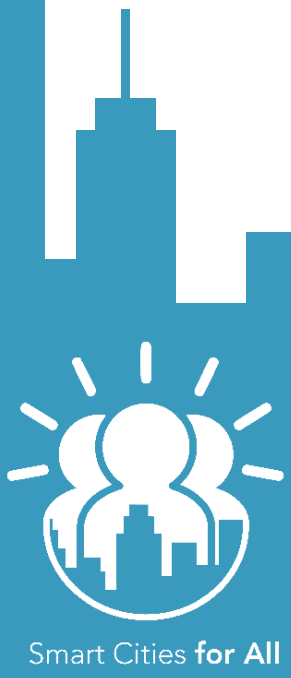
Guide to Implementing Priority ICT Accessibility Standards

Critical Technical Specifications to Support Digital Inclusion



Smart Cities for All

Acknowledgements

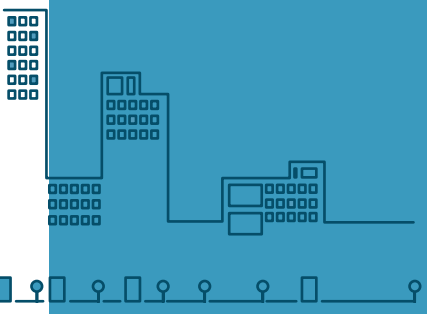
The development of this tool would not have been possible without the input of experts who are actively promoting and implementing greater ICT accessibility around the world. The following reviewers are gratefully acknowledged for their invaluable contributions:

Judy Brewer, Director of the Web Accessibility Initiative, World Wide Web Consortium

Tim Creagan, Senior Accessib`ility Specialist, U.S. Access Board

Laura Ruby, Director of Worldwide Accessibility Policy & Standards, Microsoft Corporation

Matthew Wood-Hill, Cities Standards Coordinator, Future Cities Catapult



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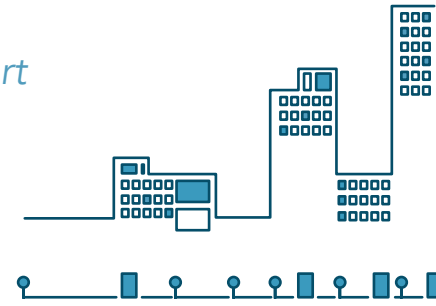
Executive Summary

Smart Cities and digital inclusion efforts are rapidly advancing worldwide but these efforts remain largely separated from one another. Without better integration between these efforts, Smart Cities programs currently risk leaving people with disabilities and older persons behind. Worldwide, Smart Cities programs are making enormous technology investments and yet do little to consider accessibility and the inclusion of persons with disabilities and older persons. Accessible information and communications technology (ICT) technical standards are key to designing a more inclusive approach to Smart Cities. Today there are a small number of internationally recognized and broadly adopted ICT accessibility standards available to guide the development of Smart Cities. Cities should begin by understanding and adopting an appropriate ICT accessibility standard to help ensure their Smart Cities programs and digital services are inclusive of persons with disabilities and older persons.

> *The Smart Cities Council defines a Smart City as one that "uses information and communications technology (ICT) to enhance its livability, workability, and sustainability"*



Objectives

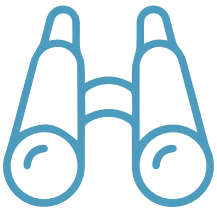
The objective of this guide is to introduce an inventory of the priority standards that define ICT accessibility criteria. These standards can help make Smart Cities more inclusive. It additionally provides a checklist of actions related to ICT standards that can be implemented by city leaders.

This guide is intended to support a range of organizations and roles related to Smart Cities programs, including city government Chief Information Officers (CIOs), IT professionals, procurement officials, technology suppliers to Smart Cities, accessibility experts, Smart City program managers, policy makers, developers who design Smart City apps and solutions, academics researching Smart Cities, and disability organizations and advocates working to make Smart Cities more inclusive.

This document has been designed to complement the Smart Cities for All: Guide to Adopting an ICT Accessibility Procurement Policy document, which explores in detail how the adoption of an ICT accessibility procurement policy can assist cities in improving the inclusivity outcomes of ICT purchases. Each document can be used separately or in tandem to enhance understanding of how standards and policies can be implemented to improve ICT accessibility in their cities.

