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Advancing Universal Acceptance of All Domain Names and Email Addresses for a Multilingual Internet

UNESCO Series on Advancing Multilingualism in the Digital Age

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Foreword

Kurt Erik Lindqvist,
President and Chief Executive Officer, ICANN

It is a privilege to introduce this Brief, developed in close cooperation and partnership with UNESCO. Our two organizations have their own specific missions, though our objectives naturally converge when it comes to enabling Universal Acceptance (UA) of all domain names and email addresses. The Internet Corporation for Assigned Names and Numbers's (ICANN's) role is to ensure the secure and stable functioning of the Internet's Domain Name System (DNS) that serves a global community. Together, we share a simple but powerful belief: the Internet should be accessible to everyone in the language and script of their choice.

Over the past two decades, significant progress has been made to internationalize the Internet's DNS. Today, more than 150 top-level domains (TLDs) and millions of second-level domains are used in a wide variety of languages and scripts. Yet while the DNS has evolved to a broader range of domain names and corresponding email addresses, the applications, software, and systems the world has come to rely upon have not kept pace with these updates. As a result, Internet users are not able to fully participate online in the language and script they use.

UA is what bridges this gap. It is a technical requirement, but it has implications on the socioeconomic development of communities driven by accessing information and communicating online. Governments have a particularly important role to play in advancing UA. By integrating UA into national digital strategies, updating procurement practices, and supporting capacity-building, they can accelerate awareness of the issue and the adoption of multilingual tools, as well as set clear expectations for industry. When governments engage on this important issue, the partnership with all stakeholders involved in facilitating UA is more impactful to the broader ecosystem.

ICANN is proud of our work with UNESCO to help build a more multilingual Internet. We hope this brief, grounded in cooperation and partnership, contributes to practical progress toward a digital future where everyone can participate online in their own language and script.

Foreword

Mariya Gabriel,
Assistant Director-General for Communication and Information, UNESCO

In an era where the Internet shapes how we learn, work, govern, and connect, it is essential that this global medium is truly inclusive of all languages and scripts. Yet, despite remarkable advances in digital technology, hundreds of millions of people around the world are still unable to use domain names or email addresses in their own languages. This limits their ability to participate fully in the digital space, and access essential services, including governmental, educational, and other critical services. The challenges are even more complex in the context of the AI revolution.

Internationalized domain names and email addresses are technically feasible and supported by established standards, yet their potential remains underutilized. The primary barrier is the absence of UA – a fundamental readiness that ensures all valid domain names and email addresses, regardless of script or language, are accepted, processed, and displayed correctly across all Internet-enabled applications and systems. Without UA, online services and platforms inadvertently – or, in an effort to reduce costs – exclude users who rely on different languages and scripts, creating digital inequities that affect education, business, commerce, governance, and social participation.

UNESCO, in collaboration with ICANN, envisions a multilingual Internet where every language has the opportunity to thrive online. A UA-ready Internet is not only a technical achievement; it is a catalyst for inclusion, economic growth, and cultural expression. It empowers communities to participate in the digital economy, fosters local entrepreneurship, and ensures that digital spaces reflect the rich linguistic diversity of our world.

Achieving UA requires collective action. Governments and regional organizations can lead by embedding UA in national digital strategies and public procurement. Technology providers must prioritize UA as a core principle in system design. Civil society organizations play a vital role in raising awareness and advocating for inclusive policies, while international institutions can support technical guidance and multistakeholder collaboration.

This policy brief represents a shared commitment to an Internet that belongs to everyone, everywhere. By promoting Universal Acceptance, UNESCO and ICANN take an important step toward a digital future in which all languages and scripts are respected, valued, and empowered – a future where the Internet truly reflects the diversity of humanity.

Executive Summary

In an era where digital technologies shape how we learn, work, govern, and connect, the Internet must be representative of the variety of languages and scripts around the world. Yet today, while striving to have multilingual content available online, millions of people remain unable to use domain names or email addresses in languages or scripts of their choice. These languages and scripts are well-supported by technical standards and are technically feasible to implement, but many software applications, websites, and digital services have not been updated to fully support them, preventing these capabilities from reaching end users. This is due to a missing technical requirement called Universal Acceptance (UA), a state of readiness that ensures all valid domain names and email addresses, including those in different languages and scripts, are accepted, validated, stored, processed, and displayed correctly and consistently, by all Internet-enabled applications and systems.

Organizations like UNESCO and ICANN are aligned in the belief that a multilingual Internet is essential to ensuring that everyone, everywhere, can participate fully in the digital age, in their own language and script. Our shared goal is a world where local languages are not simply preserved, but can flourish online. A UA-ready Internet is also a catalyst for economic growth: expanding markets and user numbers, enabling local entrepreneurship, and creating jobs as more people and businesses come online using domain names and email addresses in their own language and script. This also aligns with the World Summit on the Information Society outcomes calling for advancing multilingual domain names and email addresses.

Despite significant progress, core challenges remain. On the policy side, the crucial role of multilingual technologies is not yet well understood and considered by policy and technology decision-makers. On the technical side, many technology providers have not upgraded their systems to fully support Internationalized Domain Names (IDNs) and Email Address Internationalization (EAI). Many governments do not have national policies or procurement standards supporting UA compliance. Such requirements would support software applications and public systems to accept, validate, store, and display domain names and email addresses in a wide range of local scripts, not only the basic Latin letters (a–z) and digits (0–9). Without these standards in place, digital public services frequently remain inaccessible to people who rely on local languages and scripts.

