. It is the first time that policies on eAccessibility have been compared across a large number of countries and then related to results of website evaluation opening up new types of analysis, e.g. correlation of eAccessibility with sophistication of online services. Uniquely, the methodology used in this study is based on an appropriate blend of automated and manual techniques; previously, there has been a tendency to be over-reliant on automated testing which has its limitations — typically only 30% of checks against the guidelines can be tested automatically.

### 1.4 Standards applied to automatic and manual testing of websites

The criteria used for automatic and manual testing of websites are defined in internationally recognised guidelines. The World Wide Web Consortium (W3C) produced in May 1999 as part of its Web Accessibility Initiative (WAI) Version 1 of the Web Content Accessibility Guidelines (WCAG 1.0). This was followed by:

- Version 1 of the Authoring Tool Accessibility Guidelines (ATAG) in February 2000
- Version 1 of the User Agent Accessibility Guidelines (UAAG) in December 2002.

Together, these form the WAI guidelines that have been officially adopted by individual governments, e.g. by the Australian Government in March 2000 and the UK Government in February 2001. The EU recommended in March 2002 that the guidelines should be adopted by the public sector in Member States.

The evaluation of services in this study has determined conformance of sites with Level A and Level Double-A of the WCAG1.0 guidelines which are summarised in Appendix 1 and the detailed methodology used for this assessment is shown in Appendix 2.

### 1.5 Lessons from previous studies

The eAccessibility of public services is not a new topic for research. There have been six studies in the past five years from a range of countries (including France, Ireland, UK and the USA). References to each of these studies are given in Appendix 4.

The key message from the results of this past research is that the level of eAccessibility is disappointingly low. The conclusion from these studies is that a high proportion of websites failed to meet the minimum standards of Level A accessibility resulting in large numbers of disabled users being excluded or significantly disadvantaged in their access to government information and services.

The most useful study is the one carried out by the Disability Rights Commission in the UK in 2003-04 entitled *Web Access and Inclusion for Disabled People*. This went beyond the assessment against the checkpoints for Level A conformance and explored the links between accessibility as defined by the W3C WAI Guidelines and the broader topic of usability. It found evidence of a good correlation between accessibility and usability. This is a particularly important finding as it demonstrates that improving eAccessibility also increases general usability of online public services for people whether or not they are disadvantaged. Accessibility is, therefore, an important policy response to the mainstream issue of poor take-up of online government services.

## **2 The policy survey**

The project has conducted a policy survey from Member States and the European Commission about possible factors that may influence accessibility such as national strategy, legal frameworks, monitoring arrangements, awareness, training and tools and other issues. The results have identified a wide range of policies for engaging practitioners in improving eAccessibility.

### 2.1 Overview of public policy in the EU

The survey of Member States in the EU sought to establish the scope of public policy towards eAccessibility. Under the auspices of the European Public Administration Network (EPAN), the questionnaire was sent in May 2005 to a named policy adviser in each of the 25 Member States and the European Commission. Replies were received from every Member State (with only one exception), giving a total of 25 including the European Commission.

The responses to this survey are analysed in the rest of this section which concludes with a survey of policy and practice in the rest of the world.

### 2.2 National strategy

All but two Member States confirmed the existence of a specific current target (or plan) to improve the accessibility of public sector websites, including funding projects to meet the target. A further three states indicated that they are actually at a relatively similar, early, stage in engaging with web accessibility. Although some of these five states that are at an early stage are new Member States, this is not a general trend, with clear evidence of stronger engagement from the others.

Invited to define the timescale and scope of that target (or plan), nearly 50% (twelve) Member States provided a timescale that was no later than 2008 for implementing their plans and meeting targets. There is, as might be expected, considerable variation in the scale of the plans, and it is also unclear whether WCAG conformance is being consistently referenced, and/or to what specific level. So it is difficult to draw any firm conclusion on the likely aggregate impact on eAccessibility across the EU of these Member State initiatives.

In response to a question about progress since January 2004, eighteen respondents were able to refer to some recent activity.

Finally, respondents also described how the programme concerning web accessibility is organised in their country, referring to any codes of practice and guidelines and specifying the ministry responsible for eAccessibility. Again there is considerable variety in how this is structured; but in only about 25% of cases does there appear to be a clear locus of overall responsibility for ensuring the implementation of an eAccessibility plan.

### 2.3 Legal frameworks

A clear majority of the responses (16 out of 24) indicate that at least one item of legislation has been introduced that is relevant to inclusive access to web services.

In addition, the European Union does not operate to a legal framework, but states that 'there is a public commitment emerging from the e-Europe work and reflected in the communication of web accessibility COM (2001) 529'. Subsequently, during the drafting of this report, a new European Commission communication on eAccessibility was published, COM (2005) 425.<sup>1</sup> This notes the relevance of Article 13 of the Treaty establishing the EC (providing for action to combat discrimination) and of a number of European Directives related to the information society, which specifically refer to the inclusion of persons with disabilities and older people.

Respondents also provided supporting information about the legislation, such as the coverage, the name of the law, the year when first enacted and the level of government. For example, in the case of Germany, there is legislation at federal level, but the majority of the states (Länder) also have enacted legal provisions on web accessibility.

However, there are also examples of strong practical engagement with accessibility, even where there is no explicit legal requirement, as in Denmark. This suggests that the most appropriate role for legislation depends significantly on local practice and context.

The survey continued by inviting respondents to list the bodies responsible for the specific issue of web accessibility and the extent and scale of their responsibility. Fifteen confirmed that there is a central body responsible for managing this agenda.

A minority of Member States (9 out of 24) recorded the existence of legal incentives for websites that do not achieve a specified standard of accessibility. In this study, the possibility of incentives appeared to be the influence that had the strongest individual correlation (although still relatively weak) with accessibility outcomes. The full replies are summarized in Table 1. The responses indicate that Member States are implementing a wide variety of incentives for eAccessibility, ranging from formal incentives through to various kinds of more positive or pro-active reward. The most common forms of incentive are relatively informal, such as adverse peer comment and low rankings in public comparisons.

Some countries use the .gov sub-domain of the appropriate country top-level-domain (TLD) as a device for identifying public sector websites that are mandated (monitored, sanctioned) to be conformant with some specific level of accessibility (for example, .gov.uk, .gv at). However, many relevant public services sites, such as educational institutions and agencies, do not fall naturally within such a scope. So, while this approach provides a pragmatic and effective starting point, it is important not to restrict policy and planning along such lines, as significant public sector websites will remain unmonitored.

<sup>1</sup> [http://europa.eu.int/information\\_society/policy/accessibility/com\\_ea\\_2005/index\\_en.htm](http://europa.eu.int/information_society/policy/accessibility/com_ea_2005/index_en.htm)

## 2 The policy survey

Member State	Incentive (legal or otherwise)
Austria	<p>There are no real sanctions for the lack of conformance with W3C WAI Guidelines but accessibility is an integral part of the fundamental principles of the Austrian e-government strategy. Conformity with the W3C WAI Guidelines is, therefore, one of the criteria that must be fulfilled in order to obtain the Austrian E-government Quality Mark which confirms that a site fulfils the standards and specifications of the Austrian e-government strategy (see <a href="http://www.guetesiegel.gv.at">www.guetesiegel.gv.at</a>). If, subsequently, the guidelines are violated, the E-government Quality Mark is suspended till the corrections are made or is even cancelled if, after a period of time for upgrading, insufficient changes are made to conform with the accessibility guidelines.</p>
Denmark	<p>Many public websites participate in the yearly competition 'Best on the Web'. eAccessibility is a part of the competition, which means that the websites get a lower score if they do not fulfil the eAccessibility requirements.</p>
France	<p>Under Article 47 of the law, sanctions may be applied, for which their enforcement will be defined as a last resort.</p>
Germany	<p>The Act on Equal Opportunities for Persons with Disabilities (BGG) introduced the right to legal action taken by an association (representative action right). Under these provisions, associations recognised under the BGG can, even if there is no infringement of their own rights, request a determination by a court that any of the rights detailed in the BGG have been infringed, provided that their area of responsibilities as defined in their articles of association is affected. So far, no practical findings are available as regards such legal action.</p>
Ireland	<p>Individual cases may be taken under the Employment Equality Act, Equality Act and Equal Status Act.</p>
Italy	<p>New contracts drawn up by public administrations concerning the building of websites will not be considered valid unless they comply with accessibility criteria. Existing contracts must adhere to the provisions relating to accessibility requirements. Failure to comply with the provisions of the law implies both executive responsibility and disciplinary action as well as possible criminal prosecution and civil liability provided for by the current laws.</p>

## 2 The policy survey

Latvia	Instruction of Cabinet of Ministers in a paper entitled 'Procedure by which state institutions put information in the internet'.
Malta	Where the website is part of the public service, pressure is applied so that the problem is fixed. Failing this, the website may be removed from online until this is fixed. Great attention is given where a service to the citizen is concerned. Where this is a website in the private sector, the website may be brought under pressure to conform with requirements by the two organisations FITA/KNPD.
United Kingdom	In the public sector the most effective sanction is peer group/ministerial pressure to comply with accessibility standards. Within the .gov.uk domain, the UK has a sanction that could result in withdrawal of the domain name. The top level sanction is that the Disability Right Commission will support an individual with their complaints and resolve it, using the courts where necessary.

Table 1 **Summary of nine Member States reporting existence of incentives (legal or otherwise)**

### 2.4 Monitoring arrangements

More than half of the responses (14 out of 24) indicate the existence of ongoing monitoring of accessibility, which is encouraging. This appears to be concentrated overwhelmingly on public sector sites. There is very wide variation in:

- Scale (number of sites, resources per site)
- Methodology (self-survey/questionnaire, independent evaluation, manual/automated)
- Publication (no common reporting policy or format)
- Frequency (one-off versus periodic)

The survey also asked about other studies or projects that have been organised to check accessibility of government websites. Fifteen respondents referred to such a study or project.

Despite the high level of monitoring taking place, only a small number of responses (6 out of 24) offered estimates of percentage conformance with WCAG 1.0 Guidelines. At Level A for public sector websites, four respondents estimated 10% (or less) conformance and another three at 20% or higher. At Level Double-A one Member State estimated 25% conformance (but did not specify any estimate for Level A), three estimated 10% conformance and two estimated no more than 3%. For private sector websites only one Member State was able to venture any estimate.

The general policy with regard to user accessibility complaints is that they should be directly referred to, and handled by, the particular organisation operating the website. However there are some examples of more formal, independently mediated procedures (e.g. Malta, Netherlands). Experiences here may provide useful guidance to other Member States.

In answer to a further question about court cases relating to an inaccessible website, just one Member State reported such a case. This was not concerned specifically with web accessibility but with much more general considerations of reasonable accommodation. Although the case was decided (against the plaintiff) on relatively narrow legal grounds, it is of interest in raising a more general issue of information access for users with disability, and what the limits of reasonable accommodation may be. In this particular case the plaintiff argued for a specific form of accommodation (Braille) even though, on the evidence of the defendant, this was dramatically more expensive to provide than certain other alternatives, such as web-based text or HTML to be rendered via speech synthesis. (Note: Internationally, the most famous court case to date has been the case in Australia of Maguire vs SOCOG relating to the Sydney Olympics website in 2000, which IBM as the provider of the website lost).

### 2.5 Awareness, training and tools

This part of the survey focused on two questions.

The survey asked, firstly, about web accessibility training initiatives in the public sector. Eleven Member States report specific initiatives in training, but these appear to be of significantly different scope and level. It may be useful to explore opportunities for best practice exchanges in this area.

#### Good practice

#### Denmark

The Ministry of Science, Technology and Innovation is currently developing its public procurement accessibility toolbox further, and any public institution in Denmark can now use the new tool. This works as a database, where the organisation specifies the functionality demanded from the ICT system that is being procured. The database will then create an accessibility requirement specification.

It asked, secondly, about the availability of W3C WAI Guidelines in the national language(s) of each Member State.

According to the responses, the text is not made available in the national languages of Cyprus, the Czech Republic, Greece, Latvia, Malta and Slovenia. Translations are being prepared for Poland and the Slovak Republic. In addition, minority languages of EU Member States are often not covered.

Speakers of these languages must therefore rely on texts in languages other than their native language, but the barriers do not end there as there is often a need, not just for the core WCAG document itself, but also for extensive support and tutorial materials to be available in localised forms. This would be an appropriate area for national authorities to consider more systematic intervention.

### 2.6 Other issues

As well as giving respondents an opportunity to make any additional comments, this section of the survey enabled them to reply to two specific questions.

The first of these concerned the use of any certification system/quality mark for accessible websites (as opposed to a simple monitoring system). Fifteen responses indicate that there is currently no local certification or quality mark scheme for web accessibility. Some of these, however, did indicate that such a scheme would be desirable or may be introduced in the future. In the Member States where such schemes already exist, there is very wide variation in their nature:

- Private and publicly operated.
- Specific to web accessibility versus more general usability/quality.
- Where specific to accessibility, they may or may not reference WCAG 1.0 at various levels (A or Double-A).

This variability naturally makes comparisons difficult. The European Commission notes ongoing activity towards a possible harmonised Europe-wide quality mark. The value of any such harmonised mark would depend on the willingness of individual Member States to endorse and promote it.

### Good practice

### Netherlands

The Design4all Evaluation gives a periodical, accurate and independent check of the accessibility of websites for people with disabilities and the elderly. It was based on the project DrempeIsweg and is now based on the Quality Mark [drempeIsvrij.nl](http://drempeIsvrij.nl). This Quality Mark was a project of all Dutch stakeholders. The scheme assures you of better quality and control over the logo and the inspections.

The Design4all evaluation includes a personal account; online reports page; online helpdesk; online support; possibility for extra checks; complaints procedure etc. Websites that comply with the WCAG 1.0 Priority 1 Guidelines qualify for a quality mark and receive an official Certificate of Accessibility.

Source: [www.accessibility.nl/toetsing](http://www.accessibility.nl/toetsing)

A small, but noticeable, number of responses (5 out of 24) explicitly suggest a need for a stronger legal framework of measurable and enforceable requirements for web accessibility. These would immediately affect the public sector, but it is also envisaged that they would all be extended to the private sector. On the other hand, several responses emphasised instead the need for encouragement of good practice, and one response argued that a 'qualification and audit process' might actually do more harm than good.

Other general points of interest include:

- One response emphasised that web accessibility depends not just on web content but also on the complementary accessibility features of browsers, plug-ins and other content viewers. There was also repeated mention of the need for better (more accessible) content authoring tools. Both of these areas are also, of course, the subject of W3C WAI Guidelines (UAAG and ATAG respectively).
- Several responses noted the significant potential for public procurement policy to encourage improvement in the provision of accessible sites and services. The more recent European Commission communication on eAccessibility COM(2005) 425 (13 September 2005) attaches significant importance to the issue of procurement, and states that the Commission is preparing a mandate to the European standards organisations to develop European accessibility requirements for public procurement of products and services in the ICT domain. This should be issued to the European standards organisations by the end of 2005.

## 2.7 Engagement index

In all, the survey identified ten influencing factors that might have an impact on web accessibility:

Section of survey	Influencing factors
National strategy	Current government target Timescale no later than 2008 Activity since 2004
Legal frameworks	Legislation Responsible body Existence of incentives
Monitoring arrangements	Monitoring list Other studies or projects
Awareness, training and tools	Training initiatives
Other issues	Certification system

Table 2 **Index of engagement**

Together they can be seen as forming an overall index of engagement with web accessibility policy. The responses on these ten areas of potential influence are summarised in Chart 2 overleaf. Each respondent was invited to state if a certain feature of policy existed or not at the current time (e.g. legislation or regulation that relates to, or has an impact on, web accessibility).