> *According to United Nations estimates, 15% of the population worldwide, or some 1 billion individuals, live with one or more disabling conditions. In addition, more than 46 per cent of older persons, those aged 60 years and over, have disabilities and more than 250 million older people experience moderate to severe disability.*

Smart Cities for All Project Overview



In June of 2016, G3ict and World Enabled launched an international initiative to define the current state of ICT accessibility and the digital inclusion of persons with disabilities and older persons in Smart Cities around the world. The initiative included a survey of more than 250 international experts, a series of roundtable discussions in global Smart Cities (Quito, Barcelona, London, San Francisco, and New York), and 1-1 interviews with Smart City program managers and technologists. The initiative confirmed that the majority of today's Smart Cities are not fully accessible and as a result there is a growing digital divide for persons with disabilities and older persons.

60% of global experts surveyed in the 2016 initiative believe that today's Smart Cities are failing persons with disabilities and older persons by negatively impacting a range of areas including independent living, transportation, e-Government, employment, civic engagement, safety and justice, voting and elections, emergency response, and financial services. Importantly, global experts see no clear link between ICT accessibility standards and Smart Cities programs worldwide. 67% of the experts believed that Smart City initiatives can ensure ICT accessibility by complying with international standards however just 18% know of Smart Cities that use ICT accessibility standards today.

What are standards?

According to the International Standards Organization (ISO), a standard is a document that provides requirements, specifications, guidelines or characteristics that can be used consistently to ensure that materials, products, processes and services are fit for their purpose. International standards are the backbone of our society, ensuring the safety and quality of products and services, facilitating international trade and improving the environment in which we live. They ensure that products and services are safe, reliable and of good quality. They can also ensure that all types of ICT products and services are accessible to persons with a range of disabilities.

What is accessible technology?

Accessibility is broadly defined by ISO TC 159 as the: "extent to which products, systems, services, environments and facilities can be used by people from a population with the widest range of characteristics and capabilities to achieve a specified goal in a specified context of use."

When it comes to ICT more specifically, accessibility is generally accepted as being the quality of a mainstream technology such as a computer, mobile phone, self-service kiosk, or piece of software, to be used by the widest range of users possible, regardless of their abilities or disabilities.

Accessibility makes it easier for anyone to see, hear, and use a device and to customize their digital environment according to their own preferences, needs, and abilities. For many people, accessibility is what makes accessing Smart City programs and digital services possible.

Why are standards important to accessible technology?

For many modern technologies and in many contexts of use, standards can help ensure that ICT can be designed and developed to meet the needs of all users.
ICT standards define the ways that technology should function to be as broadly accessible as possible including to people who experience the world in different ways because of impairments and disabilities.
ICT accessibility standards are an important tool, because they give manufacturers, service providers, designers and governments the specifications and guidelines needed to design products and services that are accessible to all.

Furthermore, ICT accessibility is increasingly becoming a matter of law. Many governments have put in place a range of legal measures, such as anti-discrimination legislation, and efforts to promote the digital inclusion of persons with disabilities. ICT accessibility standards support these kinds of policies by defining in a technical way exactly what accessible means in different contexts.

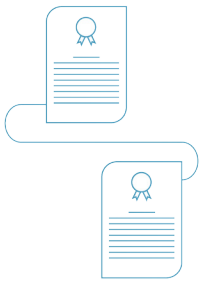
> *More than 170 countries have ratified the United Nations Convention on the Rights of Persons with Disabilities (CRPD). Article 9 of the CRPD requires State Parties "to ensure to persons with disabilities access, on an equal basis with others, to the physical environment, to transportation, to information. and communications, including information and communications technologies and systems"*

Where are ICT accessibility standards developed?

Standards Development Organizations (SDOs) and consortia play an important role in defining and promoting accessibility for ICT products and services. Policy makers can in most cases rely on their country's national standards organizations, which belong to international SDOs, for access to their ICT accessibility programs and standards. Examples include the International Organization for Standardization (ISO), the International Telecommunication Union (ITU), and the World Wide Web Consortium (W3C), whose members include many country-level organizations as well as other types of members and participants.