Realizing UA requires action from all sectors:

- **Governments and regional organizations** can lead by example by embedding linguistic and script diversity, as well as UA, into national digital strategies, modernizing digital public infrastructure, and incorporating UA readiness considerations into public procurement frameworks and the delivery of public services.

- **Technology developers, cloud, email and technology service providers, including the Domain Name System (DNS) industry and hosting providers**, must treat UA as a foundational design principle, not as a niche requirement, while upgrading applications and systems and training teams accordingly. Country code top-level domain (ccTLD) operators, in particular, are key enablers of UA at the national level. Those developing Artificial Intelligence driven software development tools should integrate multilingual support, including UA, in line with UNESCO Recommendation on the Ethics of Artificial Intelligence.

- **Civil society organizations, research organizations and academia** should raise awareness, advocate for support for multilingual technology and UA in policy debates, and partner with language communities to ensure everyone can access the Internet in their native language and script. Research organizations can play a role in advancing innovation and technical standards related to UA. Academia can also advance UA through curricula integration, capacity-building, and cross-sector collaboration.

- **International and intergovernmental organizations** can play a vital role in sensitizing policymakers and Internet users to these concepts, and establishing UA across global development agendas, offering technical assistance, and driving multistakeholder collaboration, including the DNS industry.

At its heart, UA removes the technical barriers that prevent users from choosing the domain name and related email address that best fit their needs. By making UA a shared priority, UNESCO and ICANN are taking concrete steps toward an Internet where every language and script is used.

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1. Introduction

UNESCO has been at the forefront of promoting linguistic diversity and access to information, efforts that have been grounded in its constitutional mandate to foster the free flow of ideas. Recognizing that language is central to identity, participation, and knowledge exchange, UNESCO's vision was codified in the 2003 Recommendation concerning the Promotion and Use of Multilingualism and Universal Access to Cyberspace, which calls on Member States to advance multilingual content, local language technologies, and digital access. Progress reports since 2007 have documented gains in multilingual support through policy and technology, yet they also highlight persistent disparities in linguistic representation online. The 2005 Convention on the Protection and Promotion of the Diversity of Cultural Expressions followed the same objectives and still plays a leading role in international discussions around these issues.

The World Summit on the Information Society (WSIS) Geneva Declaration of Principles (2003) and Tunis Agenda (2005) also emphasized these principles. The WSIS outcomes explicitly called for advancing multilingual domain names and email addresses – an early articulation of what is now framed as UA. The WSIS+20 outcome document reaffirms this commitment, stating:

> *We reiterate the need for the development of local content and services in a variety of languages and formats that are accessible to all people and recognize the vital importance of multilingualism to reflect the linguistic, cultural and historical diversity of all nations. We commend the work that has been done since the World Summit to extend the multilingual nature of the Internet, including the introduction of internationalized domain names and progress towards universal acceptance, and urge all stakeholders to ensure that the Internet and digital services become fully accessible and affordable to all, including Indigenous Peoples and speakers of minority languages.*

The 2025 final report of the Policy Network of Meaningful Access within the Internet Governance Forum explicitly mentions IDNs as one of the tools for the democratization of access to the Internet. The principle of a multilingual Internet has been endorsed by various language-based organizations such as Organisation internationale de la Francophonie (OIF), that have conducted advocacy around this issue in the WSIS+20 discussions in 2025.

This aligns with UNESCO's mandate and ICANN's 2026-2030 Strategic Plan, which aims to promote the advancement of UA and IDNs.

More recently, UNESCO frameworks, including the Internet Universality ROAM-X Indicators and the Guidelines for the Governance of Digital Platforms, reaffirm a multilingual Internet as integral to digital rights, and participation in the online public sphere.

Building on this foundation, UNESCO and ICANN have formalized a Memorandum of Understanding (MOU) that strengthens cooperation on the UA of all domain names and email addresses. Through this partnership, UA is recognized not merely as a technical goal, but as essential to realizing the 2003 Recommendations and the WSIS vision of a truly multilingual Internet to support online access for everyone.

This Brief shares the progress on enabling multilingual domain names and email addresses, and the challenges in their UA by software applications and services that still need to be addressed. It highlights the role of the different stakeholders, especially the public sector, to remedy these gaps in order to enable billions of people around the world to access content and communicate online in their own languages and writing systems.

2. Evolution of the Domain Name System and Internationalized Domain Names

The DNS plays a critical role in accessing resources available on the Internet anywhere in the world. By mapping human-readable domain names into numeric Internet Protocol (IP) addresses, the DNS functions like a phone book for the Internet, allowing people to navigate by easily remembering domain names (e.g., example.com) instead of memorizing complex sets of numbers (e.g., 192.0.2.192 (IPv4) or 2001:db8:220:1:248:1893:25c8:1946 (IPv6)).

Initially, the DNS was limited in scope, supporting only a small number of top-level domains (TLDs) such as the generic TLDs (gTLDs) .com, .org, and .edu and two-letter ccTLDs. Examples of ccTLDs include .ca for Canada and .sg for Singapore.[1] As the Internet expanded globally, it became evident that domain names written only using letters a–z, digits 0–9, and the hyphen (LDH), used for languages written in the Latin script, would not serve a truly global user base.

