



Asia Pacific

Top Level Domain Association

APTLD Papers Series

Paper# 6

White Paper
The Role of Country Code Top-Level
Domains (ccTLDs) in Achieving
Universal Acceptance

by
APTLD
in Collaboration with ICANN

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1 Introduction

The [Universal Acceptance](#) (UA) of domain names and email addresses is the key to achieving a digitally inclusive internet by ensuring that all domain names and email addresses – regardless of script, language or character length – are accepted equally by all Internet-enabled applications, devices, and systems. This includes supporting all country code top-level domains (ccTLDs), new and long generic top-level domains (gTLDs), and Internationalized Domain Names (IDNs) including IDN ccTLDs. The Asia Pacific (APAC) region is one of the most linguistically diverse and is home to more than 3,000 languages. With large APAC communities using local languages written in local scripts, UA – specifically for IDNs – is essential for an inclusive Internet in the region.

Therefore, the Asia Pacific Top Level Domain Association (APTLD) in partnership with the Internet Corporation for Assigned Names and Numbers (ICANN) organized a collaborative UA training program for members of the APAC community. The program was designed to raise awareness of UA challenges in the APAC region, help build technical capacity to address those challenges (configuring email servers to support Email Address Internationalization and programming to support UA), and assist ccTLDs and other stakeholders in developing and implementing robust IDN and UA-related systems and policies.

The final session in this series invited IDN ccTLD managers to share experiences related to UA. They were asked two questions:

1. What must a ccTLD manager do internally to update their own systems to be UA-ready?
2. Who are the local stakeholders for UA, and how can ccTLD managers encourage UA adoption by these stakeholders?

The discussants on these two topics included the ccTLD operators of Armenia, China, India, Iran, Russia, and Thailand. The following document collates their responses as examples and guidelines for other ccTLD operators to support UA.

APTLD would like to extend special thanks to Dr. Sarmad Hussain and his colleagues at ICANN for their contribution to the design and implementation of the series of webinars and assistance in drafting this paper.

2 Categories of Domain Names and Email Addresses

In order to support UA the following categories should be supported by applications and systems:

Domain names

Newer top-level domain names:	example.sky
Longer top-level domain names:	example.abudhabi
Internationalized Domain Names:	普遍接受-测试.世界

Internationalized email addresses (EAI)

ASCII@IDN

UTF8@ASCII

UTF8@IDN

UTF@IDN; right-to-left scripts

marc@société.org

почта@example.com

测试@普遍接受-测试.世界

ای-میل @مثال.موقع

It is anticipated that all applications and systems are able to input, validate, process, store and display all these categories of domain names and email addresses.



Accept



Validate



Process



Store



Display

The domain names and email addresses formed by all valid top-level domains (TLDs) should be supported. A current list of TLDs, which may change over time, is available [here](#). For IDNs, both Unicode (U-label) and equivalent ASCII (A-label) forms should be supported.

3 What Must a ccTLD Manager Do Internally to Update Their Own Systems to be UA-Ready?

All ccTLDs, whether ASCII or IDN ones, need to support UA because registrants may use IDNs and EAI for registrant information even if the ccTLD does not support IDN registrations. For systems, support for both A-label and especially U-label forms of IDNs is needed. It is advisable to start supporting A-labels first and then move towards supporting U-labels if it is not possible to support both forms directly. In addition, email systems should allow email box names in Unicode in UTF-8 format and domain names in both A-label and U-label forms.

To be UA-ready a ccTLD manager should:

1. Review internal policies, if applicable, to support IDNs and EAI in local language(s).
2. Train staff and stakeholders on UA practices and technical needs.
3. Review all systems to see which require updates to support UA.
4. Test each of these systems to see the extent of support available and needed.
5. Search and determine solutions and best practices in order for the systems to be updated.
6. Update the relevant systems to provide the UA support (this will be the hardest part of the process).
7. Promote the updates once done with your stakeholders, including one's own registrars and customers.
8. Collaborate with other ccTLDs at regional and international levels to promote UA.

Both the frontend and backend systems need to be updated to support UA, per the details below.