The CRPD speaks specifically to standards, requiring in Article 9 that States Parties "develop, promulgate and monitor the implementation of minimum standards and guidelines for the accessibility of facilities and services open or provided to the public;". In article 4, the CRPD requires "the promotion of universal design in the development of standards and guidelines". The CRPD also establishes the grounds in Article 32 for international cooperation and proactive exchanges "Facilitating cooperation in research and access to scientific and technical knowledge".

How do ICT accessibility standards relate to Smart Cities standards?



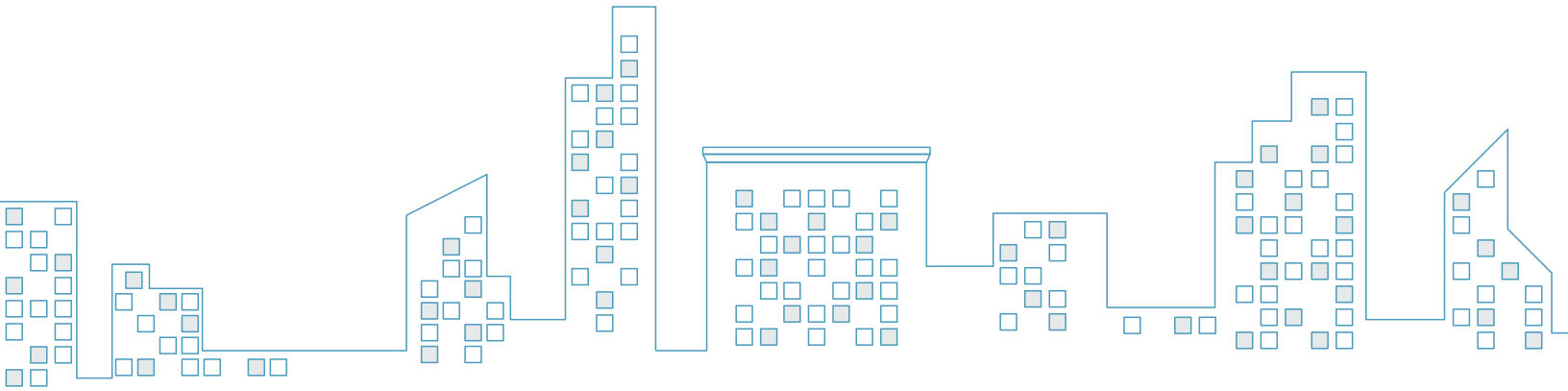
Beyond accessibility, a number of mainstream Smart City standards development efforts are currently underway at a variety of international organizations (e.g. ISO/IEC JTC1, IEC, IEEE, ITU and consortia). These Smart Cities standards activities have not yet converged and are creating some uncertainty and confusion among stakeholders. The National Institute of Standards and Technology (NIST) and partners have convened an international public working group to create a consensus framework of common architectural features to enable Smart City solutions that meet the needs of modern communities. In addition, the American National Standards Institute (ANSI) has compiled and regularly updates a list of mainstream Smart City standards and development activities.

While the standards development work on Smart Cities technologies is rapidly evolving and potentially conflicting, that is not the case with standards for ICT accessibility. ICT accessibility standards have progressed to publication, are discoverable, and are generally easy to use. This important standards work has all been done over the past 12 years by a range of international experts.

2

The Three Accessibility Standards Every Smart City Needs to Know

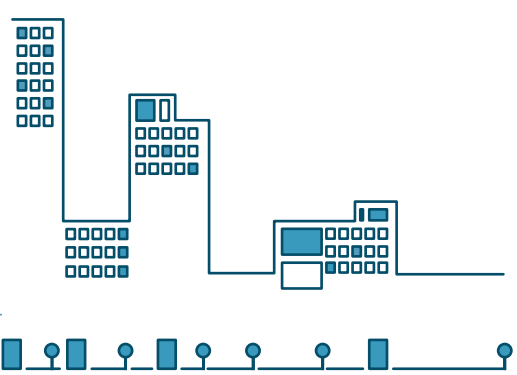
The following three standards are the most important existing standards that define what accessibility means for ICT and the web. They are critical to a range of organizations and roles interested in Smart City programs, including city government procurement officials, technology suppliers to Smart Cities, accessibility experts, Smart City program managers, policy makers, and disability organizations and advocates.