Recognizing this limitation, the Internet community began advocating for IDNs that would allow domain names to be registered in different languages and scripts such as Arabic, Armenian, Cyrillic, Chinese, Devanagari, Ethiopic, Japanese, Tamil, and others. IDNs also support extra letters in Latin script used to write languages spoken in Africa, Asia-Pacific, Europe, and the Americas, e.g., French, German, Maori, Spanish, Vietnamese, and Yoruba.

The Internet Engineering Task Force (IETF) developed the first technical standards for IDNs in 2003, later revised in 2008, known as IDNA2008 (RFCs 5890–5894). IDNA2008, based on the Unicode standard, laid the technical groundwork for multilingual domain names. In addition, ICANN worked with its community to develop IDN Implementation Guidelines, enabling the TLD registry operators to allow users to register domain names in local languages and scripts.

Since then, ICANN has supported programs for delegating both generic and country-code TLDs in local languages and scripts. Today, 151 internationalized gTLDs and ccTLDs in 37 languages covering 23 scripts are in use, serving users globally. These advancements were made possible by consensus-based policy development and standards coordination based on multistakeholder input.

IDNs also allowed for enabling email addresses in local languages and scripts. Through IETF's development of the Email Address Internationalization (EAI) standards, it is now technically possible to define and use email addresses entirely in local languages and scripts. This means people can not only register and use domain names – they can also send and receive email messages using an email address in their local language and script.

1 There are more recent models where ccTLDs are used more globally and generically, such as .ai, .io and .tv.

Here are some examples of IDNs and internationalized email addresses:

Domain names:

Arabic:	تجربة-القبول-الشامل.موريتانيا
Armenian:	համընդհանուր-ընկալում-թեստ.հայ
Bengali (Bangla):	সর্বজনীন-স্বীকৃতির-পরীক্ষা.ভারত
Cyrillic:	универсальное-принятие-тест.москва
Devanagari:	सार्वभौमिक-स्वीकृति-परीक्षण.संगठन
Greek:	καθολική-αποδοχή-δοκιμή.ευ
Hangul:	다국어도메인이용환경테스트.한국
Han:	普遍适用测试.我爱你

Email addresses:

Kannada:	ಇ-ಅಂಚೆ-ಪರೀಕ್ಷೆ@ಸಾರ್ವತ್ರಿಕ-ಸ್ವೀಕಾರಾರ್ಹತೆ-ಪರೀಕ್ಷೆ.ಭಾರತ
Katakana:	メールテスト@ユニバーサルアクセプタンス.クラウド
Lao:	ອີເມວ-ທົດລອງ@ສາກົນ-ການຍອມຮັບ-ທົດລອງ.ລາວ
Latin:	Email-test@Universales-Akzeptanz-Test.vermögensberatung
Sinhala:	ඉ-තැපැල්-පිරික්සුම@විශ්ව-සම්මුති-පිරික්සුම.ලංකා
Tamil:	மின்னஞ்சல்-சோதனை@பொது-ஏற்பு-சோதனை.சிங்கப்பூர்
Thai:	อีเมลทดสอบ@ยูเอทดสอบ.ไทย

2.1 ICANN's Role in the Advancements of Internationalized Domain Names

ICANN's efforts to enable multilingual domain names reflect its mission and core values as outlined in its Bylaws and align closely with UNESCO's 2003 Recommendation concerning the Promotion and Use of Multilingualism and Universal Access to Cyberspace. ICANN has supported the expansion and use of the DNS through both policy development and technical implementation.

A key milestone in this work was the IDN ccTLD Fast Track Process, launched in 2009. This process allows countries and territories to request ccTLDs in local scripts, called IDN ccTLDs – such as .ไทย for Thailand or .рф for the Russian Federation. The development of this process has had significant implications for governments seeking online representation in ways that reflect their linguistic requirements and cultural heritage, with 61 IDN ccTLDs delegated already for 42 countries and territories.

Complementing these efforts was the 2012 launch of ICANN's New Generic Top-Level Domains Program, which introduced over 1,200 new gTLDs, reflecting specific communities, industries, and languages. Crucially, the program enabled the creation of 90 gTLDs using different scripts, called IDN gTLDs, supporting access and expression in languages used by communities around the world.

ICANN continues to develop label generation rules (LGRs) for TLDs and currently supports 27 scripts:

> Arabic, Armenian, Bangla, Chinese (Han), Cyrillic, Devanagari, Ethiopic, Georgian, Greek, Gujarati, Gurmukhi, Hebrew, Japanese (Hiragana, Katakana, and Kanji [Han]), Kannada, Khmer, Korean (Hangul and Hanja [Han]), Lao, Latin, Malayalam, Myanmar, Oriya, Sinhala, Tamil, Telugu, Thaana, and Thai.

To ensure safe and consistent use of these scripts at the second level of the domain name (the part before the dot), ICANN continues to develop the Second-Level Reference Label Generation Rules (LGRs) in collaboration with the relevant language communities. These rules help TLD registry operators determine how to form domain names securely in different languages and scripts. ICANN has already published LGRs for second-level domains in 29 scripts.