## 2 The policy survey

	Potential influences										Total
	1	3	5	9	4	7	8	2	6	10	
<b>Member States</b>											
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	10
2	✓	✓	✓	✓	✓	✓	✓	✓	✓		9
3	✓	✓	✓	✓	✓	✓		✓	✓	✓	9
4	✓	✓	✓	✓	✓		✓		✓	✓	8
5	✓	✓	✓	✓	✓	✓		✓		✓	8
6	✓	✓	✓		✓	✓	✓		✓		7
7	✓	✓	✓	✓			✓	✓	✓		7
8	✓	✓	✓	✓			✓	✓	✓		7
9	✓	✓	✓		✓	✓			✓	✓	7
10	✓	✓		✓		✓	✓	✓		✓	7
11	✓	✓		✓	✓		✓	✓		✓	7
12	✓	✓		✓	✓			✓		✓	6
13	✓	✓	✓	✓		✓	✓				6
14	✓	✓	✓	✓	✓	✓					6
15	✓			✓		✓	✓		✓		5
16	✓	✓	✓				✓			✓	5
17	✓	✓	✓		✓	✓					5
18	✓	✓			✓	✓	✓				5
19	✓				✓	✓		✓			4
20	✓		✓		✓			✓			4
21	✓		✓	✓			✓				4
22	✓							✓			2
23			✓								1
24											0
<b>Total</b>	<b>22</b>	<b>17</b>	<b>16</b>	<b>14</b>	<b>14</b>	<b>13</b>	<b>13</b>	<b>12</b>	<b>9</b>	<b>9</b>	

### Key to influences

1	Current government target	6	Existence of incentive
2	Target achieved by 2008	7	Monitoring applied
3	Activity since 2004	8	Training initiatives
4	Responsible body	9	Other studies or projects
5	Legislation	10	Certification system

Chart 2 **Influences on accessibility across EU**

### 2.8 Evidence of good practice from rest of the world

Although the focus of this study is on EU Member States and European institutions, it is equally important to look for good practice from the rest of the world. In assessing what has happened elsewhere, we identified Australia, Canada and Hong Kong in particular as sources of best practice through their early and continuing initiatives in web accessibility. A summary of good practice is provided in Appendix 5 for each of these three countries. These summaries show that web accessibility cannot be fixed overnight and it may take several years before policies, procedures and initiatives are implemented.

#### Recommendations for public policy-makers at EU level

Ensure effective liaison with all EU-wide organisations (e.g. EIAO, EDeAN, Support-EAM, eAccessibility Expert Group) to encourage the sharing of best practice and a harmonised approach across the EU so that eAccessibility becomes part of the mainstream for online services, e.g. the link between accessibility and usability.

Ensure that EU public procurement policy now builds applicable W3C WAI guideline requirements into all procurements of new website designs, major upgrades, and all outsourced content production (such as reports, publications etc).

#### Recommendations for public policy-makers in each Member State

Assess the potential for a practical style guide with common 'look and feel' standards for public service websites in line with the Canadian model, involving disabled users.

Produce a plan for improving awareness throughout the country by reviewing all the examples of engagement identified in this survey as ideas for improving awareness of web accessibility.

See Section 5.2 for full list of recommendations

### **3 Summary of result across EU**

This project conducted automatic testing of the accessibility of 436 government websites across the EU supported by manual testing across a sample of these. Consistent with similar studies that have taken place, the results found relatively few sites that achieve even Limited Pass Level A conformance with the W3C Web Content Accessibility Guidelines (WCAG 1.0). The project researched correlations between eAccessibility and policy, using information on the many potential factors for influencing success captured in the policy survey. The potential link between eAccessibility and online sophistication was also explored.

### 3.1 Overview of performance

The main objective of this study is to report conformance of government websites in the EU with the W3C WAI Guidelines (WCAG 1.0). The study successfully evaluated 436 websites owned by public administrations of the EU's 25 Member States and several sites owned by the EU. The overall conformance with Level A is shown in Chart 3 below.

This data is based on a variety of accessibility checks derived from the WCAG 1.0 Priority 1 checkpoints, i.e. relating to Level A conformance. It was possible to fully automate a number of these checks, and these were comprehensively applied to an extended selection of pages from every site. (This extended selection of pages was generated by a computer simulating the browsing behaviour of a person, following hyperlinks from the home page to a pre-programmed depth.) The remaining checks required human judgement and interpretation and were carried out on a smaller sample of sites (31 in total). Results from these manual checks were then extrapolated to the full set of sites where appropriate.

A summary of the W3C WAI Guidelines including the four-stage system for classifying passes and failures is given in Appendix 1, followed by a detailed description in Appendix 2 of the evaluation methodology used in this study. Appendix 3 discusses the role of automated evaluation, which is part of this methodology.

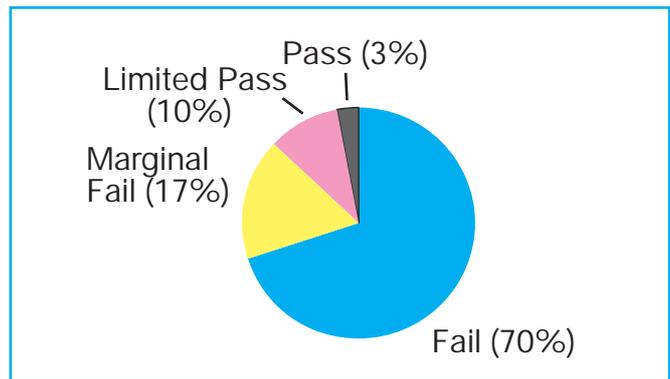


Chart 3 **Conformance with Level A (WCAG 1.0)**

The chart shows that, based on this methodology, approximately 3% of the sites achieve Level A conformance, passing the full suite of both automated and manual checks. A further 10% of sites fully passed all the automated checks, but showed a material failure on one or more of the manual checks (Limited Pass Level A). Another 17% of sites failed one or more of the automated checks, but this failure was limited in extent or scope (Marginal Fail Level A). Finally, the remaining 70% of sites showed widespread failure against one or more of the automated checks (Fail Level A).

A number of automated and manual checks derived from WCAG 1.0 Priority 2 checkpoints, i.e. relating to Level Double-A conformance, were also carried out. While many sites passed at least some of these further assessments, no sites were identified which yet achieve the comprehensive level of accessibility that would be indicated by full Level Double-A conformance.

There is, therefore, a continuing high failure rate as measured by WCAG 1.0 conformance, but for those who have studied recent research these results will be of no surprise.

### 3 Summary of results across EU

For example, a comprehensive assessment using a very similar methodology of websites across four EU states, and reported in July 2004, found that only approximately 5% (out of 4349 sites) achieved Limited Pass Level A conformance. It is important to note that this assessment included a wide range of both public and private sector sites.<sup>2</sup>

In contrast, a comprehensive assessment using an almost identical methodology into local authority websites in the UK and completed six months earlier in December 2004 found that a much higher 13% (out of 468) achieved Level A conformance.<sup>3</sup>

Nonetheless, it should be emphasised that 3% of sites in the current study did already achieve essentially full conformance with WCAG 1.0 Level A in this study. This demonstrates that it is a very real, immediate and practical objective to achieve. Moreover, if we consider the 10% of sites which already pass all the automated assessments, and the additional 17% of sites, which had only limited failures on these automated assessments, there are a large number of sites, which have already made significant progress towards this level of conformance, and which may require only relatively modest enhancement in order to achieve it fully.

<sup>2</sup> A Comparative Assessment of Web Accessibility and Technical Standards Conformance in Four EU States. Carmen Marincu and Barry McMullin. First Monday, volume 9, number 7 (July 2004). <http://eaccess.rince.ie/white-papers/2004/warp-2004-00/warp-2004-00.html>

<sup>3</sup> Better connected 2005: a snapshot of all local authority websites (Socitm Insight [www.socitm.gov.uk/public/insight](http://www.socitm.gov.uk/public/insight))

#### Comparison with private sector

This survey focuses on the public sector. The results show that much has to be done to make services e-accessible, but how typical are they across other sectors? One of the partners in this survey (AbilityNet) has in the past two years applied similar methodology, but in less depth, to assessing 76 websites in commercial sectors in the UK (airlines, newspapers, banks, supermarkets, sport, retail and telecommunications) as part of the quarterly ENation review. Of these 76 sites only five have achieved Level A. This equates to 7% of the sites tested, compared with 13% in this survey that achieved Limited Level A, or better.

This conclusion, therefore, suggests that the private sector is certainly no further advanced than the public sector when it comes to web accessibility.

#### Recommendation for public policy-makers at EU level

Set a clear target for making all public sector websites in the EU conform with WCAG 1.0 Level Double-A by 2010 as part of the i2010 strategy to promote an inclusive European information society.

See Section 5.2 for full list of recommendations

### 3 Summary of results across EU

The distribution of failure rates is also of interest as Chart 4 below shows:

Note: The total comprises 25 Member States plus the European institutions.

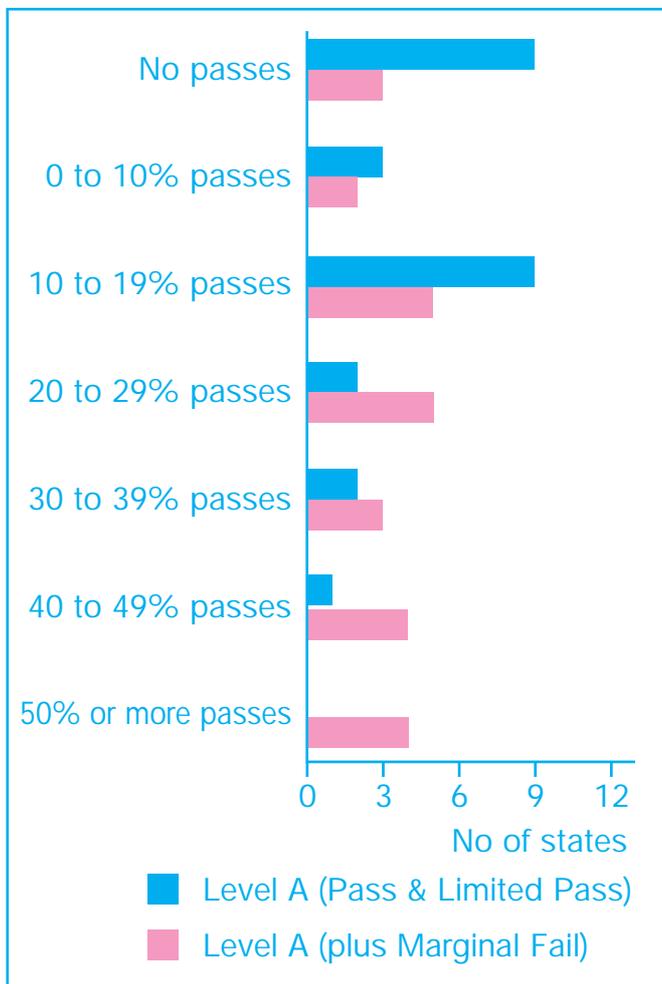


Chart 4 **Conformance with Level A (WCAG 1.0) by Member State**

The results vary from one Member State to another. The state with the highest percentage of Limited Passes at Level A achieves 40%, but nine states have no passes at all. If we extend the classification to include those we have classified as Marginal Fail Level A, then four achieve 50% or more (the highest 60%) but five Member States still have fewer than 10%.

The eight Member States that achieve the highest proportions of sites classified as Marginal Fail Level A and higher are shown in Chart 5.

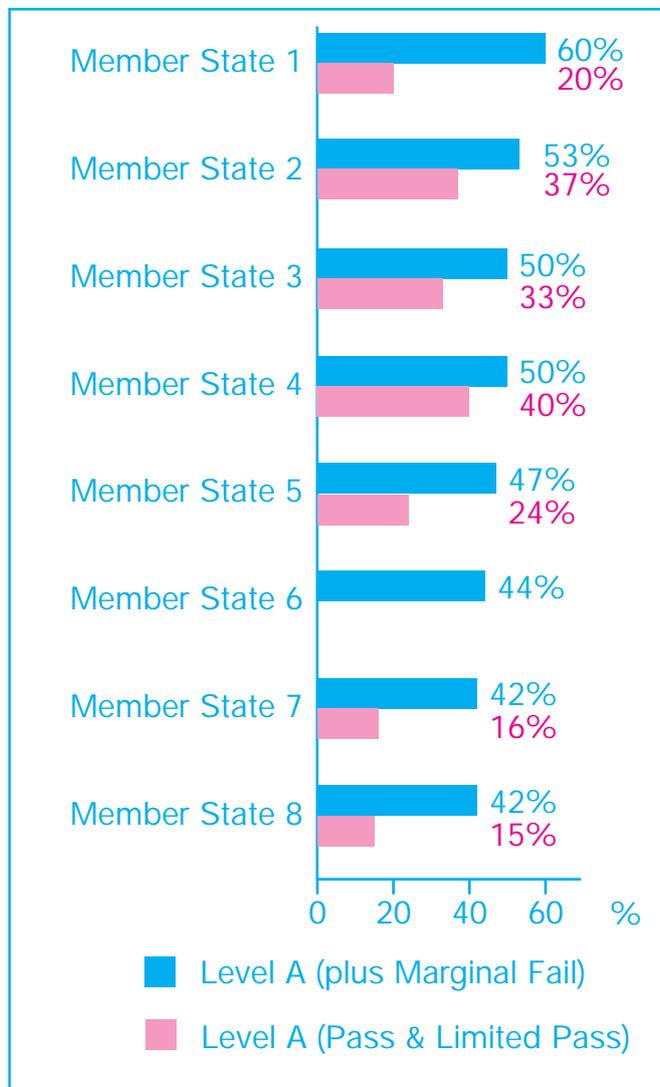


Chart 5 **Member States with highest levels of conformance**

Why do some Member States do so much better than others? Some clues are given in Section 3.3, which examines the correlations with potential influences.

### 3.2 Estimated versus actual conformance

The policy survey requested respondents to estimate the proportions of sites in each Member State that already conform with WCAG 1.0 at various levels. However, only six respondents considered that they had adequate information to make such estimates. The most comparable data returned related to Level A conformance within the public sector, where there were six clear estimates. These estimates and the actual results at Limited Pass Level A are shown in Chart 6.



Chart 6 **Estimate of conformance with WCAG 1.0 Guidelines**

The key lessons to be learned from this chart are, firstly, that most Member States are not even in a position to estimate their conformance and, secondly, that those who did provide them have offered low estimates, which clearly indicate that they know they are not coming up to even the Level A standard. Moreover, in the six cases where we can compare actual figures with estimates, five significantly over-estimated performance and three have no positive results to report at all, according to our testing of the selected sites.

If we assume that the sites studied are representative of government websites in each Member State, these observations all show that there is a significant gap in information and feedback between policy planning and actual outcomes. Closing this information gap should improve effectiveness of all related policy interventions. This could be realised independently by Member States, but there may also be benefits and synergies through co-operative efforts at the European level. The European Internet Accessibility Observatory Project (EIAO) (currently supported under the EU Sixth Framework Programme) may provide a mechanism for such collaboration. Its stated goal is to 'contribute to better eAccessibility for all citizens and to increase the use of standards for online resources' (Source: [www.eiao.net](http://www.eiao.net)).

### 3 Summary of results across EU

#### **Recommendation for public policy-makers at EU level**

Develop feedback mechanisms for closing the information gap between policy planning and actual outcomes across the EU (The European Internet Accessibility Observatory Project (EIAO) may provide a mechanism for such collaboration).

In particular, aim to test systematically, and on a regular basis, the progress that should now be made. This may include revisiting the current study in 12 to 18 months' time, and should be integrated with ongoing i2010 monitoring activities.

#### **Recommendation for public policy-makers in each Member State**

Develop feedback mechanisms for closing the information gap between policy planning and actual outcomes so that regular monitoring of performance against eAccessibility is made and communicated.

See Section 5.2 for full list of recommendations

## 3.3 Correlation with potential influences

The policy survey identified ten potential factors that might influence web accessibility. The correlation of each of these (plus the aggregate index of engagement) with the proportion of sites achieving Marginal Fail Level A or better was calculated. Chart 7 identifies the two individual influences that were then judged to show a statistically significant correlation (98%+ confidence level).

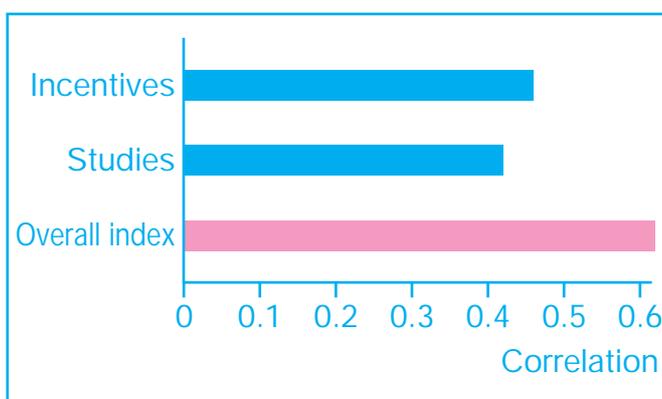


Chart 7 **Accessibility results correlated with influences**

From this chart it is seen that one single influence, which was found to have the strongest correlation with accessibility outcomes, was the existence of incentives (legal or otherwise). This was found to be statistically significant, but it should be acknowledged that this correlation is still relatively weak in absolute terms (at 0.46 on a correlation scale of zero to one) and should not be over-interpreted.