ETSI EN 301 549

The European standard, ETSI EN 301 549, defines a set of functional accessibility requirements that can be applied to a broad range of ICT products and services. The standard was finalized in 2014 after development over a period of more than 10 years, with considerable joint international and European expert input from CEN, Cenelec, and ETSI, the three European Standards Organizations (ESOs). It specifies user accessibility needs for people who have various ability impairments (e.g. low vision, limited manipulation or strength). These user accessibility needs relate to people wishing to locate, identify, and operate ICT functions and access the information provided. These user needs and ICT functions are critical to the effective deployment to all citizens of Smart City programs and solutions.

This European standard was created specifically for use in public procurement of ICT accessibility. Because the standard was developed primarily for public procurement, it is a particularly useful tool for city procurement officials to define accessibility requirements for their ICT purchases.



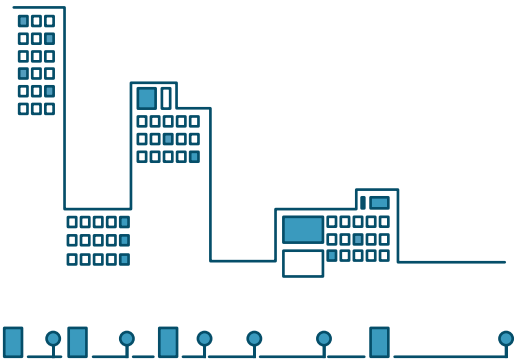
ETSI EN 301 549

ETSI EN 301 549 provides two main resources for defining ICT accessibility:

1. A list of high-level Functional Performance Statements that describe the needs of the widest range of users when using ICT products, services or documentation.
2. A comprehensive set of testable Functional Accessibility Requirements related to the Functional Performance Statements. These contain a description of the test procedures and evaluation methodology for each accessibility requirement.

Since its publication in 2014, the standard is being adopted and implemented across all 28 European Union member state countries. Several countries outside of the European Union have also taken steps to adopt ETSI EN 301 549 as their own national standard, including Norway, Serbia, Albania, Macedonia, and Switzerland. In addition, the standard is being adopted outside the European continent. Australia recently adopted it verbatim as an Australian national standard. Other countries such as Mexico are in the process of doing the same. It is written in a format that is recognized by most standards development organizations and adopting it is a relatively straight-forward process involving simple paperwork and communication with ETSI. G3ict has worked with ESO staff and other experts to develop a roadmap for governments that want to adopt and use ETSI EN 301 549.

ETSI EN 301 549 was developed by official European standards organizations and is a recognized European standard. It is common practice for those ESOs to maintain and update the standard regularly to reflect the evolution of technology over time and ensure that it remains robust and useful to procurement officials.



Functional Performance Statement example

4.2.1 Usage without vision

Where ICT provides visual modes of operation, some users need ICT to provide at least one mode of operation that does not require vision.

Notes:
Audio and tactile user interfaces may contribute towards meeting this clause.

Corresponding Functional Accessibility Requirement example

5.1.3.2: Auditory output delivery including speech

Where auditory output is provided as non-visual access to closed functionality, the auditory output shall be delivered:

a) either directly by a mechanism included in or provided with the ICT;
b) or by a personal headset that can be connected through a 3,5 mm audio jack, or an industry standard connection, without requiring the use of vision.

Notes

1. Mechanisms included in or provided with ICT may be, but are not limited to, a loudspeaker, a built-in handset/headset, or other industry standard coupled peripheral
2. An industry standard connection could be a wireless connection.
3. Some users may benefit from the provision of an inductive loop.

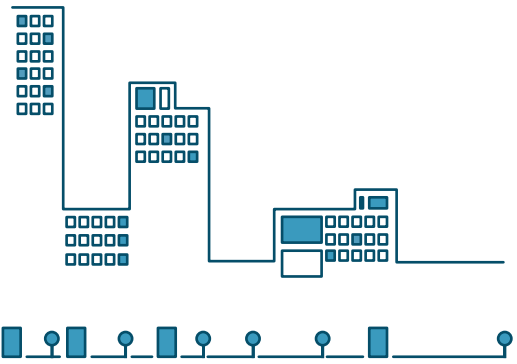
SECTION 508

In January 2017, the United States Access Board released a final rule to update its ICT accessibility requirements for Section 508 of the Rehabilitation Act. The revised rule jointly updates and reorganizes the Section 508 standards in response to market trends and innovations, such as the convergence of new technologies. The revised 508 rule also harmonizes these requirements with other guidelines and standards both in the U.S. and abroad, including the other two priority standards in this guide, ETSI EN 301 549, issued by the European Commission, and the W3C's Web Content Accessibility Guidelines (WCAG) 2.0, a globally recognized voluntary consensus standard for web content and ICT. The new Section 508 incorporates, by reference, numerous existing international ICT accessibility standards, which are enumerated in Chapter 7 of that document. These additional ICT accessibility standards may also be of interest to Smart City leaders.