3.1 Frontend Systems

1. Domain name registration frontend: user interfaces of the ccTLD manager's website as well as for its registrars and resellers should be updated to support IDNs and EAI. U-label forms are especially important for customer-facing applications for better visibility (in addition to the A-label versions).
2. ccTLDs should update their communication systems to support IDNs and EAI. This includes corporate email servers, ticketing systems, the principal website and any additional services.
3. Marketing and sales webpages with registration, subscription, and feedback forms should all accept EAI and validate such email addresses (i.e., being able to send and receive emails to and from internationalized email addresses with notifications). Email clients should support EAI.
4. Customer accounts and profiles should support IDNs and EAI.
5. Registration data systems must support IDNs and EAI. Registration Data Access Protocol (RDAP) already supports Unicode, while WHOIS is ASCII based.
6. Customers should be able to use services, complaint and feedback forms, and contacts using EAI. Further, both EAI and ASCII email addresses should be provided to staff interacting with customers (these can map to the same email box).
7. IDN and EAI should be checked for linkification issues, and they should appear as clickable links on the websites (same as the ASCII domain names and email addresses) and not as unlinked regular text.
8. A helpdesk function should be set up to address IDN and EAI-related queries.

3.2 Backend Systems

1. The registry system should allow for NS and MX records to use IDNs. The system should also more generally support IDNs and EAI.
2. As to the registry system administration database, IDNs should be stored in the U-label and A-label formats while EAI should be stored only in the Unicode format.
3. Extensible Provisioning Protocol (EPP) registration-related services should allow UTF-8 format, in addition to ASCII, to enable exchange of IDNs and EAI data.
4. Internal registry-related mail server should support EAI for communication.
5. All relevant APIs should allow exchange of IDNs and EAI data between systems.
6. All contacts for registrants, including administrative and technical contacts, should allow IDNs and EAI.
7. EAI should be supported to connect with all registrars.
8. EAI support should be enabled for the TLD contact managers.
9. It is also important to check the ccTLD's policies and contracts with registrars and other entities. These policies and contracts may also need to be updated to support IDNs and EAI for the ccTLD.

3.3 Staff Training

Training materials need to be developed and staff and stakeholders should be trained on UA-related issues and solutions. To that effect, the ccTLD should:

1. Develop and publish technical guidelines for the organization and stakeholders to support IDNs and UA.
 2. Train the staff of the ccTLD organization, as well as registrars, resellers, and other stakeholders on how to support IDNs and EAI.
 3. Enable staff and stakeholders to use IDNs and EAI. This will allow them to better experience what is needed by their customers.
- 4 Who are the Local Stakeholders for UA, and How Can ccTLD Managers Encourage UA Adoption by These Stakeholders?

The panelists identified the following stakeholders, roles, and activities of ccTLDs:

1. **Registrars, resellers, and service providers:** updating their domain name registration systems, customer service systems, and web and email services to support IDNs and UA.
2. **Technology developers and system administrators:** updating applications such as local popular websites, and systems such as web servers, to be UA-ready.
3. **Local email software and service providers:** updating tools, mail servers, and services to support the different categories of email addresses including EAI.
4. **Government and Policymakers:** making e-government systems UA-ready and promoting across agencies and the public sector.
5. **Influencers (individuals and organizations):** creating awareness across stakeholders to promote UA-readiness.

ccTLD managers have a significant role in promoting UA-readiness locally. They can generate awareness, undertake training and educational initiatives, adopt UA as a role model, provide technical support and help coordinate UA-related efforts with other public and private organizations and influencers. Below is a summary of concrete activities that can be done by different ccTLD managers in the region as shared by the panelists. Where possible, the ccTLD organizations that have authored and implemented or otherwise contributed to the promotion of the practices in question are referred to in the body of the text or in parentheses.

4.1 The Domain Name Industry to Adopting UA

The panel agreed that good practices in this regard suggest one should:

1. Update its email system to support EAI for emails. Provide every staff member a local language email address along with an ASCII email address (possibly going to the same email box). In China, CNNIC has provided Chinese email addresses to its staff. They use these email addresses on business cards and to coordinate with the customers, as needed. In Thailand, THNIC has provided Thai email addresses to its staff.
2. Upgrade internal systems to display U-labels instead of A-labels for better visibility of domain names in local languages at the EPP level, API level, and on the registration website. (Iran - IRNIC)

3. As a role model, update the website and core services for the ccTLD manager to be UA-ready. In Thailand, THNIC enables UA for Thai users.