The detailed answers about the nature of the incentive are reproduced in Section 2 of this report. Eight of the nine Member States where some form of incentive exist also have

a legislative framework that reinforces the incentives available, the exception being Denmark where an annual competition drives up standards. Overall, the result does suggest that Member States could usefully collaborate on sharing practice in the types of incentives that they have in place to encourage stronger commitment to accessible web design.

#### **Recommendation for public policy-makers in each Member State**

Review the incentives available to encourage the provision of accessible websites in the public service and, if necessary, consider the need for a strong legislative framework.

See Section 5.2 for full list of recommendations

The influence showing the second strongest individual correlation with accessibility was the reporting of recent local studies on web accessibility in the relevant jurisdictions by fifteen Member States. While this is again only a modest correlation in absolute terms, it does suggest that there is a degree of positive interaction between local studies and actual accessibility outcomes. Further, it seems likely that this wealth of evidence from such local studies contributes to the enhancement of web accessibility practices across Europe — e.g. via the European Design for All eAccessibility Network (EDeAN).

The third bar of the chart shows the impact of positive answers to all ten factors, which together can be seen as an index of engagement, with the web accessibility agenda. This shows a strong, overall correlation with current outcomes.

### 3 Summary of results across EU

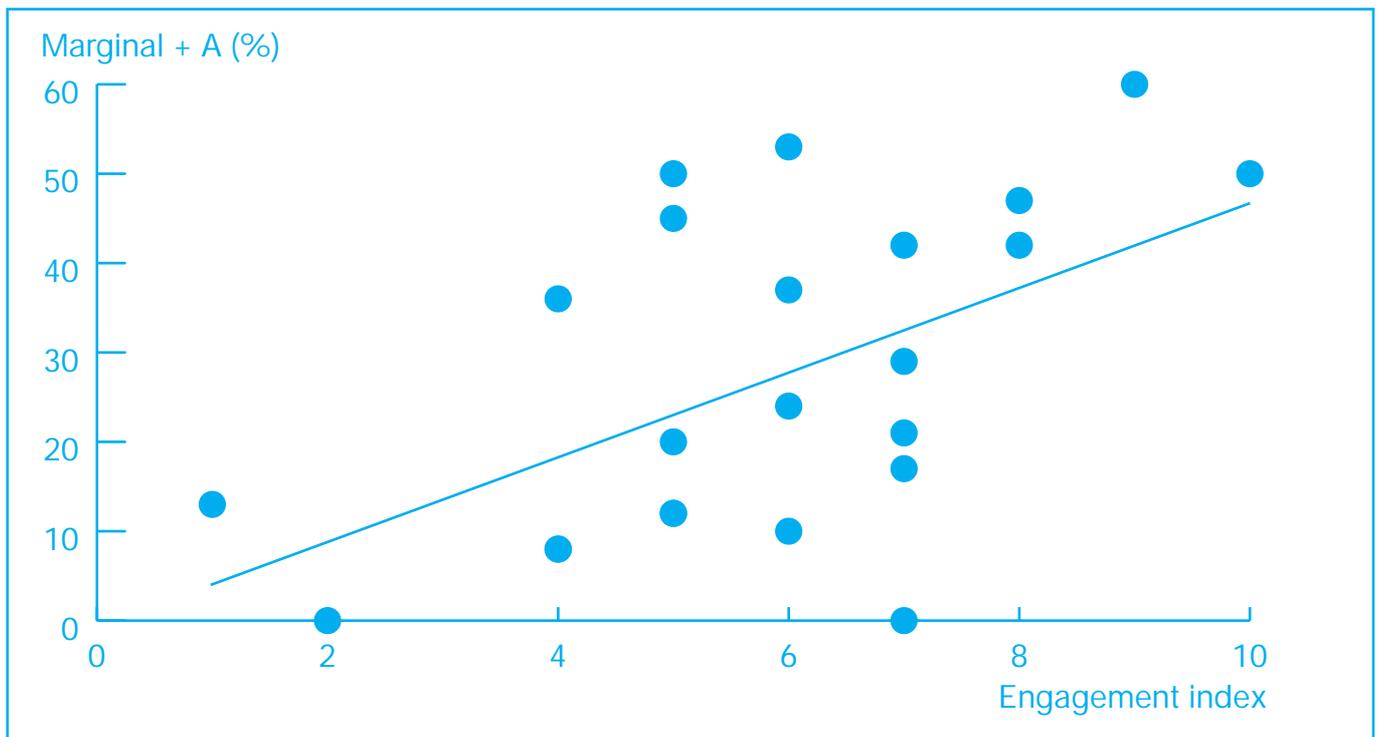


Chart 8 **A comparison of policy engagement with eAccessibility outcomes**

Chart 8 shows in greater detail the relationship between the percentage of sites in each Member State achieving at least Marginal Fail Level A conformance and this engagement index. The total set of influences surveyed give a meaningful measure of an index of engagement of each state with web accessibility policies. Stronger overall policies are already showing stronger outcomes in terms of actual WCAG 1.0 conformance. However, the particular mix of influences can vary significantly. Different Member States may choose to focus on different influences, but still achieve comparable outcomes.

These findings are also illustrated in Chart 5 (see section 3.1) that lists the eight Member States where government websites have at least been classified as Marginal Fail Level A or better in 40% of cases examined. The policy survey shows that five of these eight

Member States have a higher than average number of examples of engagement. In fact, the top three have the three highest number of mentions. Moreover, seven of the eight have some form of incentive in place (out of nine Member States in total that have some form of incentive), suggesting that the existence of incentives might lead to more accessible websites.

**Recommendation for public policy-makers in each Member State**

Produce a plan for improving awareness throughout the country by reviewing all the examples of engagement identified in this survey as ideas for improving awareness of web accessibility.

See Section 5.2 for full list of recommendations

### 3.4 Correlation with e-government sophistication

The majority of the sites studied are those put in place to provide the e-government services which are benchmarked each year as part of the eEurope initiative. These are, generally, government websites which offer some degree of interaction or transaction rather than purely informational sites. Given this situation and the general move towards greater degrees of transaction in e-government services, we explored the possibility of a link between e-government sophistication and web accessibility. More sophisticated websites might be harder to make and keep accessible, or conversely encourage much greater awareness.

In making this correlation, the study team used the eEurope/Cap Gemini definition of eEurope sophistication (see report entitled *Online Availability of Public Services: How is Europe Progressing*).<sup>4</sup>

In the event we identified no statistical correlation between accessibility and either of the key measures used in that report for online sophistication or the availability of government information online. It seems likely that the main reason for this lies in differences between the methodologies of site sampling used in the two studies. The link between website sophistication and accessibility cannot be ruled out.

On the contrary, both principled technical considerations and qualitative experience (including some of the manual evaluation in the current study) suggests that more sophisticated sites do pose a wider variety of potential accessibility barriers than less sophisticated sites.

However, the guidelines do not by definition indicate that higher complexity levels automatically imply worse accessibility for a site. It could be argued that the underlying content management system is, in that respect, far more important. A well-designed content management system can enforce adherence to a significant number of checkpoints and assist in meeting a range of others.

<sup>4</sup> [www.euractiv.com/Article?tcmuri=tcm:29-142954-16&type=Analysis](http://www.euractiv.com/Article?tcmuri=tcm:29-142954-16&type=Analysis)

## **4 Detailed analysis of results**

The testing of websites has identified clear examples of good practice, describing the approach that others should emulate if the accessibility of online public services across EU member states is to improve. It has also uncovered the common reasons why many websites are falling short of the required standards at Level A and Level Double-A. From this information a list of priorities has been developed that will achieve the greatest impact for disabled users with the most efficient use of resources.

### 4.1 Evidence of good practice

#### Overview of good practice

Web managers, developers and policy-makers, can learn from the good practice shown by some of the sites that have performed well during our testing. A further step in the process of assessment was used to select good practice sites from those that achieved Limited Pass Level A (Appendix 2 details this final step of evaluation). From this analysis, three European websites have been highlighted demonstrating overall good practice.

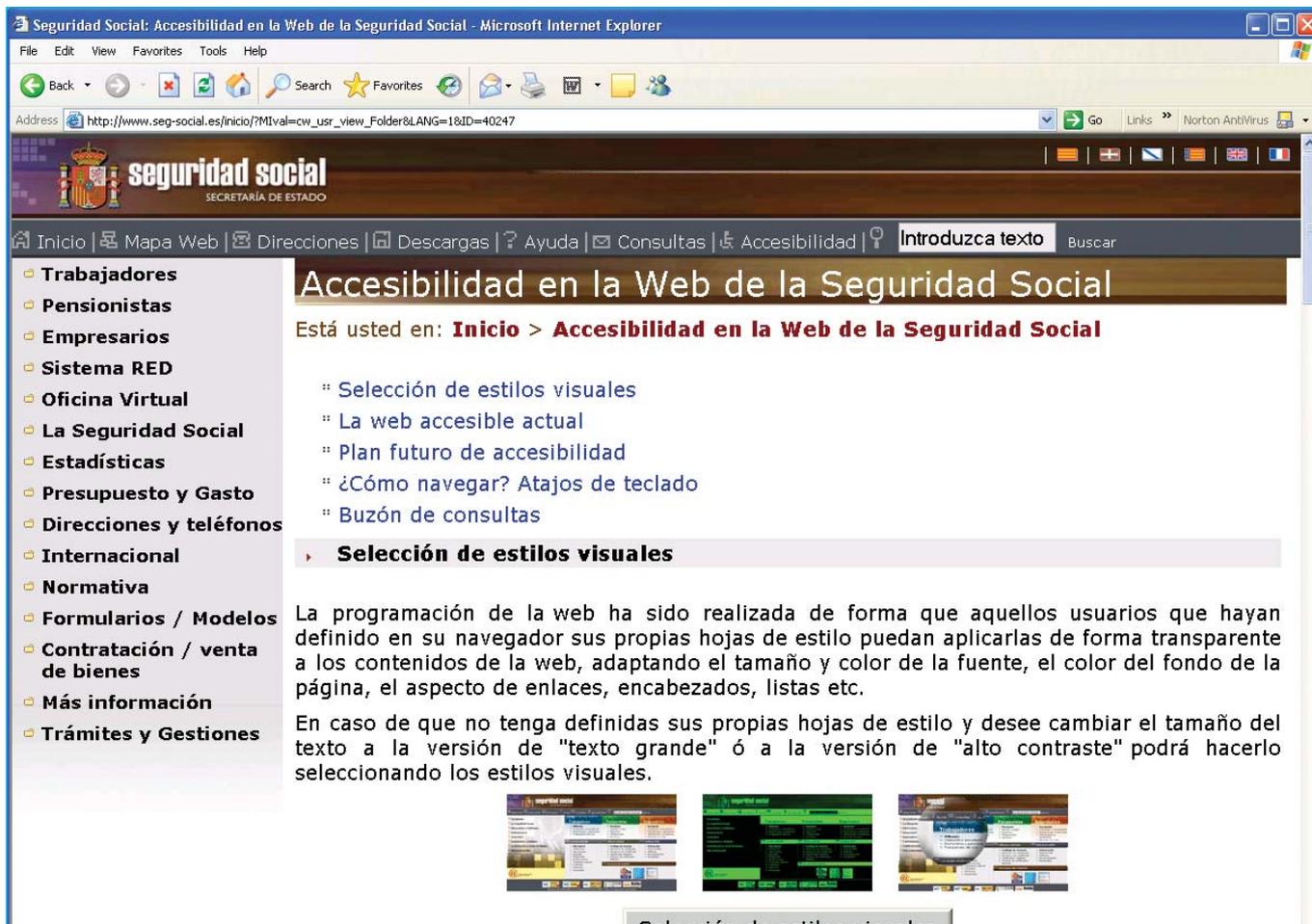
- Spain Social Security Administration [www.seg-social.es](http://www.seg-social.es)

- UK Department of Health [www.dh.gov.uk](http://www.dh.gov.uk)
- EU European Central Bank [www.ecb.int](http://www.ecb.int)

All three of these sites demonstrate at least ten out of the 12 features of good practice listed opposite. For example, they each have very clearly laid-out pages detailing site-specific accessibility features that are directly linked from the home page. These pages not only give helpful information about accessibility, but in so doing present a positive policy to accessible web services.

#### Example of good practice

Social Security Administration website [www.seg-social.es](http://www.seg-social.es) (as at October 2005)



## 4 Detailed analysis of results

### Twelve features of good practice

The following features of good practice in accessible web design are a more concrete illustration of a number of the WCAG 1.0 checkpoints. However, they are not a substitute for the full set of WCAG 1.0 checkpoints, nor are they intended to suggest any alternative prioritisation. Rather, they are just a noteworthy selection of the good practice accessibility features in operation during the current study.

#### 1 Accessibility page (Ref: WCAG 1.0 Checkpoint 13.3 – Priority 2)

This provides information about the accessibility of the website and is also an opportunity to state known accessibility barriers. By demonstrating awareness of accessibility issues, it makes a positive statement about commitment at both the policy as well as the implementation level.

#### 2 Alternative text (Ref: WCAG 1.0 Checkpoint 1.1 – Priority 1)

Whilst sighted users can see physical images on the web page, users who are vision impaired rely on the alternative text being read by a screen reader for the image so that they may understand what the image is. The use of alternative text (also known as 'alt text' or 'alt tags') for all types of image, such as pictures, text as graphics, decorative graphics, spacer 'gifs', form buttons and graphical links, is fundamental to accessibility. It is responsible for around 30-40 percent of all problems affecting a range of disabled people accessing the web.

For a number of reasons all graphics on a page need to be labelled. Blind users accessing the website via a screen reader will have only the information in the 'alt text' to gauge the importance of a particular image. In addition, missing 'alt text' on graphical links and form buttons will impede

the usability of the website for users using voice recognition software. The usability of the website will also be significantly reduced for users with cognitive impairments or dyslexia, as software packages that they use to assist them will 'speak' the content of the page, including pictures and graphical links. In short, if no meaningful alternative text is provided, this reduces greatly the readability and the visitor's understanding of the site content.

#### 3 'Breadcrumb' navigation (Ref: WCAG 1.0 Checkpoint 13.4 – Priority 2)

Providing consistent navigation is important for all users enabling them to orientate themselves within the website and reduce the possibilities for becoming confused or lost. In addition to consistent navigation, it is often helpful to provide a 'breadcrumb' navigation list. This is a design feature created to help users understand where they are in relation to the previous page, as well as the site as a whole. It is particularly helpful for users with cognitive disabilities.

#### 4 Cascading style sheets (CSS) (Ref: WCAG 1.0 Checkpoint 3.3 – Priority 2)

Cascading style sheets (CSS) are used to define the presentational aspects of a web page, such as its use of background colour, text colour and the position where objects are placed on a page, whilst the content is defined in the web page code itself. Separating content from presentation by using CSS results in the website engaging a consistent design that improves its accessibility. It facilitates easy navigation for a user as the means of navigation is likely to be in the same place on each page. By introducing CSS instead of 'hard coding' presentation information into the content, users have the facility to override style sheets with their own customised style sheet, if they require specific colour combinations, very large fonts or a different layout, for example.

## 4 Detailed analysis of results

### 5 Font resizes (Ref: WCAG 1.0 Checkpoint 3.4 – Priority 2)

It is important that users are able to increase font sizes in their browser. This is specifically helpful for low-vision users, where increasing the font from the default size enables them to read the information on the web page more clearly. This option is facilitated when websites do not attempt to specify 'absolute' font sizes.

### 6 Headings (Ref: WCAG 1.0 Checkpoint 3.5 – Priority 2)

Users of screen readers, magnifiers, or Braille displays cannot easily scan the overall organisation of a web page. This will slow down their use of the web significantly. However, if they extract an outline of the page, based on properly structured headings and subheadings, this facility will provide such users with a quick way to skim the content rather than plough through the whole web page. The user can scan the headings and select any of interest to go to the specific area on the page. Such a page outline can also facilitate in-page orientation and navigation for users with some cognitive disabilities.

### 7 Keyboard accessibility (Ref: WCAG 1.0 Checkpoint 9.2 – Priority 1)

Users with a wide variety of disabilities may be unable to operate a mouse or other pointer-type input device. This may arise owing to physical difficulty in operating a mouse, or a visual or cognitive impairment which means the user cannot effectively track an on-screen mouse pointer. In all such cases, it is essential that any user interactions required on a website can be completed using a keyboard interface — whether a conventional computer keyboard, or one specially adapted to the specific needs of the user.

### 8 Site map (Ref: WCAG 1.0 Checkpoint 13.3 – Priority 2)

This is a useful tool for people who want to orientate themselves after becoming lost in the website, particularly for a range of disabled people such as blind web users and people with cognitive impairments such as memory disorders.

The site map allows users to gain an overall 'feel' for the layout of the site, while also allowing direct access to any page on the site. If it provides access to only a selection of pages, it becomes of limited use as an information location tool. If pages appear as one very long list, the usability of the feature as a navigational aid is severely compromised.