SECTION 508

The updated Section 508 requirements specify the technologies covered and provide both performance-based and technical requirements for hardware, software, and support documentation and services. Access is addressed for all types of disabilities, including those pertaining to vision, hearing, color perception, speech, cognition, manual dexterity, and reach. The new Section 508 restructures provisions so that they are categorized by functionality instead of by product type due to the increasingly multi-functional capabilities of ICT products and use of ICT across multiple platforms. Revisions are also made to improve ICT usability, including interoperability with assistive technologies, and to clarify the types of ICT covered, such as electronic documents.

The final rule is based on recommendations from an advisory panel chartered by the US Access Board. The panel, the Telecommunications and Electronic and Information Technology Advisory Committee, included representatives from industry, disability groups, government agencies, foreign countries, and other stakeholders. One reason for including foreign countries (e.g. Japan, Canada, Australia and the European Union) was to increase harmonization with international standards relating to ICT accessibility that have been developed worldwide over the past decade. According to the US Access Board, "ICT requirements that are closely aligned remove ambiguity, increase marketplace competition, and lead to better accessibility features and outcomes."



Web Content Accessibility Guidelines (WCAG) 2.0 (ISO/IEC 40500:2012)

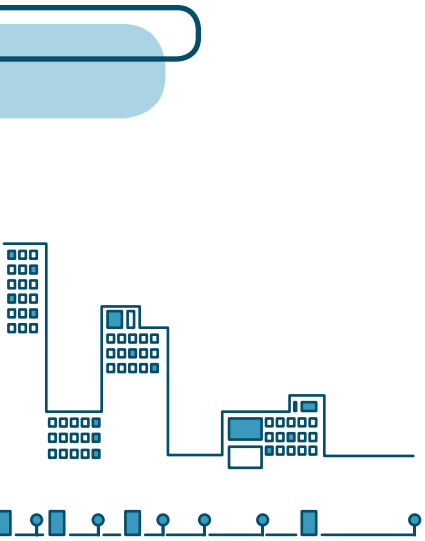
The World Wide Web Consortium's (W3C) Web Content Accessibility Guidelines (WCAG) 2.0 has also been endorsed by ISO, as the ISO/IEC 40500:2012. The standard covers a wide range of recommendations for making web content more accessible. The guidelines are intended to make web content and applications accessible, including on mobile devices, to a wider range of people with disabilities, including blindness and low vision, deafness and hearing loss, learning disabilities, cognitive limitations, limited movement, speech disabilities, photosensitivity and combinations of these. Smart Cities that follow the guidelines will make web content more usable by all citizens.

WCAG 2.0 was developed through the formal W3C standardization process in cooperation with individuals and organizations around the world, including W3C members, software developers, and other W3C groups and interested parties. The goal of WCAG 2.0 is to provide a shared standard for Web content accessibility that meets the needs of individuals, organizations, and governments internationally. WCAG 2.0 is designed to apply broadly to different Web technologies now and in the future, and to be testable with a combination of automated tools and human evaluation. For an introduction to WCAG, see the Web Content Accessibility Guidelines (WCAG) Overview.

Web Content Accessibility Guidelines (WCAG) 2.0 (ISO/IEC 40500:2012)

Web accessibility depends not only on accessible content but also on accessible Web browsers and other user agents. Authoring tools have an important role in Web accessibility. The W3C has developed the Authoring Tool Accessibility Guidelines 2.0 to make production of accessible web content more efficient as well as User Agents Accessibility Guidelines 2.0.

The WCAG 2.0 standard consists of several layers that work together to provide guidance on how to make content more accessible. It includes success criteria written as testable statements and that are technology-neutral. Guidance about satisfying the success criteria in specific technologies, as well as general information about interpreting the success criteria, are provided in separate documents. See Web Content Accessibility Guidelines (WCAG) Overview for an introduction and links to WCAG technical and educational material. WCAG 2.0 is supported by the associated non-normative documents, Understanding WCAG 2.0 and Techniques for WCAG 2.0. Although those documents do not have the formal status that WCAG 2.0 itself has, they provide information important to understanding and implementing WCAG.