These advancements were made possible through ICANN's consensus-based multistakeholder model, which brings together businesses, civil society, governments, and technical experts in open and transparent processes. Policy proposals are developed collaboratively, refined through public input, and grounded in technical standards such as those from the IETF. Linguistic proposals are developed collaboratively with the communities using the different languages and scripts.

ICANN launched the Next Round of New gTLDs in April 2026. This program will further diversify the DNS by allowing for new names in various scripts, giving new opportunities to communities waiting for access to a more multilingual Internet. This is supported by an Applicant Support Program, intended to make applying for a new gTLD or operating a registry more accessible to applicants who would otherwise be unable to apply due to financial and resource constraints.

3. Current State of Universal Acceptance of Domain Names and Email Addresses

The evolution of the DNS over the past decade has offered Internet users more choice and flexibility in selecting domain names and email addresses, including those in their local languages and scripts. However, many Internet applications and systems have not kept pace with these upgrades. As a result, numerous applications and online systems still fail to recognize and properly process multilingual domain names and email addresses.

This has practical implications. For example, if a user has an email address in the Chinese language and attempts to register or make a purchase on a website that has not been updated, the system may reject the email address as invalid. This prevents the user from completing their transaction and results in lost business and missed opportunities for e-commerce service providers. Similar issues arise when people attempt to complete online forms or register accounts using valid email addresses in local languages to access government services or social media.

3.1 What is Universal Acceptance of Domain Names and Email Addresses?

UA-related work attempts to address the technical gap in accessing and communicating on the multilingual Internet. UA of all domain names and email addresses is a technical best practice that ensures that all valid domain names and email addresses – regardless of script, language, or length – function across all Internet-enabled systems, applications, and devices. By ensuring that every system can correctly accept, validate, store, process and display these identifiers, UA makes technology interoperable – allowing different applications and services to work together smoothly, regardless of the languages or scripts involved. Achieving UA-readiness is critical to ensuring choice and enabling the participation of communities online in their preferred languages and scripts.

3.2 Universal Acceptance State of Implementation

With the rollout of IDNs at the second level under TLDs in 2003, IDN ccTLDs in 2009, and then the new (and IDN) gTLDs in 2012, ICANN and the broader Internet community observed persistent issues with how domain names and email addresses were handled across software applications and online services. These challenges highlighted the need for a coordinated, industry-wide effort to advance UA of all valid domain names and email addresses.

In response, the ICANN community – alongside technical experts, industry partners, and civil society – mobilized to promote UA-readiness. This effort included foundational work to define the scope of the issue, identify key stakeholders, and raise awareness globally. ICANN supported this work through the establishment of the community-based Universal Acceptance Steering Group (UASG) in 2015, which promoted community engagement and capacity-building for a decade. ICANN continues to support community-based UA-focused working groups of the Country Code Names Supporting Organization (ccNSO) and the ICANN Governmental Advisory Committee (GAC).

ICANN is now conducting outreach and technical implementation directly to address UA challenges, in collaboration with its other partners, including UNESCO, and the community. Universal Acceptance has been introduced by UNESCO in 2025 as a key metric within the monitoring process of the 2003 UNESCO Recommendation concerning the Promotion and Use of Multilingualism and Universal Access to Cyberspace. In addition, the topic of Universal Acceptance has also been introduced to the Global Task Force of the International Decade of Indigenous Languages (2022-2032), its main governance mechanism, helping to raise awareness among Member States, Indigenous Peoples, and key stakeholders engaged in the Decade.

Efforts have focused on creating awareness and building capacity for UA globally. UA Day, a key initiative supported by both ICANN and UNESCO, is an annual event that mobilizes stakeholders to promote and celebrate UA on local, regional, and global levels. Over the past three years, **UA Day events from 2023-25 have reached more than 23,000 people in 39 languages across 82 countries and territories**. These efforts have significantly increased global understanding of UA.

As awareness of UA has grown, the focus has shifted toward UA adoption and implementation. Stakeholders – including software developers, technology service providers, and governments – are increasingly working to ensure their systems are UA-ready. ICANN has expanded its support for these implementation efforts, guided by community input and its strategic direction.

Technical assessments carried out over the past years have revealed both barriers and progress across the Internet's technology stack, from browsers and social media platforms to email systems and programming environments. Early evaluations, about a decade ago, showed limited support for IDNs and EAI, but ongoing measurements have shown clear progress. Many platforms have improved acceptance and processing of multilingual domain names, including those formed using the new gTLDs. The status of UA support is presented in detail in the annual UA-Readiness and other survey and technical reports published by ICANN in collaboration with the community.

Assessments show that support for EAI remains a challenge. Acceptance rates for email addresses formed in local languages and scripts by websites and applications are improving but remain low, e.g., acceptance of internationalized email addresses by popular 1000 websites was found to be at 14% in a recent study. Similarly, the quarterly review shows that only around 29% of the email servers deployed using gTLD domain names support EAI as of April 2026. These assessments demonstrate some improvement over time but point to a need for continued collaboration across industry, governments, and the technical community to achieve UA-readiness.

4. Importance of Universal Acceptance

4.1 Economic Growth

UA contributes to digital and economic growth, allowing governments, businesses, and citizens in every region to fully participate in the global digital economy. Data from **Common Sense Advisory (2025 update)** shows that businesses marketing in a customer's native language are 3.5 times more likely to close a sale. Furthermore, **73% of global consumers** are more likely to purchase if product information is in their own language.