### 9 Page titles (Ref: WCAG 1.0 Checkpoint 13.2 – Priority 2)

Providing a unique page title is important because it aids users of non-graphic browsers, particularly visually impaired/blind users in identifying quickly which page they have arrived at. Unique page titles will also allow pages of the site to be indexed more accurately by non-human devices such as search engine robots.

### 10 Skip navigation (Ref: WCAG 1.0 Checkpoint 13.6 – Priority 3)

Non-graphical browsers, including text-to-speech-based browsers, provide web page information in a linear form. This means that users cannot scan pages to find the start of the important page content. By providing a means to skip to important page content, navigation is speeded up for non-graphical browser users, particularly blind and vision-impaired users.

## 4 Detailed analysis of results

### 11 Validation of pages (Ref: WCAG 1.0 Checkpoint 3.2 – Priority 2)

Pages that validate, i.e. those which have been coded using standards defined by formal grammars, are likely to be supported by more browsers and assistive technologies, thereby resulting in the page being accessible by a greater number of users. Many features of assistive technologies and web browsers rely on published formal grammars. Moreover, pages that fail validation are likely to create barriers for users accessing the web via assistive technologies such as a screen reader.

### 12 Warning of link opening in a new window (Ref:WCAG 1.0 Checkpoint 10.1 – Priority 2)

Opening a link in a new window without letting the user know is an issue because it can often confuse a screen reader user and people with cognitive impairments such as memory deficit disorder, e.g. they might not know why the browser back button no longer works.

### Example of good practice

Department of Health website [www.dh.gov.uk](http://www.dh.gov.uk) (as at October 2005)

Accessibility: The Department of Health - Help - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address [http://www.dh.gov.uk/Help/HelpTechnical/fs/en?CONTENT\\_ID=4088697&chk=ZWm8nd](http://www.dh.gov.uk/Help/HelpTechnical/fs/en?CONTENT_ID=4088697&chk=ZWm8nd) Go Links Norton AntiVirus

Site map | Help | Contact us

Search this site  this site Go

Advanced Search

DH home | Policy and guidance | Publications and statistics | News | Consultation | Procurement and proposals | About us

> DH home > Help > **Help technical**

< Help  
Contains this content:  
> Frequently asked questions

## Accessibility

Accessibility tips and features on the DH website.

**Select a section**

- About accessibility
- Keyboard navigation
- Browsealoud troubleshooting
- Downloading documents
- Text size and colour
- Speech enabling
- PDF accessibility

**About accessibility**

**Q What is accessibility and why does it matter?**

A To be accessible the DH website must be as easy to use and understand for as many visitors as possible. We comply with the World Wide Web Consortium's (W3C's) Level A guidelines for accessibility and we are committed to improving.

>> [W3C web accessibility initiative \(opens new window\)](#)

^ Back to top

**Text size and colour**

**Q Can I change font sizes and the colours of the website?**

**Related Links**

- >> [Government accessibility guidelines \(opens new window\)](#)
- >> [W3C web accessibility initiative \(opens new window\)](#)
- >> [Browsealoud \(opens new window\)](#)

## 4 Detailed analysis of results

### Additional examples of good practice

In addition to our three examples of overall good practice, the study has identified many

sites that have demonstrated individual areas of good practice, although not excelling in every way.

Member State	Title of website	URL
Austria	Austrian national portal	<a href="http://help.gv.at">http://help.gv.at</a>
Estonia	Estonian Institute	<a href="http://www.eesti.ee">www.eesti.ee</a>
France	Minister of the Interior	<a href="http://www.interieur.gouv.fr">www.interieur.gouv.fr</a>
Hungary	Prime Minister's Office Information Technology Government Commissioner	<a href="http://www.meh.hu">www.meh.hu</a>
Italy	Verso L'Universita	<a href="http://universo.miur.it">http://universo.miur.it</a>
Luxembourg	Police Grande Ducale	<a href="http://www.police.public.lu">www.police.public.lu</a>
Lithuania	State Social Insurance Fund Board under the Ministry of Social Security and Labour	<a href="http://www.sodra.lt">www.sodra.lt</a>
Malta	Portal to Malta Government Services	<a href="http://www.gov.mt">www.gov.mt</a>

Table 3 **Appropriate 'alt text' for images** (as at July 2005)

Member State	Title of website	URL
Austria	Austrian national portal	<a href="http://www.help-business.gv.at">www.help-business.gv.at</a>
France	Directorate General of Customs	<a href="http://www.douane.gouv.fr">www.douane.gouv.fr</a>
Greece	Citizen Service Centres Project — Ministry of Interior and General Secretary of Public Admin and e-Government	<a href="http://www.kep.gov.gr">www.kep.gov.gr</a>
Ireland	Online Access to Services Information and Support (OASIS)	<a href="http://www.oasis.gov.ie">www.oasis.gov.ie</a>
Lithuania	State Social Insurance Fund Board under the Ministry of Social Security and Labour	<a href="http://www.sodra.lt">www.sodra.lt</a>
Portugal	Portuguese Directorate-General for Traffic	<a href="http://www.dgv.pt">www.dgv.pt</a>

Table 4 **Appropriate handling of image maps** (as at July 2005)

## 4 Detailed analysis of results

Member State	Title of website	URL
Austria	Federal Ministry for land and forestry, environment and water management	www.lebensministerium.at
Austria	Convention on the International Trade in Endangered Species of Wild Fauna and Flora	www.artenschutz.at
Germany	The Deutschland Portal	www.deutschland.de
Italy	Comune di Sala Consilina	www.comune.sala-consilina.salerno.it
Spain	Spanish Social Security	www.seg-social.es
Sweden	Swedish Agency for Economic and Regional Growth	www.nutek.se

Table 5 **Websites with no deprecated HTML** (as at July 2005)

### Example of good practice

European Central Bank [www.ecb.int](http://www.ecb.int) (as at October 2005)

The screenshot shows the ECB website interface in Microsoft Internet Explorer. The browser's address bar displays <http://www.ecb.int/home/html/index.en.html>. The website features a top navigation bar with links for Home, Site Directory, Glossary, Links, Contact, Disclaimer & Copyright, and Search. A language selector is set to 'en'. Below this is a main menu with categories: The European Central Bank, Press, Events, Publications, Statistics, Banknotes & Coins, Monetary Policy, and Payments & Securities. On the left, a 'Direct access' section provides links for students, job applicants, suppliers, economic research, and legal framework. The main content area includes a 'Key figures at a glance' table, a 'Genuine or counterfeit? Check your Euro banknotes online' section with an image of a Euro banknote, and a 'Recently published' section with links to the latest monthly bulletin and monetary policy reports. On the right, there are sections for 'Future events' (including weekly schedules and governing council meetings), 'Languages available' (listing various languages), 'ECB Cultural Days, 2-28 November 2005', and 'TARGET' (EU-wide system for euro payments).

Marginal lending facility	3.00 %
Main refinancing operations	2.00 %
Minimum bid rate	
Deposit facility	1.00 %
→ Past key ECB interest rates	
→ Open market operations	
→ Euro foreign exchange reference rates	

## 4 Detailed analysis of results

Member State	Title of website	URL
Austria	Convention on the International Trade in Endangered Species of Wild Fauna and Flora	www.artenschutz.at
Malta	Malta Police Force — Online Reporting System	www.pulizija.gov.mt
Spain	Federation of Spanish Municipalities and Provinces	www.femp.es
Sweden	Swedish Companies Registration Office	www.bolagsverket.se
Sweden	Swedish Agency for Economic and Regional Growth	www.nutek.se

Table 6 **Websites with limited HTML validation errors** (as at July 2005)

### Recommendation for public policy-makers at EU level

Ensure effective liaison with all EU-wide organisations (e.g. EIAO, EDeAN, Support-EAM, eAccessibility Expert Group) to encourage the sharing of best practice and a harmonised approach across the EU so that eAccessibility becomes part of the mainstream for online services, e.g. the link between accessibility and usability.

See Section 5.2 for full list of recommendations

## 4.2 Common reasons for failure at Level A

### Overview of reasons for non-conformance

It is vital to understand where the reasons for failure lie in order to propose actions for improvement. We start with the most common reasons for failure at Level A, summarised in Chart 9, identified by automated evaluation. This shows a high incidence of failure across the full sample of sites for five of the fully automated checks.

(Note: These include all sites classified as Marginal Fail Level A as well as those that have been assessed as Fail Level A.)

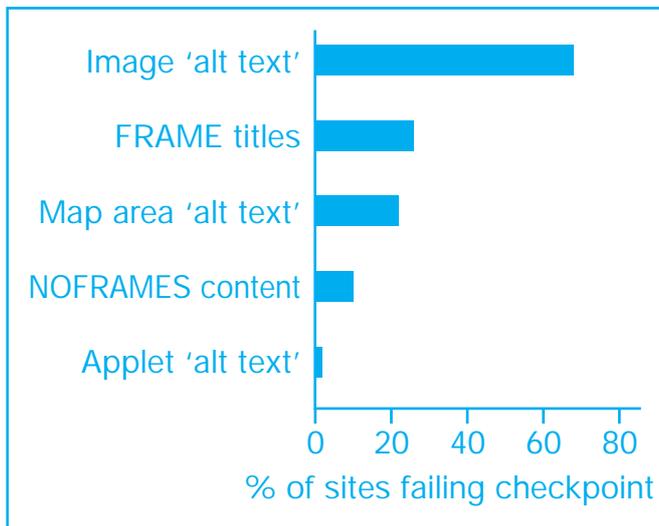


Chart 9 **Reasons for non-conformance (Level A)**

In order to help organisations achieve Level A conformance, we have provided a further series of charts, analysing in turn each of the five reasons in Chart 9.

Of the sites that were found to fail these specific checks, just over 20% were considered to have failed marginally, the failures being limited in variety and/or scope across the site. These sites were classified as Marginal Fail A. If these sites were able to have this core set of accessibility defects corrected, then they would be converted into the Limited Pass A category; and, as a result, 30% of sites would achieve this level. This would be a significant short-term step in improving WCAG 1.0 conformance, for potentially little effort.

We finish with the most common reasons for failure at Level A identified by manual evaluation. Of the 57 sites which successfully passed all the fully automated checks at Level A, a sample of 16 were subjected to further detailed manual evaluation. At this stage, four of these sites were found to have substantially achieved Level A conformance; the remaining 12 sites (75% of those subject to this manual evaluation) still failed at least one check. There was no single dominant reason for this. Most sites failed on multiple checks, and there was substantial diversity in which particular manual checks were failed. However, five kinds of problem accounted for almost all of these failures. If these could be corrected, virtually all the sites considered here could have achieved the full Level A Pass classification.

## 4 Detailed analysis of results

### Missing alternative text for image

‘Provide a text equivalent for every non-text element’ (WCAG 1.0 Checkpoint 1.1 — Priority 1)

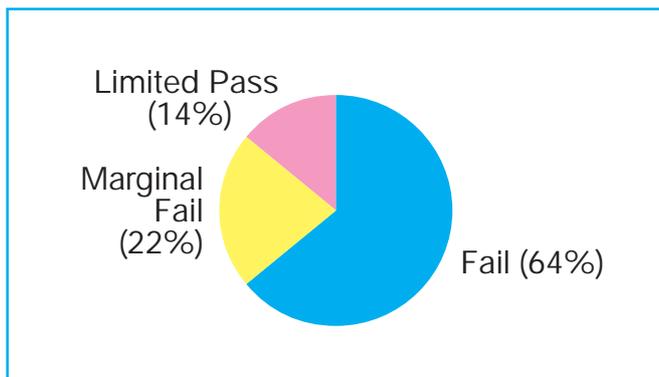


Chart 9a **Image ‘alt text’ (Level A)**

Almost two-thirds of sites have widespread instances of this problem. Omission of this alternative text represents a substantial potential barrier for significant numbers of people with disabilities, particularly those affected by a variety of vision impairments. This manifests itself in two distinct ways:

- Most seriously, an image may convey significant information or play an important functional role, such as hyperlinked graphical icons to navigate to certain site resources. In these cases, people who cannot perceive the images effectively will find it very difficult, if not impossible, to access some or all of the site facilities.
- An image may, in reality, only be for visual decoration, or be functionally redundant. In these cases, the appropriate alternative text is simply an empty string. However, it is still important to provide this explicitly. Without it, serial assistive technologies, such as Braille displays and speech synthesisers will be forced to waste time announcing the presence of the image, and affected users cannot be sure whether or not they are missing an important feature.

Formulation of appropriate alternative texts for images does require training for website designers and authors; but it is not a complex skill. In the great majority of cases, composing suitable alternative texts requires only a nominal amount of additional effort. There may be a difficulty if an authoring tool or content management system does not facilitate the process of adding alternative texts; but in such cases it would be appropriate for organisations to source more appropriate tools, ideally conforming with the W3C WAI Authoring Tool Accessibility Guidelines (ATAG).

Deployment of appropriate alternative texts for images can bring additional benefits. For example, images cannot, in general, be automatically indexed for search purposes; but the corresponding text alternatives can. Where images carry significant information or are functionally important, this will improve access to a site for all users.

To summarise, it is clear that this defect is correctable, usually with minimal investment, and with significant and immediate benefits for users with a variety of disabilities. Given the continuing high incidence of this defect, there is a strong case for targeted intervention to address this single issue.

#### Recommendations for web managers and developers in all public sector organisations

Ensure that all images are supported with effective alternative text, appropriate to the situation at all times (including explicitly null alternative text, where applicable).

See Section 5.2 for full list of recommendations

## 4 Detailed analysis of results

### Missing FRAME titles

'Title each frame to facilitate frame identification and navigation' (WCAG 1.0 Checkpoint 12.1 — Priority 1)

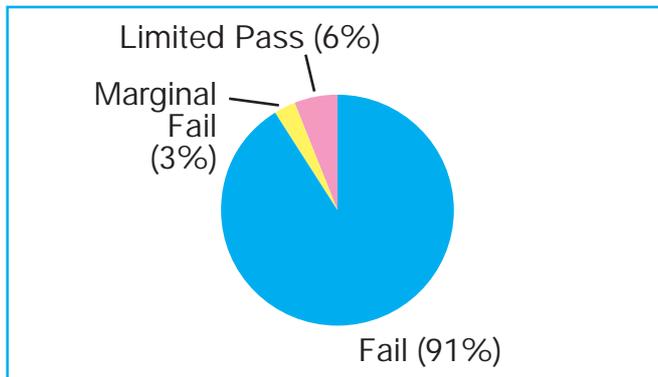


Chart 9b **FRAME titles (Level A)**

The second most pervasive of the defects assessed was missing 'title' attributes on 'frame' elements. This occurs in sites that use the HTML 'frameset' mechanism for combining a number of distinct resources, or pages, into a single unit for visual display to the user. A typical application is to maintain a common navigation panel for a site in a separate pane of the browser window from the substantive site content. The frameset mechanism was originally conceived and designed specifically with visual users in mind, and, therefore, presents additional difficulties for users who cannot directly perceive a multi-frame visual layout. Frameset sites can still be made accessible to such users, but this depends critically on providing additional, non-visual 'hints' or 'cues' about the functions of the different visual frames. This is technically done via the 'title' attributes on the 'frame' elements. In the absence of such attributes, these sites will be difficult, if not impossible, to navigate for many users with a wide variety of visual disabilities.

Frameset is, at this stage, an obsolete technology. This is evident from the fact that, in this study, only about 22% of sites use it. We recommend that, where a website with frameset is undergoing a major redesign, the opportunity should be taken to discontinue its use.

However, in the interim, of those sites using frameset, almost all (91%) currently omit titles from frames. Accordingly, where frameset does continue to be used, we strongly recommend the basic step of providing appropriate frame titles as a matter of urgency. In general this requires a very modest effort, and has a significant positive impact on accessibility to such sites for a variety of users with disabilities.

#### **Recommendations for web managers and developers in all public sector organisations**

Discontinue the use of obsolete frameset technology. If not immediately possible, make sure that the settings related to its use are fully accessible.

