

Universal Acceptance of Domain Names and Email Addresses: A Key to Digital Inclusion

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Background

Domain names provide Internet users with the opportunity to create a unique online identity of their choice. The Internet Corporation for Assigned Names and Numbers (ICANN) has supported the work of the community to increase the options for such identifiers through the expansion of the Internet's Domain Name System (DNS).

In addition to the earlier generic top-level domains (gTLDs) such as .com and .org, more than 1,200 new gTLDs have been delegated by ICANN through the New gTLD Program, which launched in 2012. Some of these new gTLD are longer than three characters (long TLDs). Businesses and organizations were able to choose gTLDs that represent a specific geography, profession, interest, community, and more, including .london, .accountant, .photography, .pizza, and .fun, just to name a few. These gTLDs provide global consumers and end users with more choice while also increasing competition in the domain name industry.

The expansion of the DNS has also made the Internet more multilingual and inclusive of communities around the world, as domain names are also available in a number of different languages and scripts. These Internationalized Domain Names (IDNs) are based on the IDN protocol developed by Internet Engineering Taskforce (IETF) in 2003 (subsequently revised in 2008). Examples include a Russian domain name in Cyrillic script: [универсальное-принятие-тест.москва](#). In addition, studies by organizations such as [Centr](#) show that use of IDNs correlates with online content in local languages. Around 150 IDN TLDs, including both generic and country code TLDs, have been delegated by ICANN, including شبكة (.network in Arabic), .संगठन (.organization in Devanagari), דומיין (.com in Hebrew), .我爱你 (.Iloveyou in Chinese), .ไทย (.thai in Thai), and .ευ (.eu in Greek), and more.

The Universal Acceptance Problem

Despite the availability of domain names using different TLDs, including those in different languages and scripts, and email addresses created by using these domain names, their acceptance and usability is not well supported by current software and applications. For example, a [recent study](#) conducted by Universal Acceptance Steering Group (UASG), reports that less than 10 percent of the 2000 websites tested accept email addresses in local languages and scripts, e.g., a Korean email address: [이메일테스트@다국어도메인이용환경테스트.한국](#). Even domain names using the long TLDs in American Code for Information Interchange, or ASCII, such as .engineering or .international, are only accepted by about 80 percent of the websites tested. This is in contrast to the domain names and email addresses using earlier gTLDs such as .com and .org and country code TLDs (ccTLDs), such as .sg and .ca, which are generally accepted by websites and applications. Another analysis by ICANN found that out of approximately 35 million email servers listed in gTLD zone files, only 22.2 percent are configured to support email addresses in local languages and scripts (called Email Address Internationalization or EAI) as shown in Figure 1 (see [here](#) for more detailed data).

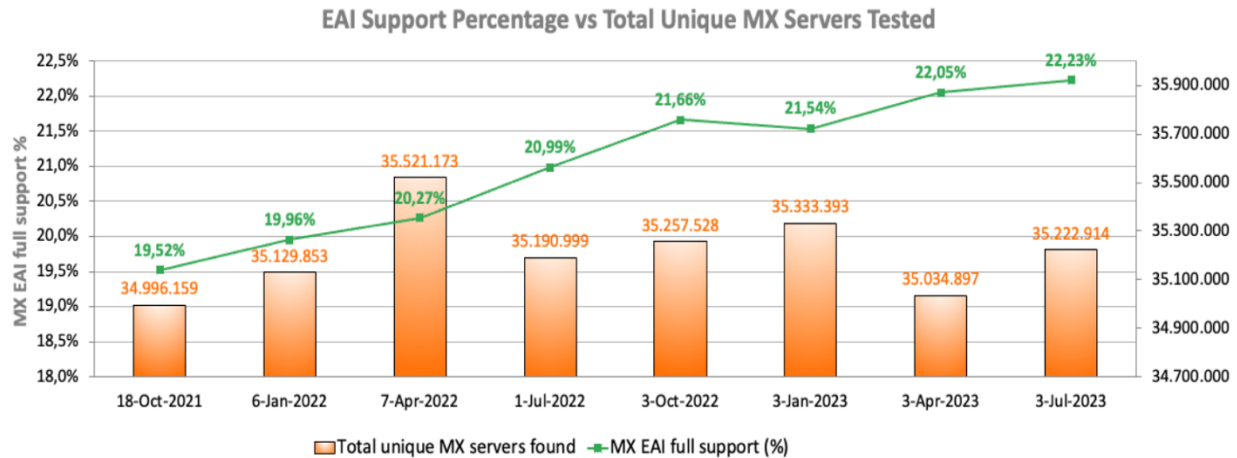


Figure 1: Support of internationalized email addresses in the email servers listed in gTLD zones

Universal Acceptance (UA) is the concept that all valid domain names and email addresses, including those formed with the new and longer ASCII gTLDs and IDN TLDs, are accepted and treated consistently by all software and applications. Achieving UA ensures that Internet users can effectively navigate and communicate online using a chosen domain name and email address that best aligns with their interests, business, culture, language, and script. Therefore, UA is a foundational requirement for achieving meaningful online access by enabling consumer choice and digital inclusivity, a goal also envisioned in [WSIS Tunis Agenda](#) and [WSIS+10 Outcome Documents](#).