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How the Three Priority Standards Relate

Substance

ETSI EN 301 549 and the revised Section 508 rule are, by design, quite similar in their content. In fact, when it released the final rule, the US Access Board recognized that the technical requirements of the updated Section 508 regulations and the ETSI EN 301 549 standard are closely harmonized. They both define a set of functional accessibility requirements that can be applied to a broad range of ICT products and services. They both specify user accessibility needs for people who have a broad range of ability impairments (e.g. low vision, mobility, hearing, or cognitive). Both standards were developed with international participation and the intent to be made similar. Both build on and reference existing international standards and were designed specifically with the public procurement of ICT in mind. For specific accessibility functionality, ETSI EN 301 549 and the revised Section 508 rule may sometimes give different guidance to developers for achieving the same outcome for users with disabilities. As part of its process, the US Access Board evaluated

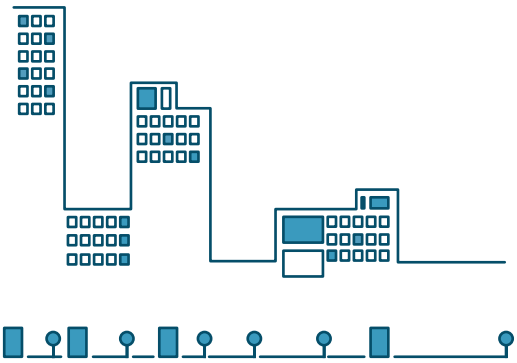
Substance

ETSI EN 301 549 on a provision-by-provision basis and formally determined that there are no conflicts in the technical requirements between it and the Section 508 final rule. Importantly, from a technical perspective, companies and developers that design their products and services to meet either set of requirements should be able to sell to customers in both markets using either standard.

Development Process

While the substance of ETSI EN 301 549 and the US Section 508 rule are similar, the organizations and processes to develop them are different. ETSI EN 301 549 is a technical standard, developed by ETSI, an acknowledged standards development organization using a recognized standards development process. ETSI follows a well-defined process that allows global participation with decisions made by a consensus of the participants. While the European Commission has a special advisory role in ETSI, it does not take part in decision making. Section 508 is a US federal government rule. The US Access Board, an agency responsible for developing the ICT criteria for the Section 508 regulations, follows the US government's regulatory process, which includes a public notice and comment process with the Access Board as the final decision maker.

Both ETSI EN 301 549 and the revised Section 508 rule incorporate the third standard in our inventory, WCAG 2.0. Both reference specific Level A and Level AA Success Criteria and Conformance Requirements in WCAG 2.0 and apply them not only to websites, but also to electronic documents and software. WCAG 2.0 was developed at the World Wide Web Consortia (W3C). Most W3C work revolves around the standardization of Web technologies. To accomplish its work, W3C follows processes that promote the development of high-quality standards based on the consensus of the membership team and public. W3C defines its processes as promoting fairness, responsiveness, and progress.



Development Process

Moving forward, both ETSI EN 301 549 and Web Content Accessibility Guidelines (WCAG) 2.0 (ISO/IEC 40500:2012), as technical standards, will be updated regularly to reflect the evolution of technology over time and as per the regular maintenance cycles of their respective standards development organizations. The maintenance cycle of the Section 508 rule is determined by the Access Board. The recently updated Section 508 regulations marked the first revision to the original rules that were initially issued in 2000.

Many countries have expressed interest in adopting the ETSI EN 301 549 standard. As it is written in a format that is recognized by most standards development organizations, adopting it is a relatively straight-forward process. In addition, because it references the WCAG 2.0 standard, when it is updated any city legislation or regulation using ETSI EN 301 549 would automatically be referencing the most recent version of the WCAG standard as well, thereby incorporating any revisions and modifications made to the standard over time.
G3ict has developed a roadmap with the steps and considerations necessary to adopt ETSI EN 301 549.