See Section 5.2 for full list of recommendations

## 4 Detailed analysis of results

### Missing alternative text for image map area

'Provide a text equivalent for every non-text element' (WCAG 1.0 Checkpoint 1.1 — Priority 1)

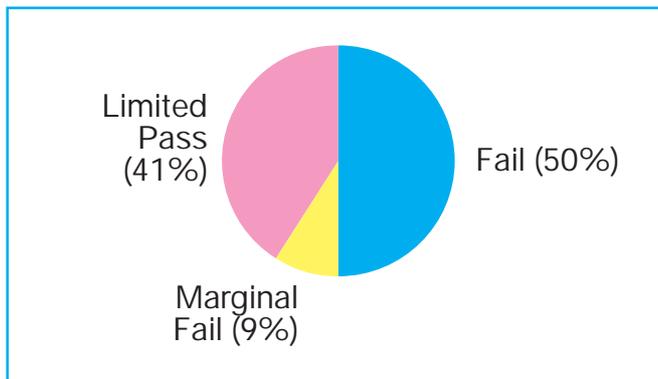


Chart 9c **Image map area 'alt text' (Level A)**

Image maps are used to provide complex 'clickable' images, where clicking in different parts of the image follows a different hyperlink. They are commonly used to implement graphical navigation bars. In this study, their use was quite extensive, with over 33% of sites having at least one example.

As with simple images, the image map technique presents potential access barriers, particularly for users with vision impairment. Similarly, the solution is to associate appropriate alternative texts with each image map area, and thus with each distinct hyperlink. The user's assistive technology can then render the navigational possibilities in a tailored, accessible, form.

Image maps differ somewhat from generic images in their impact on accessibility. Firstly, as they are often used to implement critical site navigation features, they can have a fundamental and pervasive impact on overall site accessibility if they are inaccessible. Secondly, when used in this way, typically they arise in the form of one or more site-wide templates, and so repair (adding appropriate text alternatives) can often be a very simple and quick process, even on otherwise very large or complex sites.

As a result, and particularly given the relatively small intervention that is often required, we strongly recommend that web developers should repair these defects.

## 4 Detailed analysis of results

### Missing NOFRAMES alternative

'Provide a text equivalent for every non-text element' (WCAG 1.0 Checkpoint 1.1 — Priority 1)

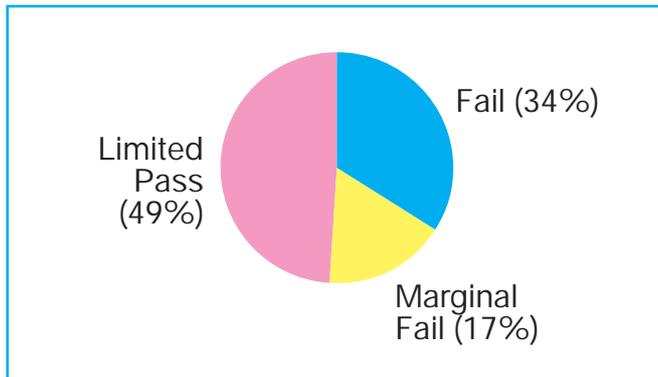


Chart 9d **NOFRAMES content (Level A)**

This defect again relates to the use of frameset technology. The 'noframes' element is intended to provide an alternative access mechanism in cases where a user's browser does not support frameset at all. If a site must use frameset, it should code frame titles correctly and also provide an appropriate and functional 'noframes' element.

Only 10% of sites overall omit the 'noframes' element. However, this constitutes over 30% of sites that do use frameset. Moreover, manual inspection of a sample of these sites shows that, even where a 'noframes' element is identified, the content is often found to be an ineffective alternative, i.e. a statement that the site requires a browser which supports frameset. Therefore, it is likely that the incidence of satisfactory frames alternatives is lower than the raw data suggests.

Nevertheless, there is ongoing debate within the web accessibility community about the practical impact of the 'noframes' mechanism. All current browsers with substantial practical deployment, including text-only browsers such as Lynx, now support frameset directly. A requirement for 'noframes' is separately and explicitly mentioned in WCAG 1.0 checkpoint 6.5, but that is at Priority 2.

Furthermore, in contrast to the provision of frame titles, designing and deploying truly equivalent 'noframes' content requires a larger development investment.

In these circumstances, we do not regard provision of 'noframes' content as a high priority for remedy. It would be better to address the requirement for frame titles and, ideally, to move away from the use of frameset technology entirely.

## 4 Detailed analysis of results

### Missing alternative text for applets

'Provide a text equivalent for every non-text element' (WCAG 1.0 Checkpoint 1.1 — Priority 1)

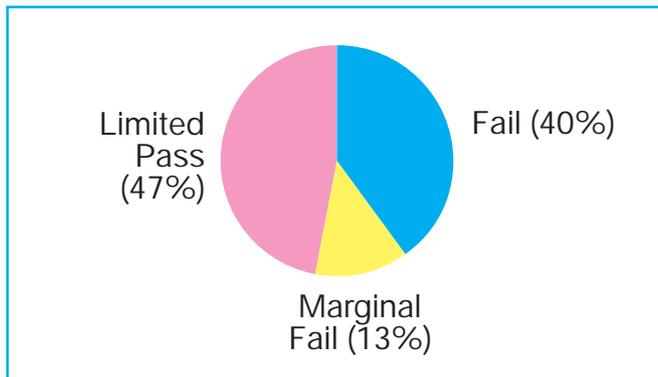


Chart 9e **Applet 'alt text' (Level A)**

Applets are small applications or programs embedded within web pages. They can pose particular barriers for assistive technologies. Therefore, the W3C WAI Guidelines recommend that all applets should include a text alternative. This should, as far as possible, provide equivalent functionality for any user who cannot access the applet.

Only 1.4% of sites were identified as failing this check. However, this does represent 40% of all sites that used applets. In addition, where applets are used, they may provide crucial components of site functionality. Therefore the absence of a text equivalent may represent a very serious accessibility barrier.

Manual investigation of a sample of the applets identified showed that most of them were used to implement scrolling 'ticker-tape' displays of news items. This is a somewhat dubious technique on general usability grounds. If it must be used, then it is important to ensure that the information (and linkage, if applicable) presented is also made available by other means, whether via the 'alt' attribute of the applet element or otherwise.

We identified one complex transactional site that relied critically on Java applets for its functionality. Although some of the applets had text alternatives, these served only to advise that the service was unusable without Java applet support. There was no statement or advice regarding access issues for users with disabilities, and there was no indication that accessibility was considered in the design process. In this type of case, where an important e-government service is being provided through this mechanism, it should be a high priority to implement a comprehensive accessibility review. This review should consider carefully both the provision of alternatives to the particular applet and also the accessibility issues for users with disability who have Java support. The latter is addressed in WCAG 1.0 Checkpoint 8.1 ('Make programmatic elements such as scripts and applets directly accessible or compatible with assistive technologies'), and would be classified as Priority 1 in this case.

## 4 Detailed analysis of results

### Inappropriate text alternatives for images

‘Provide a text equivalent for every non-text element’ (WCAG 1.0 Checkpoint 1.1 — Priority 1)

As already discussed, text alternatives should be provided for all images, to facilitate users who cannot perceive the image. The automated evaluations picked out sites where text alternatives are simply missing; however, in the case that alternatives are present, manual evaluation is required to assess whether they are actually appropriate. There was a practical difficulty here about the methodology, because the evaluators were not fluent in all the different languages of the 25 Member States, and so could assess the suitability of text alternatives in only a minority of cases. Nonetheless, a number of images were found to have ineffective text alternatives; given the limitations in the evaluation, it is likely that this problem is, in fact, even more extensive. The images with ineffective text alternatives include:

- Decorative images that should have an explicitly empty or null alternative text, but where gratuitous text has been included.

The appropriate alternative text is an explicitly empty string: `alt=""`. However, in one case, for example, such images were encountered with an alternative text of `alt="Empty"`! This indicates a designer who is clearly conscious of the technical requirement for alternative text, but has not been properly trained in the underlying rationale or function.

- Functional images where the alternative text did not serve the same function as the image.

For example, several cases were found where the image is primarily or completely an image of some text. Designers sometimes do this to achieve a particular graphical (font) effect. Where feasible, it is generally preferable to use style sheets rather than an image for this purpose. However, if an image of text is used, the alternative text should normally include this text; but examples were found where this was not the case. (It may be noted that this is one case where the evaluator can make this judgement even without understanding the natural language of the text.)

## 4 Detailed analysis of results

### Accessibility of Javascript functionality

‘Ensure that pages are usable when scripts, applets, or other programmatic objects are turned off or not supported. If this is not possible, provide equivalent information on an alternative accessible page.’ (WCAG 1.0 Checkpoint 6.3 — Priority 1)

‘Make programmatic elements such as scripts and applets directly accessible or compatible with assistive technologies.’ (WCAG 1.0 Checkpoint 8.1 — Priority 1/2)

Javascript is software code embedded within a web page, usually in order to add extra user functionality or interaction. Typically, in the sites encountered it was used for adding more dynamic ‘drop-down’ functionality to menus. The use of Javascript potentially poses additional barriers to users with a variety of disabilities because it may not interoperate properly with their assistive technologies. (It should also be noted that, for security reasons, Javascript may be disabled for many users.) This can be a very serious barrier if it prevents access to critical

navigation functions of a site. For example, a significant number of sites were identified where important Javascript functionality was not usable through keyboard interaction. This directly excludes users with a variety of disabilities who cannot use a mouse or other pointer-type input device. It should be emphasised that Javascript is potentially a very useful technology, and designers should not be discouraged from applying it, where appropriate. Indeed, in certain cases, Javascript can enhance functionality for a variety of users, sometimes particularly including those with certain disabilities. For example, one site in this study used Javascript to make it easier for users to adjust the styling of the site presentation to suit their needs (colours, text size, etc) which clearly facilitates accessibility in certain circumstances. Nevertheless, where Javascript is used, designers should take care to ensure both that it is coded with accessibility in mind, and also that any important functionality is still available even if Javascript is disabled.

## 4 Detailed analysis of results

### Unmarked changes in natural language

‘Clearly identify changes in the natural language of a document’s text and any text equivalents (e.g. captions).’ (WCAG 1.0 Checkpoint 4.1 — Priority 1)

Certain assistive technologies (in particular, speech synthesisers and Braille displays) need to know the natural language of a text in order to render the information intelligibly for a user. This is most critical where a single page includes text in more than one language. It is then essential that each change in the natural language be explicitly marked so that the assistive technology can adapt as necessary. It should be noted that the provision of multi-lingual websites is very helpful to a wide variety of users, including those with various disabilities, and is strongly to be encouraged. However, where this is being done, the minor additional effort to ensure that natural language use is made technically explicit should be incorporated in the authoring process. Indeed, authoring tools may be able to actively assist authors in marking changes in natural language use, provided that authors are trained effectively in their use.

### Incorrect mark-up of tables

‘For data tables, identify row and column headers.’ (WCAG 1.0 Checkpoint 5.1 — Priority 1)

‘For data tables that have two or more logical levels of row or column headers, use markup to associate data cells and header cells.’ (WCAG 1.0 Checkpoint 5.2 — Priority 1)

Tables are used in web pages in two quite different ways:

- Layout tables are used simply to achieve some intended visual layout of the different elements of the page.
- Data tables are used to represent information that has a genuine tabular, or two-dimensional structure, where there are specific relationships between the items arranged in a common row and/or column.

Perception of tables presents particular problems for users with visual disabilities, who cannot scan the two-dimensional structure of the table visually.

Layout tables are, generally, now discouraged, as the same effects can be achieved more flexibly and adaptably using style sheets instead (CSS). However, if tables are still used for layout, then they should specifically not use ‘mark-up’ that is intended only for data tables, such as identifying certain cells as row or column headers. Otherwise, such tables may wrongly trigger special features of assistive technologies that are intended only for dealing with data tables. At the very least this can be very frustrating for such users.

## 4 Detailed analysis of results

Data tables can and should be used where data has a genuine tabular structure. In this case, however, it is essential to make the structure as explicit as possible to facilitate the navigation of the table by users who cannot directly perceive this structure visually. In particular, column and/or row headers must be marked as such. If a table is complex with multiple levels of structure, then additional mark-up may be needed to more precisely indicate the mutual relationships between different items of information. Again, achieving this relies critically on training of relevant content authors in how to implement good table design using their given authoring tools.

### Accessibility of rich media

‘Ensure that pages are usable when scripts, applets, or other programmatic objects are turned off or not supported. If this is not possible, provide equivalent information on an alternative accessible page.’ (WCAG 1.0 Checkpoint 6.3 — Priority 1)

‘Provide a text equivalent for every non-text element’ (WCAG 1.0 Checkpoint 1.1 — Priority 1)

By ‘rich media’, we mean audio and video resources, animations, and so on. In general, this study found relatively few examples, but the number can be expected to increase in the future, particularly as broadband allows more practical access to such resources. Rich media can bring particular benefits to users with a variety of disabilities. Users can have increased options to select combinations of media that better suit their particular needs and skills. For example, a speech recording on the web may be directly accessible to a person with a vision impairment, but totally inaccessible to a person who is deaf. But if that audio file is accompanied with a full text transcript, then each user can choose the form best suited to that person.

However, this presupposes that multiple-media complement each other rather than act as mutually exclusive alternatives. In fact, some examples were encountered in the present study where particular resources were made available exclusively in one (audio-visual) media type. While this clearly facilitates some users, it is also relatively inflexible in adapting to many people with other needs and preferences, particularly those who cannot see, or hear, or interact graphically etc.

So, the use of multi-media is to be specifically encouraged on general accessibility grounds, but it should incorporate applicable accessibility features (e.g. synchronisation of media alternatives, audio description, etc) and also be complemented with generic functional equivalents (typically text-based) that can be adapted to the widest variety of potential users.

### 4.3 Common reasons for failure at Level Double-A

#### Overview of reasons for non-conformance

This section reviews the results from a number of tests relating to WCAG 1.0 Priority 2 checkpoints. These are important in order to meet the policy objective of Level Double-A conformance. However, the Priority 1 checks already discussed are the most immediately pressing areas identified for intervention. Most of the checks reviewed here relate to issues where results depend critically on improvements in content management systems or authoring tools. These issues are of long-term importance to improving web accessibility. Web developers still have a key role to play, particularly through the incorporation of these requirements into procurement policies.

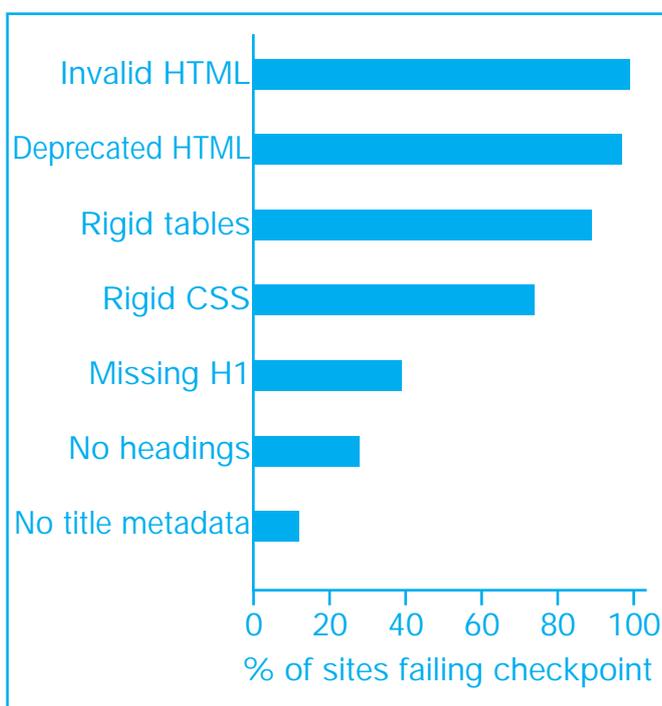


Chart 10 **Reasons for non-conformance (Level Double-A)**

#### Invalid HTML

‘All web-based resources should validate to published formal grammars.’ (WCAG 1.0 Checkpoint 3.2 — Priority 2)

The force of this checkpoint is that the resources should be structured or formatted in accordance with a clear and public technical specification. The rationale is that such technical validation against known, public, formats is the best way of ensuring consistent and reliable interoperability between the hugely diverse, and constantly evolving, systems that constitute the web.

The early, explosive days of the web saw a phase when technical standards evolved very rapidly and technically skilled content developers were scarce. In that situation it became common for websites to be ‘hand-crafted’, to work well only with certain popular browsers, in typical configurations (screen or window size etc), rather than for generic compatibility with any standards-based browsing platform or device. Each time a new user technology was deployed (even just a significantly new version of a browser), it was necessary to re-test and reconfigure the design to suit the new situation, without ‘breaking’ backwards compatibility with the previous systems. In addition, browser developers created several proprietary extensions to standard HTML that would only work with their own browsers in order to get competitive advantages over their rivals. However, it is now clear that this is not a sustainable long-term strategy. Recent years have seen a consistent trend towards ‘standards-based’ web design, illustrated, for example, by the Web Standards Project (WaSP) (see [www.webstandards.org](http://www.webstandards.org)).