For policymakers, UA represents a crucial component of national digital transformation agendas. In many countries, particularly in developing regions, enabling local-language domain names and email addresses unlocks new market opportunities, fosters entrepreneurship, and supports job creation, especially for small and medium enterprises (SMEs) and startups operating in native languages.

As Internet access expands, people increasingly expect to interact online in their own scripts and languages. Widespread UA adoption empowers businesses to differentiate themselves in competitive markets, accelerate digital expansion into linguistically diverse regions, and gain an early advantage in the growing multilingual Internet economy.

Governments that act now to promote UA-readiness – through procurement policies, digital standards, and capacity-building – can position their economies for leadership in the multilingual Internet age. Organizations that support domain names and email addresses in diverse scripts could enjoy an early advantage and expanded access to global markets.

4.2 Preservation of Languages and Culture

UA plays a vital role in safeguarding the world's linguistic diversity online. With over 7,000 languages spoken and signed globally, many are underrepresented or absent in the digital sphere. By enabling the use of domain names and email addresses in a wide range of commonly used languages and scripts, UA makes it possible for speakers of diverse languages to navigate and engage with the Internet in their mother tongue. This broader access in different languages and scripts not only encourages greater Internet use among non-English speakers but also creates incentives to produce and consume content in native languages, contributing to the continued vitality of these languages and scripts in the digital era.

Domain names and email addresses in local scripts enhance the capability of the communities to express their cultural heritage online, from digital storytelling and traditional knowledge sharing to promoting Indigenous art, literature, education, and tourism. For policymakers, UA represents a practical lever for strengthening cultural resilience online and protecting meaningful digital expression in native languages. In supporting UA, governments can help ensure that all citizens can participate fully and confidently in the digital future.

Efforts for supporting IDNs through UA align with UNESCO's continued work to safeguard cultural and linguistic heritage in the digital age, including through initiatives such as the United Nations International Decade of Indigenous Languages (2022–2032) and the Global Roadmap for Multilingualism in the Digital Era: Advancing the Role of Language Technologies, and its action plan which provides a strategic framework to promote access, and the effective use of all languages online. The promotion of UA also directly aligns with the objectives of the WSIS+20 process, which emphasizes linguistic diversity, supportive digital infrastructure, and multilingual access to cyberspace. These goals are supported by language-based organizations that aim to promote multilingualism online, a feature becoming even more crucial due to the development of Artificial Intelligence (AI) technologies, whose training depends, in part, upon Internet content.

4.3 Educational Benefits

As digital platforms become ever more central to education delivery, it is essential that these tools function seamlessly across all languages and scripts. This is especially important for learners whose languages are not as prevalent online. A recent UNESCO report reaffirmed that children learn best when they are taught in their mother tongue. Evidence consistently shows that early learning rooted in a child's first language strengthens comprehension, cognitive development, and long-term academic achievement, while also building confidence and preserving cultural identity. However, when educational platforms, email systems, and websites fail to recognize domain names or email addresses in local scripts, it creates a technical barrier to access and communication online that reinforces linguistic and digital exclusion.

Adopting UA helps remove these barriers by ensuring that all valid domain names and email addresses are accepted and function correctly online. This is crucial for students as well as the broader ecosystem that supports them: parents trying to access school portals and services, teachers integrating and using educational technology, administrators overseeing management, communications and reporting, and ministries developing policy and strategy for digital learning initiatives.

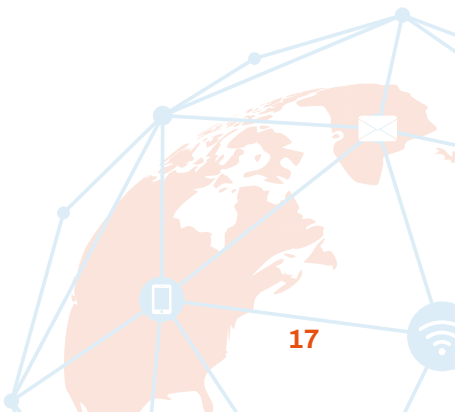
When digital tools fully support local languages, communities can build and manage education systems that operate in their native tongues. Such efforts also increase online accessibility in remote and underserved areas and strengthen national digital education policies. Digital literacy and competency depend on systems that work in the user's own language; UA ensures that people of all ages can develop the confidence and skills to engage fully online.

For governments and education ministries, prioritizing UA and multilingual infrastructure is a strategic investment in national digital capacity – laying the groundwork for lifelong access to education and digital opportunities.

4.4 Access and Reliability for E-Governance

UA supports both effective access to the digital public infrastructure (DPI) and reliability of e-governance services, which are increasingly central to digital transformation strategies across countries. As governments deploy large-scale digital systems for identity, payments, and public service delivery, it is essential that these platforms can accept and process all valid domain names and email addresses. Ensuring UA-readiness across interconnected systems helps maintain interoperability between platforms, reduces friction in user onboarding, and enables seamless access to services across diverse linguistic and technical environments.

At the same time, inconsistent handling of such inputs can lead to failed registrations, missed communications such as one-time-passwords and notifications, and diffculties in accessing services, ultimately affecting user confidence. In this context, UA serves as an important enabler of both system reliability and user trust, contributing to more inclusive, effcient, and resilient digital governance frameworks.