4.2 UA Outreach and Training for the Broader Technical Community

The panel underscored the importance of outreach and training activities and agreed that the ccTLD managers should consider supporting the following activities:

1. The community should work with the Universal Acceptance Steering Group ([UASG](#)) to have UA Ambassadors conduct UA training locally, especially for local software developers. (Armenia - AMNIC)
2. Academia is not equally versed in these topics and active intervention and training is needed for computer science students in universities for this purpose. Conduct training on IDNs and UA for technology students. Training materials should also be developed. (China - CNNIC; Iran - IRNIC)
3. Outreach to open-source application providers to support UA. (China - CNNIC)
4. Develop and run a technical awareness and training campaign at the national level. (India - NIXI)
5. Provide IDN domains to academia to promote IDN usage. (India - NIXI)
6. Organize local language websites and Wikipedia contests for the use of IDNs and promotion of local content. In India, this is being done for all the 22 official languages. (India - NIXI)
7. Render financial support to small-size website developers to support UA. (India - NIXI)
8. Motivate global and international technology organizations to support UA. (India - NIXI)
9. Develop software development kits to support UA. (Iran - IRNIC)
10. Develop UA-related materials in local languages and organize a central website to publish and disseminate these resources. (Russia, the Coordination Center for TLD .RU/.PФ; Thailand - THNIC)

More specifically in Russia, the Coordination Center for TLD .RU/.PФ has a UA project website ([Поддерживаю.РФ](#)) with the following information.

- a. Documents explaining UA/EAI/IDN in Russian language
- b. A UA-ready software list
- c. Guidelines on IDN and EAI support in .PФ
- d. An EAI testbed available for developers to test EAI

In Thailand, THNIC has set up a wiki page on EAI implementation.

11. Organize UA technical trainings and hackathons (Russia, the Coordination Center for TLD .RU/.PФ; Thailand - THNIC).

In Russia, the Coordination Center for TLD .RU/.PФ undertakes the following activities:

- Creating materials on EAI implementation issues and how it works in the Russian language.
- Developing training materials in the Russian language for UA-readiness for Java and Python developers.
- Presenting the .PФ case at local hackathons like a “Digital Breakthrough” all-Russia hackathon for professional developer teams.
- Conducting a summer school hackathon for students to create UA-ready websites.

In Thailand, THNIC organizes hackathons and trainings on setting up email servers that support EAI and UA for web developers.

12. Conduct UA training sessions at technical forums internationally. (Thailand - THNIC)
13. Demonstrate the use of email addresses as an identifier for various applications, e.g., online training platforms. (Thailand - THNIC)

4.3 Awareness, Support, and Incentives for the Community

The panelists suggested that as an ultimate source of expertise ccTLDs should:

1. Create an awareness campaign to inform registrants on each registration. (India - NIXI)
2. Nominate UA Ambassadors for local language communities. In India, NIXI is planning to nominate UA Ambassadors to represent all the 22 official languages.
3. Maintain a UA helpdesk to address complaints related to IDNs and EAI. (India - NIXI)
4. Provide one free email address with any IDN registration, which motivates the user to use the IDN domain. (India - NIXI)
5. Provide a free IDN domain along with the registration of an ASCII domain. (India - NIXI)
6. Undertake awareness campaigns for domain names in local languages. In Iran, IRNIC is promoting IDNs to help increase their registration by the community.
7. Support technology for easier use of domain names and email addresses in local languages. In Russia, the Coordination Center for TLD .RU/.PФ conducts a digital dictation on Cyrillic domain names as a part of a nationwide digital literacy initiative for end users. (Russia, the Coordination Center for TLD .RU/.PФ)
8. Host awareness campaigns for local language content. In Russia, the Coordination Center for TLD .RU/.PФ sponsors a public discussion on the internationalization of web content and Internet identifiers on the Day of Slavic Writing and Culture.
9. Create awareness of the advantages to using local-language domain names. In Russia, the Coordination Center for TLD .RU/.PФ held a marketing webinar on Cyrillic IDNs advertising and search engine optimization (SEO) advantages, communicating that domain names in local languages under .PФ are easy to memorize.
10. Publish educational materials about UA/IDNs/EAI for non-technical audiences. (Russia, the Coordination Center for TLD .RU/.PФ)
11. Disseminate UA-related information through social media. (Thailand - THNIC)
12. Provide a free local language email service. In Thailand, THNIC provides a free Thai email service. The service allows both Thai and English email box names.
13. Involve influencer individuals and organizations to promote the use of domain and email addresses in local languages. In Thailand, THNIC collaborates with the Tourism Authority of Thailand, Cultural Promotion Department, and Electronic Transaction Development Agency to promote the use of Thai domain names and email addresses. (Thailand - THNIC)