## 4 Detailed analysis of results

These developments affect all web users, but they have a particular impact on users with disabilities. Many of these users are heavily reliant on special-purpose assistive technologies. By their nature, these technologies are devised for relatively specialised and small user groups. So, whereas users of dominant or mainstream technologies can generally assume that websites and services will be explicitly tested and guaranteed to work with those technologies, users of specialist or minority systems must rely much more heavily on sites being generically interoperable — through conformance with open technical standards.

However, despite recent progress towards ‘standards-based’ web design, the vast majority of web-based resources continue to demonstrate very poor conformance with technical standards. Hence, the finding in the current study, that 99% of the sites evaluated still have significant problems in this area, is completely consistent with findings from other similar studies.

As noted, there is a particular role here for procurement policy. It is likely that an explicit requirement to adhere to standards on any web content development or authoring systems, built into procurement documents, and suitably verified, would have a significant impact in driving the improvement of conformance with formal standards in these technologies. In the shorter term, useful progress may be made by deploying server-side systems dynamically to coerce HTML to conform with standards as it is being served (see, for example, the `mod_tidy` module for the Apache web server at <http://mod-tidy.sourceforge.net/>). In addition, automated tools are available to test the validity of (X)HTML CSS and other formats used.

It should be acknowledged that improving standards conformance does not generally have the same immediate and tangible effect on accessibility, as, say, providing text alternatives for images, ensuring keyboard accessibility of user interactions, or offering full text transcripts of audio material.

### Deprecated (outdated) features

‘Avoid deprecated features of W3C technologies.’ (WCAG1.0 Checkpoint 11.2 — Priority 2)

For the most part, this check is concerned with HTML features that originally appeared in early versions of HTML but have since been superseded by alternative mechanisms, most prominently the use of style sheets, such as Cascading Style Sheets (CSS). Style sheets support the effective separation of web page content and presentation, which, in turn, facilitates the flexible adjustment of presentation to suit best the particular needs of any individual user. In the current study, it was found that over 97% of sites did make some use of CSS; however, an almost identical proportion also still make significant use of a variety of deprecated HTML features that would be better implemented via style sheets.

In order to realise the potential benefits of CSS for personalised presentation, it is important that it be embraced fully for all aspects of presentation, and that use of the deprecated, HTML-based presentational mechanisms be discontinued. As with HTML validity, this is largely an issue for web content development and authoring tools, and again, intervention through public procurement policies will have a significant impact in improving this situation. Similar to the requirement for well-formed (X)HTML, detection of deprecated features is something that can be verified easily and unambiguously through the use of validators or schemas.

## 4 Detailed analysis of results

### Table height/width absolute values

#### CSS absolute values

'Use relative rather than absolute units in mark-up language attribute values and style sheet property values.' (WCAG 1.0 Checkpoint 3.4 — Priority 2)

These two issues relate to facilitating flexible visual presentation of web pages. The layout and overall visual formatting can either be 'rigid', where elements of the page are directed to appear in absolute sizes and positions on a screen, or 'fluid', where elements of the page have hints about relative sizes and positioning, but can be flexibly scaled or rearranged to suit the particular display available. Fluid layout and formatting allows text size, in particular, to be easily scaled up and down, and the entire page layout to adjust dynamically, flowing into the available width and avoiding horizontal scrolling if possible.

This particularly facilitates people with intermediate levels of vision impairment — a very large, and growing, user group, but it also delivers benefits to many mainstream users. For example, it facilitates browsing on hand-held devices such as PDAs and mobile phones, and scaling up pages for effective display on projection systems.

With failure rates of 89% and 74% for the two items reported here, it is clear that such fluid coding of web pages is still not widely deployed. Again, content development and authoring tools play a large role in this, and intervention via procurement policy is particularly important in bringing about improvements.

### Missing H1

#### Headings not used

'Use header elements to convey document structure and use them according to specification.' (WCAG 1.0 Checkpoint 3.5 — Priority 2)

These two checks both relate to the appropriate use of HTML 'header elements' to implement hierarchical structure in a web page. This is particularly useful to non-visual users, or visual users with high magnification, where it is very difficult to scan within a page. It also helps users with a variety of cognitive disabilities who benefit from additional navigational supports. Suitably configured browsers can use the header information to present all these users with additional, hierarchical, in-page navigation.

With failure rates of 39% and 28% for the two items reported here, this is a significant issue. Improvement depends partly on support in authoring/content development tools; however, most tools currently deployed do actually permit proper use of headers, although they may not prevent improper use. Accordingly, a significant improvement here probably requires active intervention in training for content developers and authors.

## 4 Detailed analysis of results

### Missing metadata (TITLE)

‘Provide metadata to add semantic information to pages and sites.’ (WCAG 1.0 Checkpoint 13.2 — Priority 2)

The ‘title’ element in a web page is a form of metadata. In this particular case, it is intended to provide a brief, informative title for the particular page. It is typically used by browsers to label the window or tab in which the page is displayed; and is normally used as the default label for the page in bookmarks or shortcuts. Search engines will also typically use this as a brief label for a page when including it in a listing of search results. Clearly then, appropriate title elements are valuable for a variety of purposes and improve site usability for all users, but they are especially helpful to users who have difficulty with fast scanning, memory or navigation between browser windows or tabs, i.e. users affected by a variety of visual and/or cognitive disabilities.

This was a pervasive problem on 12% of sites, and affected at least some pages on an additional 20% of sites. Further, this particular automated check only tested whether a title element was present, but it did not assess whether a given title element was meaningful or appropriate. Accordingly, the actual failure rate is probably somewhat higher again. As with appropriate use of headers, improvement in this does need some support in content authoring and development tools, but is primarily an issue for adequate training of content developers and authors.

### Recommendation for web managers and developers in all public sector organisations

Make sure that all content commissioners and authors are fully trained in the importance of accessible content, and in the means that are made available to them to achieve this.

See Section 5.2 for full list of recommendations

### 4.4 Priority actions for improvement

The analysis of non-conformance with Level A and Level Double-A can be brought together to form an action plan for improving eAccessibility. The priorities set out below take account of two important criteria — the ease of execution and the impact for disabled users.

**Step 1** Provide effective text alternatives for all images and image map hotspots.

The automated tests confirm that:

- 64% of sites with images failed to provide any ALT text for some images.
- 50% of sites with image maps failed to provide any ALT text for some image map hotspots.

The manual tests confirm that:

- 32% of sites with images failed to provide meaningful ALT text for some images.
- 21% of sites with image maps failed to provide meaningful ALT text for some image map hotspots.

**Step 2** Discontinue the use of frames — use style sheets and server-side scripting/templating/content management systems.

The automated tests confirm that:

- 34% of sites with frames failed to provide adequate NOFRAMES content.
- 91% of sites with frames failed to provide meaningful titles for individual frames.

**Step 3** Create HTML code which validates, and discontinue use of deprecated (outdated) HTML features.

The automated tests confirm that:

- 99% of sites contained invalid HTML.
- 97% of sites contained deprecated HTML.

**Step 4** Ensure the site works without requiring the use of a mouse.

The manual tests confirm that:

- 30% of sites with scripted functionality contained features, including navigation, that could not be used via the keyboard.

**Step 5** Warn users if links are set to open in a new browser window.

The manual tests confirm that:

- 90% of sites with links set to open in a new window failed to provide the user with any warning that this was the case.

**Step 6** Code content structures correctly.

The automated tests confirm that:

- 28% of sites failed to code any headings as headings.
- 55% of sites with some headings coded failed to use a logical heading structure on some pages.

## 4 Detailed analysis of results

The manual tests confirm that:

- 67% of sites where data tables were found failed to code some or all of the table headings accurately.

Looking beyond these priorities, we can see that today's problems should not be perpetuated by continuing with current procurement and training practices. Action should be taken by policy-makers and practitioners to ensure that new procurements have in-built accessibility requirements and that all those involved in web development and support are trained to keep websites accessible.

### Recommendations for web managers and developers in all public sector organisations

Plan now to get existing sites up to at least Level A in the short term (by the end of 2006) and to achieve Level Double-A in the mid-term (by end of 2008), prioritising carefully work applied to individual sites in order to enable the quickest resolution of the most common problems that will achieve the biggest impact.

Make sure that all content commissioners and authors are fully trained in the importance of accessible content, and in the means that are made available for them to achieve this.

Build applicable W3C WAI guideline requirements into all public procurements of new website designs, major upgrades, and into all outsourced content production (such as reports, publications etc).

See Section 5.2 for full list of recommendations

### Recommendations for web designers in the software industry

Produce software tools that conform with Authoring Tool Accessibility Guidelines (ATAG1.0) to at least Level Double-A, and/or with the User Agent Accessibility Guidelines (UAAG 1.0) as applicable, (including open source software).

Build the W3C WAI Guidelines into industry codes of practice.

Train all web designers in both the requirement for, and the techniques to achieve, fully accessible websites.

Develop a competence framework for web designers that includes web accessibility and use it for personal development schemes and recruitment campaigns.

See Section 5.2 for full list of recommendations

### Recommendations for public policy-makers in each Member State

Produce by 2006 a short-term public plan that enables a clear measurable improvement for all websites delivering public services.

Ensure that government policy now builds applicable WAI guideline requirements into all public procurements of new website designs, major upgrades, and all outsourced content production (such as reports, publications etc). In the case of software procurement, such requirements should apply equally regardless of the licensing model (open- or closed-source).

See Section 5.2 for full list of recommendations

## 4 Detailed analysis of results

### Recommendations for public policy-makers at EU level

Ensure that EU public procurement government policy now builds applicable W3C WAI guideline requirements into all procurements of new website designs, major upgrades, and all outsourced content production (such as reports, publications etc).

Carry out a feasibility study in 2006 into the development of an appropriate qualification in accessible websites for developers, managers and content providers (perhaps aligned with the European Computer Driving Licence).

See Section 5.2 for full list of recommendations

## 5 Conclusions

The findings from the survey are clear. Online public services have a long way to go before they are fully accessible and inclusive. However, this research indicates that policy engagement is linked to the eAccessibility of government services and that rapid improvement is achievable through coordinated effort by those who are best placed to effect change — the public policy-makers in the EU, web managers and developers in public sector organisations and web designers in the software industry. We provide 21 detailed recommendations to be adopted by these key stakeholders.

### 5.1 Summary of findings

#### eAccessibility across the EU public sector

This study is unique in its coverage of web accessibility across the EU's public sector at the national and EU levels, i.e. central government and European institutions. The results of the policy survey indicated that, whilst there is considerable strategic support for eAccessibility, there is significant diversity in approach and in many instances, little in the way of incentives, training or accreditation. Given the cultural and governmental diversity across EU Member States, this comes as no surprise, but there is much that governments can learn from each other due the variety of approaches taken.

Current incentives range from legal requirements (e.g. in France, Germany, Italy, Ireland) to the less formal, peer-group approach (e.g. in Austria, Denmark, Malta, UK). This report shows that both approaches can prove successful, but a combination of the two approaches brings maximum leverage in realising improved accessibility.

Training was identified as an area of weakness, but it is clearly an activity that needs to run parallel to any hard or soft incentives. In particular, there is a need for the W3C WAI Guidelines to be made available in all EU languages. Further training and support documentation also need to be made accessible to all. This could be further enhanced by an EU-wide eAccessibility accreditation programme.

The report defines an **index of engagement** in policy towards eAccessibility, listing both hard and soft incentives. Countries which reported activities in a high proportion of policy areas were given a higher index. Through statistical analysis, the report shows that a high index of engagement implies

greater eAccessibility of public services. Adoption of incentives across the board has shown the strongest link with improvements in eAccessibility.

#### Blend of automated and manual testing

This study breaks new ground by using a blend of automated and manual techniques for evaluating eAccessibility across the EU. 436 websites were tested against the W3C WAI WCAG 1.0 guidelines and some interesting results were found. The overall picture shows that there is still much work to be done, but this report identifies key areas of concern which, if dealt with, would lead to the situation improving significantly.

The research for this report found that 3% of sites achieved Level A conformance. A further 10% passed the automated testing, but difficulties were identified during manual testing. Many sites continue to omit alternative text for images. Where provided, it was often found to be inappropriate or ineffective. Where frames were used, they often appeared without titles or equivalent alternatives. By addressing these issues alone, the total number of sites achieving a Limited Pass at Level A could increase to 30%.

Several other areas of concern were identified during the manual testing. These include:

- poor scripting, which prevents users from accessing functionality via the keyboard
- failure to indicate changes in natural language
- and the incorrect markup of tables.

## 5 Conclusions

These issues also need to be addressed in order to make full Level A conformance a realistic possibility. They also highlight the importance of user testing in the meaningful evaluation of website accessibility. Performing user testing with a range of users with disabilities or working with user organisations to validate website design is an invaluable factor in ensuring both accessibility and usability. It routinely highlights a range of issues that would otherwise have remained unaddressed.

No sites were found to achieve Level Double-A conformance. 99% of sites contained invalid HTML; at least 90% did not effectively separate content and presentation; and over 40% of sites failed to properly identify the logical structure of page content. Whereas a stronger programme of training and accreditation would solve many of the issues with Level A conformance, the problems here are strongly affected by the authoring tools used to create web content. Hence, there is a need to build eAccessibility requirements into procurement policies relating to web content and the tools used to manage that content.

From our analysis of the common reasons for failure at Level A and Level Double-A, a set of recommendations for action has been developed to bring as many websites up to Level A as possible in the shortest amount of time. By following this plan, public administrations across Europe will rapidly achieve significantly higher levels of eAccessibility.

### Priorities for action plan

- 1 Provide effective text alternatives for all images and image map hotspots.
- 2 Discontinue the use of frames — use CSS and server-side scripting instead.
- 3 Create HTML code that validates, and discontinue use of deprecated HTML features.
- 4 Ensure the site works without requiring the use of a mouse.
- 5 Warn users if links are set to open in a new browser window.
- 6 Code content structures correctly.

### 5.2 Recommendations for policy development

Overall, this report confirms that there is a long way to go in making public sector websites accessible to all, but it also gives clear pointers for a number of actions to improve the situation. Engagement and interest is growing, and there are clear examples of organisations already demonstrating much improved practice. If some can get accessibility right, there is no reason why others cannot, given the right support and training. Some concrete improvements are possible for almost all websites evaluated in this exercise, which are easily carried out and have a measurable impact. These form the basis of a number of short-term, tactical recommendations.

In the longer-term, the main policy action should be to aim for Level Double-A. To achieve this it may be necessary to take a series of smaller steps, e.g. focus on Level A for all sites in the very short term, but also progressively, and in a prioritised way, target specific government services to achieve Level Double-A.

However, the effectiveness of policy relies on good feedback and monitoring, especially in an area such as this, which can be confusing to those who are not familiar with different evaluation approaches. We have provided an important snapshot; but this needs to be monitored on an ongoing basis. Effective monitoring needs a combination of automated evaluation, expert manual evaluation, and effective channels for user feedback. Harmonisation of monitoring across the EU would make comparison much easier.

For the medium term, it is crucial to equip content developers and authors with tools that support accessibility and to train them in how to provide content that is accessible. Different roles need different training. Another medium-term objective should be for public sector organisations to implement an explicit procurement policy for tools and content, which might well have a significant effect on the industry.

Finally, we must not forget that the focus of this study is to evaluate eAccessibility in the context of public service websites and the W3C WAI Guidelines, but the impact of achieving Level Double-A is much broader. eAccessibility is not only concerned with people who are vision impaired, but with people who are hearing impaired, motor impaired or learning disabled. In principle, the idea is to create 'a design for all' enabling everyone to use the online public services. If the W3C WAI guidelines are followed, websites can be made accessible to a very wide variety of people with disabilities. In this way the delivery of inclusive government services in a multi-channel context becomes a more achievable objective through an accessible internet channel.

In order to achieve both the specific objective of online services that conform with W3C WAI guidelines and the broader objective of inclusive services, recommendations should be focused on the different contributions made by different groups of stakeholders.

### Public policy-makers at European Union level

#### Recommendation 1

Set a clear target for making all public sector websites in the EU conform with WCAG 1.0 Level Double-A by 2010 as part of the i2010 strategy to promote an inclusive European information society.

#### Recommendation 2

Develop feedback mechanisms for closing the information gap between policy planning and actual outcomes across the EU (The European Internet Accessibility Observatory Project (EIAO) may provide a mechanism for such collaboration).

#### Recommendation 3

In particular, aim to test systematically, and on a regular basis, the progress that should now be made. This may include revisiting the current study in 12 to 18 months' time, and should be integrated with ongoing i2010 monitoring activities.

#### Recommendation 4

Ensure effective liaison with all EU-wide organisations (e.g. EIAO, EDeAN, Support-EAM, eAccessibility Expert Group) to encourage the sharing of best practice and a harmonised approach across the EU so that eAccessibility becomes part of the mainstream for online services, e.g. the link between accessibility and usability.