5. Challenges to Universal Acceptance

5.1 Awareness and Engagement Challenges

A barrier to UA is a persistent gap in awareness, both among those who need UA-ready solutions and those who can provide them. This creates a supply and demand dilemma. On the demand side, most end users are unaware that new gTLDs, IDNs, and email addresses in their local scripts exist. As a result, there has been limited demand for UA-ready services, which reduces the incentive for technology providers and businesses to prioritize support. In addition, the public sector, which could serve as both a user and enabler of UA-ready technologies, often lacks awareness of the potential of UA to improve digital access for local languages and scripts.

On the supply side, IT companies consider that UA requirements could mean an increase in costs and complexity of applications and systems, while many developers, IT managers, and service providers remain uninformed about UA requirements or the technical steps needed to implement them. This low awareness leads to missed opportunities to build UA-readiness into digital systems and products to reach a broader customer base. The result is a self-reinforcing cycle: demand does not rise because support is lacking, and support remains low because demand appears low. Addressing this awareness gap through communication to relevant stakeholders is critical to unlocking broader adoption and advancing digital access provided by supporting UA.

5.2 Technical Barriers

While awareness of UA is growing, three key technical barriers continue to limit its full implementation: inconsistent processing and linking of IDNs and EAI, limited support for EAI in email systems, and the inability of many software applications and platforms to allow sign-in using email addresses in local languages and scripts.

One challenge is proper display. IDNs, when not fully supported, sometimes appear as a string of random-looking characters instead of showing the intended local script. In addition, correct display of bidirectional scripts, and interactions between right-to-left and left-to-right scripts, can create confusion and reduce confidence in the system. Similarly, linkification – the automatic recognition and conversion of domain names and email addresses in the text into clickable links – often fails when faced with IDNs or EAI, impacting the overall user experience.

Email infrastructure presents even more fundamental obstacles. Many email providers do not yet support EAI, which is essential for sending, receiving, and registering accounts using email addresses in local languages. As a result, users may be unable to create or use email addresses that reflect their preferred language or script. Support for EAI needs to be done broadly across all email services and servers to allow for communication between different users globally.

Finally, many platforms and websites, including social media, government portals, and e-commerce services, do not accept email addresses in local languages and scripts during account registration or login. These persistent technical limitations must be addressed to ensure that today's global Internet is more multilingual and accessible to all.

Local web and email hosting providers need to upgrade their systems to allow end users to be able to register, deploy, and use IDNs and EAI.

5.3 Capacity Challenges

Even where the standards for UA and the tools which support UA exist, a significant gap remains in the technical capacity to implement and deploy them. Many IT professionals, software developers, and system administrators lack technical knowledge of how to support IDNs and EAI. Without a clear understanding of implementation pathways, these features are often deprioritized or misunderstood.

A common misconception is that internationalization introduces security vulnerabilities. However, evidence shows that these concerns are often overstated. A recent Reputation Block List (RBL) analysis published by ICANN found that IDNs, as a percentage, are associated with fewer reported DNS Abuse issues than their ASCII-based counterparts. Safe and secure implementation methods are available, yet the perception of risk continues to hinder adoption.

This knowledge gap is further exacerbated by the lack of training in internationalization concepts within computer science and engineering education. Most curricula do not cover how to develop and test systems that support multilingual identifiers, leaving new graduates unprepared to build UA-ready technologies.

Bridging this capacity gap requires a sustained effort to integrate UA into technical education, professional development, and industry standards.

5.4 Policy and Regulatory Challenges

Despite growing awareness, there is an uneven pace of adoption of UA across jurisdictions, and some governments and regulators may not have updated frameworks, procurement systems, and public services. This creates a situation where citizens might have valid domain names and email addresses in their own languages and scripts, but cannot use them to access government platforms, banking, or other essential services.

Another challenge is the limited alignment between national regulations and international standards. Policies governing digital infrastructure can be uneven or siloed, as regulators focus on priorities such as cybersecurity, privacy, and competition, sometimes without explicitly addressing UA for supporting the variety in languages and scripts online. Without clear mandates, service providers have little incentive to update their applications and systems to support diverse scripts and domain names. As a result, entire linguistic communities, especially those in remote areas or economically vulnerable communities, remain locked out of online participation, despite the technical feasibility.

6. Policy Recommendations for Internet Stakeholders

UA is a cornerstone of today's modern, multilingual Internet. Supporting UA and addressing implementation challenges is a shared responsibility among governments, industry, civil society, and international organizations.

Across all sectors, stakeholders are encouraged to:

- **Adopt and implement UA-readiness as a norm** in digital systems, software applications, and services
- **Promote alignment with international technical standards**, including IDNA2008 and EAI-related standards (RFCs 3492, 5890–5893, 6530–6533, 6855–6858)
- **Integrate IDN and UA awareness and training** into education, workforce development, and professional certification programs, e.g. see a UA Curriculum Integration Program offered by ICANN for universities globally
- **Foster collaboration across stakeholder groups** to share data, case studies, and best practices
- **Embed UA into digital inclusion strategies**, ensuring that language and script support is treated as integral to access the Internet

6.1 Governments and Regional Organizations

Governments and regional organizations play a key role in fostering an Internet that is globally accessible in different languages. As custodians of digital public infrastructure or of the rules that regulate it, they are well-placed to integrate UA into national strategies, policy frameworks, and public procurement processes. Their engagement can help enhance digital transformation projects and ensure that digital services, especially in areas such as education, health, and e-governance, are accessible to all citizens, regardless of language or script. In line with the WSIS+20 Outcome Document, including its emphasis on implementation roadmaps and recognition of progress on IDNs and UA, governments and regional organizations can further align UA with broader digital development and multilingual Internet commitments.