ICANN and UASG are investigating the gaps in technology related to UA-readiness, and have published the following studies reporting the potential issues and summarized in the [UA Readiness Report for FY23](#):

1. Technical Platforms and Applications
 - a. Platforms used to enable and develop applications: Standards, Frameworks, Libraries, and Tools.
 - i. [UA Readiness of Programming Languages and Frameworks](#)
 - ii. [UA Readiness of Networking Command Line Tools](#)
 - iii. [Universal Acceptance \(UA\) of Content Management Systems \(CMS\) Phase 1 - WordPress](#)
 - iv. [UA-Readiness of Web Hosting Tools \(cPanel, Plesk, ISPConfig\)](#)
 - b. Actual deployment: Applications, including websites developed.
 - i. [UA Readiness of Web Browsers](#)
 - ii. [UA Readiness of Social Media Platforms](#)
 - iii. [Email Acceptance by Websites](#)
 - iv. [UA-Readiness of Popular Identity Platforms \(Okta, Auth0, OpenIAM\)](#)
2. Email Software and Services
 - a. Platforms used to enable and develop applications: Standards, Frameworks, Libraries, and Tools.
 - i. [EAI Support of Email Software and Services](#)
 - b. Actual deployment: email services and servers deployed.
 - i. [EAI Readiness of Email Servers](#)

In order to be UA-ready, software applications need to be able to accept, validate, process, store, and display all domain names and email addresses correctly. The [Universal Acceptance Readiness Framework](#) lays out details on how to check for UA-readiness using a gating approach to verify UA conformance of an application. To allow for global UA testing, a set of domain names has been registered covering the various categories and scripts, including Arabic, Armenian, Bengali, Chinese (Simplified, Traditional), Cyrillic, Devanagari, Ethiopic, Georgian, Greek, Gujarati, Gurmukhi, Hangul, Hebrew, Hiragana, Kannada, Katakana, Lao, Latin, Malayalam, Myanmar, Oriya, Sinhala, Tamil, Telugu, Thaana, Thai, and Tibetan. In addition, an email testbed has also been set up using these domain names. This provides a comprehensive dataset to test applications for UA as captured in [UASG004](#) and corresponding data in [UASG004A](#).

The studies show that many online applications, including social media applications, content management systems, and others, do not allow users to use email addresses in local languages and scripts. This presents a significant gap in current technology to allow users globally to meaningfully access the online resources and communicate effectively, limiting their digital inclusion.

UA Remediation Efforts

ICANN has been working with its community, including the Universal Acceptance Steering Group (UASG), to promote UA awareness and UA adoption. To address the multifaceted challenges of UA, the outreach is focused on multiple stakeholders, including technology developers, providers of email tools and services, the public sector, TLD registries and their registrars and academia.

In order to provide stakeholders with the necessary tools and resources to become UA-ready, ICANN and the UASG have also developed a wide range of guidelines and training materials. For example, the UASG has investigated and published guidelines for implementing mailbox names in local languages outlined in its [Considerations for Naming Internationalized Email Mailboxes](#) report. ICANN has recently published a [Universal Acceptance \(UA\) Roadmap for Domain Name Registry and Registrar Systems](#), and conducted the [Regional Universal Acceptance Training Program](#) in 2021. ICANN continues to engage with the technology organizations to raise the issues related to UA and encourage them to fix them.

ICANN is also working with entities globally to organize UA Day annually, on or around 28 March of every year. The aim of UA Day is to raise awareness and build capacity for UA globally. ICANN supported more than 50 UA Day events across 40 countries for [UA Day 2023](#) reaching out directly to around 9,400 participants.

A Call to Support UA Adoption

The technical community has already contributed significantly, by developing protocols for domain names and email addresses to be represented in the different languages and scripts. Promoting UA adoption presents further opportunity for the technical community to provide the Internet users real choice and representation online, while enabling a multilingual Internet for digital inclusion. For more information visit <https://icann.org/ua> or email UAProgram@icann.org.