#### Recommendation 5

Ensure that EU public procurement policy now builds applicable W3C WAI guideline requirements into all procurements of new website designs, major upgrades, and all outsourced content production (such as reports, publications etc).

#### Recommendation 6

Carry out a feasibility study in 2006 into the development of an appropriate qualification in accessible websites for developers, managers and content providers (perhaps aligned with the European Computer Driving Licence).

### Public policy-makers in Member States

In line with the strategic objective for 2010 to promote an inclusive European information society, each Member State should produce an implementation plan that will cover at least the following recommendations.

#### Recommendation 7

Produce by 2006 a short-term public plan that enables a clear measurable improvement for all websites delivering public services.

#### Recommendation 8

In particular, promote the need for cross-governmental centres of excellence for eAccessibility (within Member States) that will provide special action plans, teams, standards and tools for improving eAccessibility according to clear priorities of ease of execution and impact on service.

#### Recommendation 9

Review the incentives available to encourage the provision of accessible websites in the public service and, if necessary, consider the need for a strong legislative framework.

#### Recommendation 10

Produce a plan for improving awareness throughout the country by reviewing all the examples of engagement identified in this survey as ideas for improving awareness of web accessibility.

## 5 Conclusions

### Recommendation 11

Assess the potential for a practical style guide with common 'look and feel' standards for public service websites in line with the Canadian model, involving disabled users.

### Recommendation 12

Ensure that government policy now builds applicable W3C WAI Guideline requirements into all public procurements of new website designs, major upgrades, and all outsourced content production (such as reports, publications etc). In the case of software procurement, such requirements should apply equally regardless of the licensing model (open- or closed-source).

Note: This will normally require WCAG 1.0 Level Double-A, and may also include ATAG 1.0 Level Double-A and UAAG 1.0 (with an appropriate conformance profile) where these would also be applicable.

### Recommendation 13

Develop feedback mechanisms for closing the information gap between policy planning and actual outcomes so that regular monitoring of performance against eAccessibility is made and communicated.

## Web managers and developers in all public sector organisations

### Recommendation 14

Plan now to get existing sites up to at least Level A in the short term (by the end of 2006) and to achieve Level Double-A in the mid-term (by end of 2008), prioritising carefully work applied to individual sites in order to enable the quickest resolution of the most common problems and thus achieve the biggest impact. In particular:

- ensure that all images are supported with effective alternative text, appropriate to the situation at all times (including explicitly null alternative text where applicable)
- discontinue the use of obsolete frameset technology. If not immediately possible, make sure that the settings related to its use are fully accessible
- be aware that it may be both efficient and effective to address many Priority 2 issues in parallel with the full achievement of Level A conformance.

### Recommendation 15

Make sure that all content commissioners and authors are fully trained in the importance of accessible content, and in the means that are made available to them to achieve this.

### Recommendation 16

Build applicable W3C WAI Guideline requirements into all public procurements of new website designs, major upgrades, and into all outsourced content production (such as reports, publications etc).

## Web designers in the software industry

### Recommendation 17

Produce software tools that conform with Authoring Tool Accessibility Guidelines (ATAG1.0) to at least Level Double-A, and/or with the User Agent Accessibility Guidelines (UAAG 1.0) as applicable, (including open source software).

### Recommendation 18

Build the W3C WAI guidelines into industry codes of practice.

### Recommendation 19

Train all web designers in both the requirement for, and the techniques to achieve, fully accessible websites.

### Recommendation 20

Develop a competence framework for web designers, which includes web accessibility, and use it for personal development schemes and recruitment campaigns.

### Finally...

Each Member State has to oversee improvements in accessibility for large numbers of websites, measured usually in hundreds, if not thousands, of public sector sites. This is no small task requiring commitment and resources, yet in most cases responsibility will be diffused across a range of stakeholders. These recommendations are likely to fail, unless one overriding recommendation is implemented to ensure full responsibility.

### Recommendation 21

**Designate a champion (an individual and/or an institution) for eAccessibility in each Member State with the responsibility and authority to ensure that improvements are made with the long-term target of achieving Level Double-A for all government websites by 2010.**

# Appendix 1

## Website accessibility guidelines (W3C WAI)

### 1 Overview of WCAG 1.0 recommendations

#### Levels

The Web Content Accessibility Guidelines (WCAG) are dated 5 May 1999 as Version 1. There are three Levels of conformance with this guideline:

- **Conformance Level A:** all Priority 1 checkpoints are satisfied.
- **Conformance Level Double-A:** all Priority 1 and 2 checkpoints are satisfied.
- **Conformance Level Triple-A:** all Priority 1, 2, and 3 checkpoints are satisfied.

#### Priorities

Each checkpoint has a priority level assigned by the Working Group based on the checkpoint's impact on accessibility.

#### 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.

The rest of this appendix summarises the guidelines (covering Priorities 1 to 3) and the checkpoints (covering Priority 1 only). This material is an extract from a much longer document of the key points about the guidelines and the levels of conformance (for further information see [www.w3.org/TR/WCAG10/](http://www.w3.org/TR/WCAG10/)).

## 2 Web content accessibility guidelines

	<b>Guideline</b>	<b>Checkpoints for Priority</b>	<b>1</b>	<b>2</b>	<b>3</b>
1	<b>Provide equivalent alternatives to auditory and visual content.</b>  Provide content that, when presented to the user, conveys essentially the same function or purpose as auditory or visual content.		4	0	1
2	<b>Don't rely on colour alone.</b>  Ensure that text and graphics are understandable when viewed without colour.		1	1	(1)
3	<b>Use markup and style sheets and do so properly.</b>  Mark up documents with the proper structural elements. Control presentation with style sheets rather than with presentation elements and attributes.		0	7	0
4	<b>Clarify natural language usage.</b>  Use markup that facilitates pronunciation or interpretation of abbreviated or foreign text.		1	0	2
5	<b>Create tables that transform gracefully.</b>  Ensure that tables have necessary markup to be transformed by accessible browsers and other user agents.		2	2	2
6	<b>Ensure that pages featuring new technologies transform gracefully.</b>  Ensure that pages are accessible even when newer technologies are not supported or are turned off.		3	2	0
7	<b>Ensure user control of time-sensitive content changes.</b>  Ensure that moving, blinking, scrolling, or auto-updating objects or pages may be paused or stopped.		3	4	0
8	<b>Ensure direct accessibility of embedded user interfaces.</b>  Ensure that the user interface follows principles of accessible design: device-independent access to functionality, keyboard operability, self-voicing, etc.		1	0	0

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9	<p><b>Design for device-independence.</b></p> <p>Use features that enable activation of page elements via a variety of input devices.</p>	1	2	2
10	<p><b>Use interim solutions.</b></p> <p>Use interim accessibility solutions so that assistive technologies and older browsers will operate correctly.</p>	0	2	3
11	<p><b>Use W3C technologies and guidelines.</b></p> <p>Use W3C technologies (according to specification) and follow accessibility guidelines. Where it is not possible to use a W3C technology, or doing so results in material that does not transform gracefully, provide an alternative version of the content that is accessible.</p>	0	2	1
12	<p><b>Provide context and orientation information.</b></p> <p>Provide context and orientation information to help users understand complex pages or elements.</p>	1	3	0
13	<p><b>Provide clear navigation mechanisms.</b></p> <p>Provide clear and consistent navigation mechanisms — orientation information, navigation bars, a site map, etc — to increase the likelihood that a person will find what they are looking for at a site.</p>	0	4	6
14	<p><b>Ensure that documents are clear and simple.</b></p> <p>Ensure that documents are clear and simple so they may be more easily understood.</p>	1	0	2
	<b>Total</b>	<b>18</b>	<b>29</b>	<b>19</b>

Table 7 **Summary of checkpoints for WCAG 1.0**

### 3 Definition of pass and failure at Level A

#### Pass Level A

A selection of pages has completely passed an extensive selection of Priority 1 checks, including a range of checks that can only be assessed through manual inspection.

#### Limited Pass Level A

A limited selection of pages has completely passed a limited selection of Priority 1 checks, but involves only fully automated checks on a subset of pages. Site may therefore fully conform at Level A.

#### Marginal Fail Level A

Limited failure occurs in Level A conformance, below specific quantitative thresholds. Site fails a limited number of distinct Priority 1 checks and/or on a limited number of pages and/or a limited number of failure instances, but involves only fully automated checks on a subset of pages. Checkpoints that require manual checking have not been verified.

#### Fail Level A

Extensive failure occurs in Level A conformance. Site fails multiple distinct Priority 1 checks and/or multiple pages and/or multiple failure instances, but involves only fully automated checks on a subset of pages. Checkpoints that require manual checking have not been verified.

In particular the notion of 'Marginal Fail Level A' used in this study relates solely to the results from the automated assessments. To avoid being overly harsh in rating sites on the basis of the automated checks, we included 'marginal' allowances for some criteria. For example, to fail a site that has thousands of images, on the basis of finding just one image that lacks an 'alt' attribute, would appear to be rather extreme. It is simplistic, and potentially misleading, to equate such a site with one where no images at all have been made accessible. Hence, a small marginal allowance of failed images is allowed. Similar small allowances were made for some of the other automated assessment criteria.

## 4 Detailed criteria for Level A

If any of the following automated assessments results in a 'marginal' rating, the overall classification for that site is designated as Marginal Fail Level A.

### Images without an ALT attribute:

- If the number of images which are found to lack an ALT attribute is 0 = **PASS**
- If the number of images which are found to lack an ALT attribute is less than or equal to 10 **OR** if the number of images which are found to lack an ALT attribute is less than or equal to 5% of all the images found = **MARGINAL**
- If the number of images which are found to lack an ALT attribute is more than 10 **AND** is also more than 5% of all the images found = **FAIL**

### Image map hotspots (AREA) without an ALT attribute:

- If the number of AREA elements which are found to lack an ALT attribute is 0 = **PASS**
- If the number of AREA elements which are found to lack an ALT attribute is equal to 1 **OR** if the number of AREA elements which are found to lack an ALT attribute is less than or equal to 5% of all the AREA elements found = **MARGINAL**
- If the number of AREA elements which are found to lack an ALT attribute is more than 1 **AND** is also more than 5% of all the AREA elements found = **FAIL**

### APPLET elements without an ALT attribute:

- If the number of APPLET elements which are found to lack an ALT attribute is 0 = **PASS**
- If the number of APPLET elements which are found to lack an ALT attribute is equal to 1 **OR** if the number of APPLET elements which are found to lack an ALT attribute is less than or equal to 5% of all the APPLET elements found = **MARGINAL**
- If the number of APPLET elements which are found to lack an ALT attribute is more than 1 **AND** is also more than 5% of all the APPLET elements found = **FAIL**

### FRAMESETS with no NOFRAMES content:

- If the number of FRAMESET elements which are found to lack a NOFRAMES element is 0 = **PASS**
- If the number of FRAMESET elements which are found to lack a NOFRAMES element is equal to 1 **OR** if the number of FRAMESET elements which are found to lack a NOFRAMES element is less than or equal to 5% of all the FRAMESET elements found = **MARGINAL**
- If the number of FRAMESET elements which are found to lack a NOFRAMES element is more than 1 **AND** is also more than 5% of all the FRAMESET elements found = **FAIL**

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### FRAMES with no TITLE attribute:

- If the number of FRAME elements which are found to lack a TITLE attribute is 0 = **PASS**
- If the number of FRAME elements which are found to lack a TITLE attribute is equal to 1 **OR** if the number of FRAME elements which are found to lack a TITLE attribute is less than or equal to 5% of all the FRAME elements found = **MARGINAL**
- If the number of FRAME elements which are found to lack a TITLE attribute is more than 1 **AND** is also more than 5% of all the FRAME elements found = **FAIL**

# Appendix 2

## Detailed methodology used for website evaluation

### 1 Overview of survey

The methodology comprised the following steps in order to check conformance with the WCAG 1.0 recommendations.

#### Step 1 Automated assessments

All of the European website addresses supplied were subject to automated assessment. The automated assessments were carried out by Greytower Technologies using a suite of software tools developed by them and used in previous projects with RNIB, Socitm and AbilityNet.

#### Step 2 Manual assessment

A selection of the sites that underwent automated assessment was then subject to manual assessment and manual verification of the automated data. A team of web accessibility experts from RNIB, AbilityNet and Dublin City University carried out the manual assessments and data verification.

#### Step 3 Selection of good practice

Those sites that achieved Limited Pass Level A were used as the start of a final step in selecting sites that might be considered as representing good practice.

### Step 1 Automated assessment

#### Selection of sites

The initial list of URLs was taken from three sources:

- The list of URLs used for the 2004 eEurope benchmarking exercise of the European Commission, which looks at the availability and sophistication of twenty basic e-government public services in the Member States ([http://europa.eu.int/information\\_society/eeurope/2005/doc/all\\_about/online\\_availability\\_public\\_services\\_5th\\_measurement\\_fv4.PDF](http://europa.eu.int/information_society/eeurope/2005/doc/all_about/online_availability_public_services_5th_measurement_fv4.PDF)). Of the e-government services studied in the eEurope benchmarking, we took the URLs owned by central government in the Member States.
- The members of the EPAN (European Public Administration Network) e-Government Working Group provided the URLs for up to five key e-government services from their countries, which are not covered in the eEurope benchmarking exercise. These URLs were primarily for national portals and flagship e-government services for citizens and businesses delivered by central government in each Member State.
- A list of URLs, agreed between the UK Presidency and the European Commission, was provided for twenty, high-profile European institutions and agencies.

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The URLs from all three sources were checked for validity, and consolidated into a single list of 569 URLs, which were submitted for automated assessment.

### Assessment of selected sites

Greytower Technologies, a web consultancy based in Sweden and the UK, which specialises in web accessibility, and which RNIB have worked with successfully for several years carried out the automated assessment. The company has developed an in-house suite of software tools for checking websites for a wide range of issues, with a focus on accessibility. The project team drew up a list of assessment and data output requirements, and all sites assessed using that specification. This assessment specification was based on and built on the Level A specification developed for work on the Socitm Insight 'Better connected' annual reports on UK local authority websites. The specification includes analysis of 60 distinct characteristics of each retrieved page. Overall, these address seven distinct WCAG 1.0 Priority 1 checkpoints, and ten distinct Priority 2 checkpoints.

Each of the submitted 569 URLs was processed by first automatically retrieving a number of pages, starting from this home URL and progressively following hyperlinks to a pre-programmed depth (within each domain/site). The retrieved pages were then each subject to the automated assessment as specified. The results were consolidated for each site and stored into a spreadsheet for detailed analysis. At this stage a number of sites were removed from further consideration, where sufficient data was not obtained for reliable investigation. This could arise for a variety of reasons:

- A site may have been relocated to a different domain.
- It might be temporarily out of service.
- It might rely on non-HTML navigation.
- It might require registration/login.
- It might be intrinsically a very small site.

At the conclusion of this process, usable data was obtained for a total of 436 sites. These were consolidated, in turn, into a smaller set of fully automated conformance checks (five relating to two distinct Priority 1 checkpoints and twelve relating to nine distinct Priority 2 checkpoints), together with a range of conformance indicators that can inform and guide more detailed manual checks of other checkpoints, which cannot be fully automated.

### Step 2 Manual assessment

#### Selection of sites

The overall total number of manual assessments possible was set by the resources available within the project. A selection process was designed to ensure effective validation of all the automated check results (both positive and negative), and also to ensure a good pool of candidate sites for identification of good practice. The process adopted is described below.

For each EU country, including some European institutions as a nominal 'Member State', the best and worst sites were identified, on the basis of the automated data. The best site was identified as being the site that had actively passed the most data checks. The worst site was identified as being the site that had actually failed the most data checks.

For countries with more than 20 valid automated results in the list of sites, both the best and worst sites were passed forward for manual inspection. For countries with fewer than 20 valid automated results in the list of sites, just the best site was passed forward for manual inspection. This resulted in 31 sites being selected.

#### Data verification

As part of the manual assessment, the details of the data reported by the automated assessment were checked to ensure the accuracy of the results of the automated assessment. The detailed specification for verification of automated data can be found at [www.cabinetoffice.gov.uk/e-government/eaccessibility](http://www.cabinetoffice.gov.uk/e-government/eaccessibility) as part of the supporting documentation for this project.

#### Assessment of sites

Building on the results and data provided by the automated assessments, the team from RNIB, AbilityNet and Dublin City University carried out additional manual assessments. Detailed guidance notes, and an assessment spreadsheet with standardised selection lists for responses, were drawn up and circulated to all involved in the manual assessments. Before the start of the manual assessments, one site was selected for a trial assessment in order to ensure coverage of as many issues as possible. All assessors carried out a manual assessment of the trial site. The results were compared, and those issues that resulted in markedly differing assessments were discussed, and agreement reached on how these issues should be assessed and judged.