Recommended Actions:

- **Develop national strategies and action plans** that integrate UA adoption into broader digital inclusion and multilingualism initiatives, including within WSIS+20 implementation processes
- **Align national standards with global protocols** (IDNA2008 and EAI RFCs) and establish mechanisms such as technical working groups or coordination bodies to implement them
- **Update policy and regulatory frameworks** to promote UA-readiness, ask for UA compliance in public procurement, and include UA indicators for monitoring progress
- **Enable e-government UA readiness**, reviewing and upgrading public platforms and services to meet international IDN and EAI standards, and encouraging all contracted vendors to deliver UA-ready systems
- **Build institutional capacity**, offering technical training for public officials and embedding UA evaluation criteria in public-sector IT assessments
- **Lead by example**, adopting local-language domain names and email addresses for official communications to normalize the use of local languages and scripts
- **Engage national DNS and IT industries**, including ccTLD operators, web hosting providers and software developers, to strengthen local capacity and promote UA adoption

6.2 Technology developers, cloud, email, and technology service providers, including the DNS industry and hosting providers

Technology companies are central actors in the digital ecosystem and play a critical role in enabling a multilingual Internet. Their adoption of UA not only addresses a core aspect of online access and communication but also opens access to growing user bases in emerging markets. By ensuring their systems can accept, validate, process, store and display all domain names and email addresses – regardless of language or script – they make digital tools usable for everyone. UA also aligns with future-focused business practices, helping companies stay ahead of global digital transformation trends and regulatory expectations. This includes normalizing the use of all domain names and email addresses,

ensuring systems are UA-ready by design, upgrading legacy infrastructure, and building internal capacity. The ccTLD operators in particular are key enablers of UA at the national level. Organizations developing Artificial Intelligence (AI) driven software development tools and solutions should explore adding support for UA for accessing the multilingual Internet.

Recommended Actions:

- **Embed UA in design and development lifecycles**, ensuring systems can accept, validate, process, store and display all valid domain names and email addresses, including those in different languages and scripts. Integrate UA validation into software testing and quality assurance processes
- **Upgrade existing systems** to incorporate UA-readiness into regular maintenance, testing, and software updates
- **Invest in staff training** to equip software developers, quality assurance teams, and system administrators with the knowledge and tools to implement and test for UA
- **Collaborate with governments and standards bodies** to maintain compatibility with international protocols and emerging UA best practices
- **Demonstrate market leadership** by publicly committing to UA-readiness, helping establish a new industry norm for broader access to online resources and communication
- **Explore integrating AI solutions** to easily register and deploy domain names, to host online content, and email addresses in local languages and scripts
- **Explore integrating multilingual support, including UA**, as a default in AI driven software design, development and testing

6.3 Civil society organizations, research organizations and academia

Civil society organizations, academia, and language communities play a critical role in ensuring the Internet is accessible to a global population. These groups often serve as both advocates and implementers, promoting awareness of UA and helping ensure digital infrastructure supports local languages – including Indigenous languages. By engaging in grassroots initiatives, documenting successes, and holding institutions accountable, civil society actors help translate technical standards into tangible outcomes that will benefit a broad range of Internet users. In addition to creating awareness, academia and research organizations create innovative solutions and capacity for enabling technical standards and their implementation in applications and services.

Recommended Actions:

- **Raise public awareness** about the benefits of UA through community outreach and capacity-building programs
- **Advocate for UA implementation**, engaging governments, software developers, and platform providers to ensure multilingual access to public and private digital systems
- **Document and share success stories** that showcase the tangible benefits of UA, thereby inspiring replication across regions
- **Collaborate with Indigenous language communities** to ensure that their languages and scripts are technically supported online, and that these communities are meaningfully included from the outset in all discussions and decision-making processes concerning their languages and data, in full respect of Free, Prior and Informed Consent (FPIC), a fundamental principle of the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP)

- **Innovate and integrate UA in technical solutions** by building appropriate standards and sustainable technical capacity building programs for UA implementation

6.4 International and Intergovernmental Organizations

International and intergovernmental organizations hold a unique mandate to lead UA adoption at scale. With their normative role, technical expertise, and global convening power, these institutions can help embed UA into standards, development cooperation, and initiatives enabling online access. Their leadership can accelerate cross-border alignment and collaboration on technical protocols, support country-level capacity building and implementation, and promote UA as a core pillar of inclusive digital development.

Recommended Actions:

- **Integrate UA as part of supporting the variety of languages and scripts online in global digital agendas**, integrating it into digital access, multilingualism, and capacity-building programs
- **Provide technical assistance** to governments and regional bodies developing UA frameworks and supporting standards
- **Facilitate multistakeholder collaboration on UA**, creating platforms for dialogue, coordination, and joint initiatives across public, private, and community sectors
- **Support international monitoring and reporting**, developing indicators and publishing case studies to track UA progress globally

- **Champion UA as a development priority**, linking it to social and economic development of communities by participating fully in digital life

Suggested Measurements of UA

The following questions and example indicators are provided for member states as illustrative guidance to support reflection and dialogue around measuring progress on UA. These suggestions are not intended as finalized or official metrics, but rather as starting points for further development and contextual adaptation.