4

Smart Cities ICT Accessibility Standards Checklist

A Smart City wanting to leverage ICT accessibility standards to increase its commitment to digital inclusion for all citizens can take the following four steps:

Step 1: Become familiar with the three priority ICT accessibility standards

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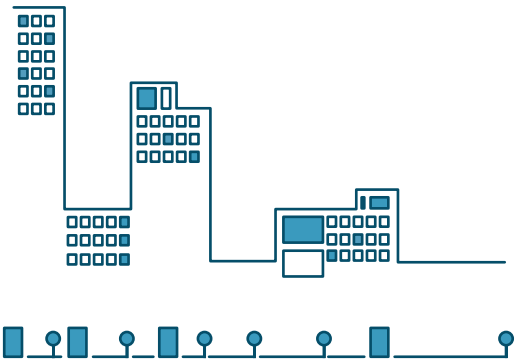
Step 2: Do a citywide ICT accessibility assessment using an ICT accessibility standard.

Step 3: Evangelize ICT accessibility standards.

Step 4: Adopt an ICT accessibility standards strategy.

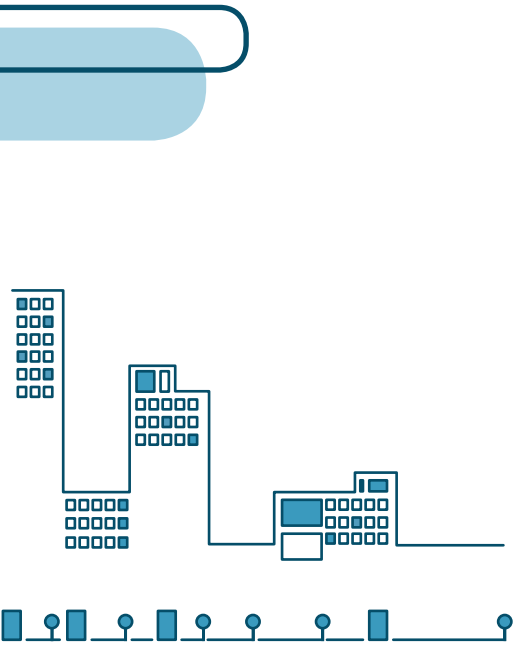


- [ ] **Step 1:** Become familiar with the three priority ICT accessibility standards.

  - Use the links in this guide to study each of the standards.

  - Reach out to experts, such as those at your country's National Standards Body within industry and civil society, who will have deep knowledge of the standards and different perspectives on them.

  - Determine if there are any national or regional policy commitments that may require adopting ICT accessibility standards in your city. For example, the United Nations Convention on the Rights of Persons with Disabilities (CRPD), which most countries in the world have signed and ratified, includes a commitment to ICT accessibility and international standards. CRPD Article 9 requires the development, promulgation, and monitoring of accessibility standards and guidelines.

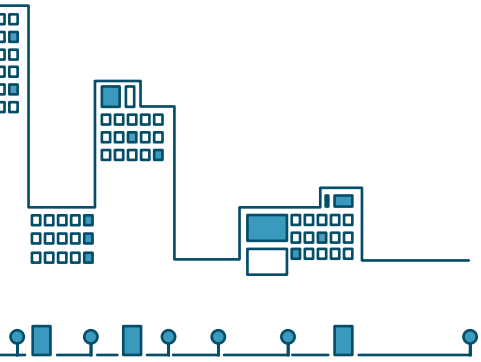


☐ **Step 2:** Do a citywide ICT accessibility assessment using an ICT accessibility standard.

- Develop a process for using ICT accessibility standards to assess the current state of ICT accessibility across critical city services and programs such as transportation, safety, education, and employment.
- Use standards to evaluate the accessibility of key ICT systems both managed directly by the city and operated by third parties.
- Regularly update the citywide ICT accessibility assessment. As technology evolves, ongoing ICT accessibility assessments can help ensure that Smart City programs remain inclusive.

☐ **Step 3:** Evangelize ICT accessibility standards.

- Train city leaders to understand and use ICT accessibility standards to support the Smart City programs and priorities they manage.
- Partner with disability organizations, civil society, academia, and industry to develop and support ICT accessibility standards outreach programs for users, developers, and IT professionals.



☐ **Step 4:** Adopt an ICT accessibility standards strategy.

- Create a strategy for ICT accessibility standards, recognizing them as a basis for maintaining a city's commitment to digital inclusion. Promote ICT accessibility standards across Smart City policies and programs.