4.4 The Public Sector's Role in Policy Development

The panel discussion also centered on the role of the public sector in promoting UA, which should include but not be limited to the following important activities:

1. In public procurement of software, it is necessary to give preference to software that supports UA. (Armenia - AMNIC)
2. Governments should help organize cross-departmental collaboration to address UA support, including cooperation with the software development sector locally and globally. Local linguistic experts should also be included in these discussions to address local language constraints in IDNs and EAI. (Armenia - AMNIC)
3. The public sector should proactively contribute to the UA policy shaping process. In India, NIXI develops UA policy in tandem with a national taskforce that unites subject matter experts to address UA challenges. In addition, NIXI is busy promoting UA adoption with web designers, email providers, mobile app providers, software developers, and content generators.
4. The central and provincial governments should facilitate the launch of IDN-based email services. In India, this has been done for Karnataka and Rajasthan states. Also, the COVID app launched in India is UA-ready.
5. Government should also support official languages in the government e-market procurement platforms. In India, there's already support of seven official languages in the government e-market procurement platform with plans to expand support to the 22 official languages. (India - NIXI). A specific focus in this respect should be made on the requirement to make the public sector's IT procurement UA compliant in the first place.
6. Support translation in local languages to disseminate information in the language of choice of the user. In India, the government is setting up the National Language Translation Mission for this purpose.

4.5 Local and Global Coordination in UA Adoption

As a truly universal challenge, UA requires a blend of complementing local and global activities and the panel agreed that the following ones should form top priorities:

1. The relevant industry should organize and work with local email service providers to encourage them to support internationalized email addresses. In China, the community has organized into Chinese Domain Name Consortium (CDNI) for this purpose. Many local email service providers are working on system upgrades and are soon to announce support for Chinese email addresses. (CNNIC)
2. ccTLDs should host UA Local Initiatives supported by the Universal Acceptance Steering Group ([UASG](#)), as exemplified by Thailand where THNIC hosts the national UA Local Initiative of Thailand.

4.6 Metrics and Rewards

In an effort to promote UA, ccTLDs should be at the forefront with definitive solutions enabling and empowering stakeholders to vigorously contribute to UA adoption. Specifically, ccTLDs can:

1. Create a UA-readiness index for country-wide technology. (India - NIXI)
2. Set up a UA-ready certification program for websites that support UA. In Thailand, THNIC is setting up a program for Thai UA certification. (Thailand - THNIC)

3. Create a UA self-certification program. (Russia, the Coordination Center for TLD .RU/РФ)

5 Conclusion

The panel discussion revealed a general consensus about the significant role ccTLD managers need to play in supporting and promoting the Universal Acceptance of domain names and email addresses. First and foremost, ccTLD managers should make their own systems support UA, especially in local languages. In addition, ccTLD managers should play an active role promoting UA in their communities by working with a broad range of stakeholders, planning outreach, and conducting technical training activities for these stakeholders. There are many national, regional, and global efforts already underway to promote UA adoption, resulting in readily available resources and best practices for both ccTLDs and other stakeholders. Working to achieve UA is an evolving process, so ccTLD managers should stay up to date on the latest UA resources and initiatives as they work to make UA-readiness a reality in their local communities.