Potential question 1.
Awareness: Are the stakeholders promoting Universal Acceptance of all domain names and email addresses?

Example indicators:

- UA awareness events and promotions organized by the public sector, local DNS industry (including ccTLD(s)), academia, business, community, civil society, and media

Sources:

- UA Day and other events that promote UA awareness
- Media and social media promotions by the DNS industry, including the gTLD and ccTLD manager(s), promoting UA awareness
- Panels on UA-related issues at national and international Internet governance forums

Potential question 2.
Policy Support: Does the government or regional organization have a policy framework to enable the Universal Acceptance of all domain names and email addresses for providing access to a multilingual Internet? If so, is it being effectively implemented?

Example indicators:

- Existence of policy and regulatory frameworks for Universal Acceptance of all domain names and email addresses, including those in local languages and scripts
- Existence of technical standards for Universal Acceptance of all domain names and email addresses in local languages
- E-governance systems being used that are UA-ready

Sources:

- International standards for IDNs, EAI and definition of UA of all domain names and email addresses
- National policies concerning Universal Acceptance of all domain names and email addresses, including policies for marginalized communities
- National definitions and standards aligned with the international definition of IDNs, EAI and UA

- Regulatory strategies concerned with UA, including procurement requirements concerning UA for government systems and e-government services
- E-governance systems in use by the public sector and citizens
- Evidence and independent assessments of the impacts of relevant approaches

Potential question 3.
Implementation: Is there a substantial and growing use of domain names in diverse local languages signifying increasing multilingual use of the Internet?

Example indicators:

- Use of domain names in local languages for major government websites, government e-services, e-commerce platforms, and social networking applications
- Support for email addresses in local languages for major government websites, government e-services, e-commerce platforms, and social network applications

Sources:

- Registration numbers of domain names in local languages under gTLDs and ccTLD(s)
- Email servers listed in gTLDs and ccTLD zone files (based on MX records) supporting email addresses in local languages
- Data on use of domain names and support of email addresses in local languages from social network platforms, government departments, and e-commerce platforms (where published or available upon request)
- Degree of success for end-to-end user journey through an application using any domain name and email address
- Assessments by credible business analysts, academics, and independent experts

Potential question 4.
Capacity Development: Is there sufficient capacity development to technically implement Universal Acceptance of all domain names and email addresses in diverse local languages for a multilingual Internet?

Example indicators:

- Students graduating with relevant IDNs, EAI and UA related technical knowledge
- Professionals taking the relevant technical training

Sources:

- Recommendations on inclusion of UA into IT-related curricula by the national curricular body
- Universities integrating UA into technical IT-related degree programs
- Inclusion of UA into technical courses offered by IT-related vocational training programs
- Recommendations on supporting UA by software and computer associations

7. A Vision for a Multilingual Internet for All

UA is not only a technical milestone; it is a cornerstone of a multilingual Internet. As more people connect to the Internet using diverse languages and scripts, UA ensures that everyone can access domain names or email addresses in their native tongues.

The long-term vision is clear: a digital ecosystem where all valid domain names and email addresses – regardless of language, script, or length – are seamlessly accepted across software platforms, applications, and services. This vision can only be realized through coordinated action across governments, industry, civil society, regional and international organizations.

UA supports increasing access to education, online resources and digital services for all communities and economies and strengthens digital literacy, increasing commercial opportunities and facilitating social as well as economic development. It lays the technical groundwork for digital societies that reflect and serve the spectrum of written languages.

Achieving this vision will require sustained effort – including awareness-raising, capacity-building, policy formulation, regulatory alignment, and technical implementation. This includes efforts to train AI technology to create UA-ready solutions. Yet the opportunity to create a more resilient digital infrastructure that benefits all users, in all regions, using all languages, is well worth the effort.

A future in which Universal Acceptance is the norm, not the exception, is one where every individual can access and engage meaningfully with the Internet using any valid domain name and email address in their own language and script.

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ICANN

UNESCO 2003 Recommendation on Multilingualism in Cyberspace: A Foundation for Universal Acceptance

Adopted in 2003, the UNESCO Recommendation on the Promotion and Use of Multilingualism and Universal Access to Cyberspace remains a cornerstone normative instrument for today's digital world. Its principles are even more relevant in an era marked by rapid technological change, persistent digital divides, and the urgent need to ensure that all languages — including low-resourced and Indigenous languages — can thrive online.

The recommendation calls on Member States and all stakeholders to promote linguistic diversity in digital environments, develop local content, and ensure that communities can access, use, and create digital resources in their own languages. These commitments directly underpin the goals of Universal Acceptance, which seeks to ensure that all valid domain names and email addresses — in every language and script — function seamlessly across the global Internet.

In a world where many existing languages still lack adequate digital presence, strengthening multilingualism online is vital to digital inclusion, cultural continuity, and participation in the digital economy. Grounding Universal Acceptance efforts in the 2003 Recommendation reinforces the imperative to build a truly inclusive, multilingual Internet where everyone can participate in their own language.