- Select and adopt an ICT accessibility standard for the city. Require government departments to reference it.

- Define clear roles, responsibilities, and financial resources to support the implementation of an ICT accessibility standard.

- Require vendors to demonstrate conformance to an ICT accessibility standard for all ICT procurements. A technology-neutral procurement policy promotes innovation, eliminates barriers to trade and market access, enhances competition, and supports the development and broader deployment of interoperable and accessible products. Use public procurement and ICT accessibility standards to build a trusted supply chain as a part of the city's digital inclusion efforts. Smart Cities for All: Guide to Adopting an ICT Accessibility Procurement Policy document explores this area in more detail.

Conclusion

This guide has explored the inventory of priority standards that define ICT accessibility criteria as standards play a crucial role in the push towards true ICT accessibility in Smart Cities. Standards form the framework for the types of cities we want to create and society that we want to live in. They not only ensure the safety and quality of products and services but also underpin the rights that we define as fundamental to a city's citizens.

ICT standards define the ways that technologies should be implemented to be as broadly accessible as possible, including to people who experience the world in different ways. ICT accessibility standards are an essential tool because they give designers, manufacturers, service providers and governments the specifications and guidelines on how best to develop products and services that are accessible to everyone. International standards already developed can be implemented in Smart Cities around the world to ensure that all types of ICT products and services are accessible to the significant proportion of the population that older persons and persons with a disability make up.

By leveraging the three existing accessibility standards detailed in this guide and the Smart Cities ICT Accessibility Standards checklist, city leaders can educate their staff and the public on the importance of ICT accessibility. They can also ensure compliance with the increasing recognition of ICT accessibility as a right protected by law and ensure the large ICT investments being made by Smart Cities can be as widely utilized as possible and the maximum benefit gained from them.

G3ict

The Global Initiative for Inclusive Information and Communication Technologies is an advocacy initiative launched in December 2006 by the United Nations Global Alliance for ICT and Development, in cooperation with the Secretariat for the Convention on the Rights of Persons with Disabilities at UN DESA. Its mission is to facilitate and support the implementation of the dispositions of the Convention on the Rights of Persons with Disabilities (CRPD) promoting digital accessibility and Assistive Technologies. More information can be found at http://g3ict.org/

World Enabled

World Enabled is a global education, communications, and strategic consulting group. We support companies and governments with the full implementation of legal mandates that promote the rights of persons with disabilities. Our work and research initiatives focus on urban planning and inclusive urban development. With our international partners, we build inclusive societies where people with disabilities fully develop their talents and reach their full potential. More information can found at http://worldenabled.org/

Team Bios

This initiative is being headed by James Thurston, Vice President at G3ict and Dr. Victor Pineda, President at World Enabled. Both James and Victor are leading global experts and are committed to building a broad coalition to ensure that persons with disabilities enjoy the amazing advances of Smart Cities on an equal basis with others.

Dr. Victor Santiago Pineda is the President of World Enabled. He also serves as president the Global Alliance on Accessible Technologies and Environments (GAATES). Dr. Pineda is a recognized leader in international disability rights and was appointed by US President Barak Obama to the Architectural and Transportation Barriers Compliance Board. He teaches city planning at University of California, Berkeley. Dr. Pineda has received numerous awards, including a National Science Foundation (NSF) Innovation research grant, a Fulbright-Hays Scholarship, and the AAPD Paul G. Hearne Leadership Award. Dr. Pineda received a B.A., B.S. and M.C.P. from the University of California, Berkeley and a Ph.D. from the University of California, Los Angeles.

James Thurston is an internationally recognized technology policy leader. As G3ict's Vice President for Global Strategy and Development, he leads the design and implementation of new programs to scale up G3ict's global impact. He has served as advisor to high-ranking government leaders in the US and abroad on technology policy, human rights, and digital inclusion. He has experience applying both technology and public policy to important social and economic challenges. He holds broad policy and management experience in both the private and public sectors and at the federal, state, and international levels of government. Prior to joining G3ict, Mr. Thurston was Director of International Accessibility Policy at Microsoft, where he developed and executed a worldwide strategy to expand the company's outreach on disability and technology issues. Mr. Thurston holds both a Master of Public Administration and an M.A. in East European Studies from the University of Washington, as well as a B.A. in International Affairs from the University of Maine.

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