A second trial site was selected and assessed by all assessors, and again the results were compared. This time the results were sufficiently consistent, and the manual assessments went ahead.

The assessment spreadsheet for each site contained the data from the automated assessment for that site, the example URLs furnished by the automated assessment for that site, and a results spreadsheet for the assessor to enter the results of the manual assessment. Room was provided for comments relating to specific URLs, and for comments relating to the checks being carried out. The detailed specification for manual assessment carried out on each website can be found at [www.cabinetoffice.gov.uk/e-government/eaccessibility](http://www.cabinetoffice.gov.uk/e-government/eaccessibility) as part of the supporting documentation for this project.

When all the manual assessment results were returned, they underwent extensive additional manual checking by a single senior assessor to ensure consistency and accuracy.

### Step 3 Selection of good practice

The list of sites that reached Limited Pass Level A were ranked according to the number of passes and fails. A mini-audit was performed on each of these sites to elicit areas of good practice using the following criteria:

- Is the 'alt text' provided meaningful?
- If frames were used, are frame titles meaningful?
- Is the text a good default size, and can the text be resized in the browser?
- Can the web page be resized to 800x600 without any horizontal scrolling?
- Do the colours reflect personal settings?
- Are there any distracting or moving images?
- Does functionality still work when JavaScript is disabled?
- Is there an accessibility statement?
- Does a site map exist and is it useful?
- Has skip navigation been provided?
- Is the navigation clear and consistent?
- Have page names been given appropriate names?

# Appendix 3

## Role of automated evaluation

### 1 Overview of automated testing

As outlined in Appendix 2, automated accessibility evaluation is a process whereby:

- A computer is programmed to access a website, starting from the home page, automatically following the links from that page, and keeping a copy of each page found. It is essentially simulating a user browsing the site. It keeps on following links from the subsidiary pages (drilling deeper into the site) until some pre-programmed limit is reached for how deep to go, or how many pages overall to retrieve.
- Each page that has been retrieved is then scanned for certain violations of the WCAG 1.0 checkpoints. The tests that are carried out in this way are completely mechanical, requiring no human intervention or judgement.
- The results of scanning each checkpoint, on each page, are recorded and collated to give overall results for the complete site.

Automated evaluation is very useful precisely because, being completely mechanical, it can very quickly, and at low cost, provide an assessment of a large number of web pages, providing either comprehensive evaluation of a single (large) site or, as in the current study, allowing a significant sample of pages to be evaluated from each of a large number of different sites.

### 2 Limitations of automated testing

However, this form of evaluation is also strictly limited by its mechanical nature. It can only detect certain very specific, and relatively narrow, accessibility barriers; accordingly, there are very many potential accessibility barriers that cannot be detected in this way.

To give just one example, consider the issue of images embedded in web pages. To make the page accessible, it is required that every image should be provided with an accompanying 'text alternative'. This text alternative would not be presented for users who can satisfactorily perceive the image; but for users who are blind, or have otherwise impaired vision, the text alternative would be presented instead (perhaps through speech synthesis, or Braille, or magnified text etc). There is a very specific technical mechanism that is used to associate alternative text with images in a web page (the so-called 'alt' attribute of the 'img' element). It is very simple for a computer program to automatically examine a web page and check whether each image does have alternative text associated with it. If there is no such text, then this is an accessibility barrier for many users with disability (rated as Priority 1 in WCAG 1.0), and can be reliably reported as such.

### 3 Inflexibility of automated testing

However: where alternative text is actually provided, there still remains a very significant question as to whether the particular text is effective or appropriate — does it provide a genuine alternative for users who do not have access to the image? Assessing this requires understanding of the original image and the role it plays in the page, separately understanding the meaning of the alternative text, and then forming a judgement as to whether the two are functional and effective alternatives to each other. This process of perception, understanding and critical comparison is not something which can be programmed into a computer. Rather, the only way of making such a judgement is to rely on a suitably trained human being. Computer tools may be used to assist, and possibly make the evaluation process more efficient, but the work cannot be done without such manual intervention.

This is just one example; there are many other examples of WCAG 1.0 checkpoints requiring human judgement for their proper evaluation.

It follows from this that automated accessibility evaluation is a very useful technique for getting certain types of accessibility evaluation, but it also has significant limitations. In particular, automated evaluation can be both effective and reliable in detecting certain definite barriers or forms of in-accessibility; further it can be a useful aid in detecting certain potential barriers where manual judgement would be required for proper assessment. On its own, however, it can never give a positive judgement of actual accessibility.

A further criticism that is sometimes made of automated accessibility evaluation is that it is unreasonably harsh. It is said to be impractical to achieve the 100% correctness that automated tests look for, particularly in the context of a large site, which may be subject to continual revision, expansion and updating. This is more properly a criticism of the WCAG 1.0 conformance criteria which are indeed expressed in somewhat rigid or absolute terms.

In the current study, this was addressed by the introduction of the 'Marginal Fail' classification. These are sites that do show failures on one or more of the fully automated tests, so they cannot be regarded as strictly conformant with WCAG 1.0; nonetheless, the failures are not pervasive or comprehensive in the context of the overall size and scope of the site. Of course there is some degree of arbitrariness in choosing particular thresholds on these checks to distinguish between 'marginal' and 'comprehensive' failure, and there will inevitably be some sites close to the boundary. Further, even limited failures may have a disproportionate effect on the accessibility of any particular site. Nonetheless, in the context of a comparative assessment, involving large numbers of diverse sites, the marginal classification does give a good indication of sites that are already making detectable progress towards more accessible design.

# 4 Conclusions

Overall, the negative results from the automated evaluation phase of the current study, i.e. the proportion of sites that are showing 'failure' on one or more automated checks, are robust and reliable: they do genuinely indicate the presence of accessibility barriers affecting significant numbers of users with disabilities.

Finally, it is worth commenting that the majority of the sites assessed in the study are primarily 'informational', i.e. for the most part, they do not deliver complex, transactional, services. The particular automated checks used here do give reasonable coverage of the most common accessibility barriers that arise on such sites. However, as e-government moves towards increasing levels of sophistication in the services offered, these checks will become less satisfactory in their coverage. In particular, where sites require user 'log-in', or involve sequences of pages with user input (forms), or rely on executing special, site-specific, software on the user's computer (applets, scripts etc), then automated evaluation of accessibility becomes progressively more difficult. Accordingly, manual assessment of accessibility will certainly continue to be necessary and will, if anything, need to play a stronger role in overall tracking of the achievement of accessibility objectives.

## Appendix 4

### Previous studies about web accessibility

Worldwide, a range of research has been conducted in the area of web accessibility and usability. During the course of this project the following studies and investigations have been examined.

#### **Cyprus**

2001 — Website content accessibility of Cypriot sites

[http://pzaphiri.agrino.org/Papers/accessibility-panhellenic\\_final.pdf](http://pzaphiri.agrino.org/Papers/accessibility-panhellenic_final.pdf)

#### **France**

1999 — The accessibility of the world-wide web for visually impaired people

[www.snv.jussieu.fr/inova/publi/aaateacces.htm](http://www.snv.jussieu.fr/inova/publi/aaateacces.htm)

#### **Ireland**

2002 — Web accessibility reporting project (WARP)2002 baseline study

[http://eaccess.rince.ie/white-papers/2002/warp-2002-00/warp\\_2002-00.html](http://eaccess.rince.ie/white-papers/2002/warp-2002-00/warp_2002-00.html)

#### **UK**

2003 — The Web: Access and Inclusion for Disabled People (A Formal Investigation by the Disability Rights Commission)

[www.drc-gb.org/publicationsandreports/report.asp](http://www.drc-gb.org/publicationsandreports/report.asp)

#### **UK**

2005 — Better connected reports into UK local government websites

[www.socitm.gov.uk/public/insight/default.htm](http://www.socitm.gov.uk/public/insight/default.htm)

#### **USA**

2001 A Usability analysis of selected Federal Government websites

[www.govexec.com/dailyfed/0302/030802j1.htm](http://www.govexec.com/dailyfed/0302/030802j1.htm)

## Appendix 5

# Evidence of good practice from rest of the world

### Overview of research

This appendix details good practice from elsewhere in the world than the EU so that we might identify any lessons from other countries.

A combination of reading through past research documentation and online research provided a list of countries who were active in the field of web accessibility. From this list Australia, Canada and Hong Kong were identified as key players through their early and continuing initiatives. Countries such as Japan are topical in the field of web accessibility owing to the recent release of their first ever public web access guidelines in June 2004 and Kazuhito Kidachi recently joining the Web Standards Project (WaSP) in August 2005. This appendix, however, focuses more on those countries at the cornerstone of web accessibility for a number of years.

Most notably, Australia is an early player with initiatives dating back to 1997, whilst Hong Kong's Digital 21 Strategy was released in 1998 and Canada's Common Look and Feel Standards in 2000. When one looks at countries that have had accessibility policies in place for nearly a decade, it is clear, however, that, although there is improvement, much still has to be done to ensure conformance with guidelines in all public websites. This confirms the complexity of achieving and sustaining web accessibility.

### Australia

Australia is notably an early player in government web accessibility and is the only jurisdiction where a major web accessibility case has been lodged and won by the complainant. The Human Rights and Equal Opportunities Commission ruled that the Sydney Organising Committee of the Olympic Games was in breach of the Disability Discrimination Act in providing a website containing accessibility barriers. Website accessibility initiatives within Australia have been present since 1997 and since June 2000, and all government agencies have been required to make their websites accessible and to include accessibility as a key performance measure in new website contracts. Some key initiatives developing within Australia are:

- Public access to materials

Government web accessibility materials are posted on publicly accessible websites.

- Government funding

As far back as 1998/1999 the government provided \$1.5 million in community grants for research and implementation projects to web accessibility in order to facilitate the production of approaches that could be adopted by other web developers.

## Appendix 5

- Better services, better government

This initiative was created to improve public access to government information and services including individuals with disabilities.

- Guide to minimum web standards

Created in 2000, this is the government standard to which all government websites must adhere.

- Level A accessibility

All government sites must meet at least Level A standard.

- Responsibility

There is no formal means of assessing the accessibility of government websites. Each individual government department and agency is responsible for ensuring that its website meets accessibility guidelines.

- Other formats

In addition to Level A compliance, information contained within PDFs should be made available in other formats. If not, they are subject to complaints under the Disability Discrimination Act.

In a communication from Senator Richard Alston in March 2002, he congratulated Parliament on the launch of the revamped Australian Parliament House website, [www.aph.gov.au/](http://www.aph.gov.au/). He suggested that the website provides an excellent example of a customer-focused e-government website. The website was redesigned to enhance the accessibility and provide better access for individuals with disabilities.

Additionally, a communication also dated March 2002 reported that levels of accessibility have continued to increase, with 63% of agencies reporting full compliance with accessibility guidelines and nearly half of remaining agencies reporting a compliance rate of 70% or more of website pages.

### Canada

Canada's Government On-Line Initiative is the Government of Canada's project to provide Canadians with enhanced access to improved citizen-centred, integrated services, anytime, anywhere and in the official language of their choice by 2005. It has continued to emphasise website design so that navigation and better information flow is facilitated. Usability and accessibility tests are completed on an ongoing basis to ensure websites are accessible to all individuals regardless of disability.

A recent communication by the United Nations in its Global e-Government Readiness Report 2004 stated that 'Canada is an example of a best practice approach for multilingual online information illustrated on its national site which offers mirror pages in English and French.'<sup>5</sup> It was suggested that this well-earned praise is partly attributed to Canada's Common Look and Feel Standards, which were created to ensure Canadian Government websites conform witho policies and legislation.

<sup>5</sup> [www.gol-ged.gc.ca/rpt2005/rpt04\\_e.asp](http://www.gol-ged.gc.ca/rpt2005/rpt04_e.asp)

## Appendix 5

Canada's Common Look and Feel Standards ensure that all departmental and government agency websites are accessible to people with disabilities. The minimum standard which must be met is Level Double-A with additional conformance criteria that have been set out by the Canadian Government. A compliance deadline for government agencies was set to December 2002. Some key initiatives developing within Canada are:

- Common Look and Feel Standards (CLF)

Introduced in 2000, the CLF ensures all departmental and government agency websites must be accessible to people with disabilities (Level A and AA, together with additional standards laid out by the Canadian Government). The deputy head of each department or agency is responsible for ensuring compliance.

- Policy

On the duty to accommodate persons with disabilities in the federal public service, employment systems must not create barriers. By inference, all websites and intranets used by federal employees must be made accessible.

- Interpretation and support documents

A number of interpretation and support documents have been developed to help with policy implementation — the Common Look and Feel Self Assessment Guide and Government of Canada Internet Guide.

- The Government of Canada website

This includes clear and easy to read information on Common Look and Feel Standards.

- Web Accessibility Testing Service (WATS)

Operated by the Treasury Board and HRDC, this reviews and tests government websites for accessibility. CLF experts attend each laboratory test and is available to provide support and recommendations for improving accessibility.

- Access Working Group

This monitors trends in web accessibility and is the contact point with the W3C Initiative. Senior staff at Industry Canada's Assistive Devices Industry Office sit on the W3C WAI steering committee, ensuring the Canadian government has input into it and is always up to date with emerging international web accessibility standards.

- Complaints

Complaints are made to the department or agency responsible for the website information. If it not resolved at this level, the complainant can lodge a complaint with the Canadian Human Rights Commission.

### Hong Kong

Hong Kong's Digital 21 Strategy is a government initiative. Originally written in 1998, the strategy provides:

- Tips for improving the accessibility of websites

- Guidelines for the dissemination of information through government home pages

- Lists seminars on usability and accessibility considerations in website implementation

## Appendix 5

Web Access by People with Disabilities is a Government initiative to facilitate access to websites by people with disabilities. Set up in 2001 it provides:

- Efforts to revamp government sites
- Guidelines for public bodies
- Promotional and educational activities

A capital account commitment of HK\$4.5million was provided so that government departments that needed financial assistance for revamping their work could gain access to funding. The IT Hong Kong Campaign is to raise awareness and promote wider adoption of IT in the community and includes:

- All government websites are in compliance with internal accessibility guidelines to facilitate navigation by people with visual disabilities.
- Seminars and workshops are conducted regularly for the private sector to encourage the adoption of barrier-free web design in the private sector.

Some new initiatives have been developed in Hong Kong to promote accessibility. These include:

- Setting up a Digital Solidarity Fund — provide funding from non-government organisations to carry out activities to bridge the digital divide.
- Some government departments running a pilot scheme (early 2004) of a sound version of selected information on their websites to enhance accessibility for the elderly and visually impaired.
- Radio programmes to introduce the web accessibility concept.

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Sue Spafford, Project manager, Socitm Insight

John Lamb, Designer, M & MT Ltd

# Further information

## **EuroAccessibility:**

This is a consortium of organisations across Europe who signed a memorandum of understanding to work together to harmonise accessibility evaluation, and toward a Europe-wide quality mark. [www.euroaccessibility.org](http://www.euroaccessibility.org)

## **Support-EAM:**

A formally funded project under the EU sixth framework programme, it aims to develop/propose a basis for a Europe-wide web accessibility quality mark, due to be completed by 31 March 2006. [www.support-eam.org](http://www.support-eam.org)

## **The European Design for All eAccessibility Network (EDeAN)**

Established under the eEurope 2002 action plan, this is a network of 'centres of excellence' in design-for-all across Europe. Each Member State has a National Contact Centre, and may also have a local network as well. It functions mainly as a clearing house for news about eAccessibility in Europe. [www.eaccessibility.org](http://www.eaccessibility.org)

## **W3C Web Accessibility Initiative (WAI)**

WAI is a domain within the World Wide Web Consortium (W3C) responsible for developing the de facto international guidelines on Web Accessibility (WCAG etc.). [www.w3.org/WAI/](http://www.w3.org/WAI/)

## **Publications**

A Comparative Assessment of Web Accessibility and Technical Standards Conformance in Four EU States. Carmen Marincu and Barry McMullin. First Monday, volume 9, number 7 (July 2004).

<http://eaccess.rince.ie/white-papers/2004/warp-2004-00/warp-2004-00.html>

Better connected 2005: a snapshot of all local authority websites. [www.socitm.gov.uk/public/insight](http://www.socitm.gov.uk/public/insight)

Cabinet Office  
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Stockley House  
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Website: [www.cabinetoffice.gov.uk/e-government/](http://www.cabinetoffice.gov.uk/e-government/)

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