Supporting Internationalized Email Addresses

Universal Acceptance of Domain Names and Email Addresses

PacNOG26

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Universal Acceptance Readiness

Vision

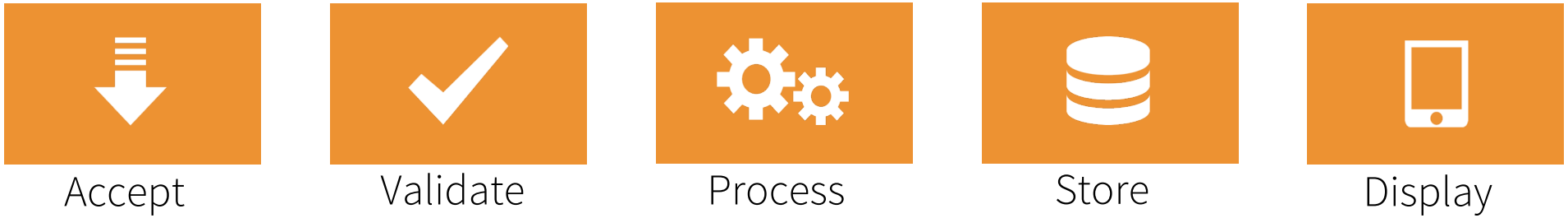
All domain names and email addresses work in all software applications.

Impact

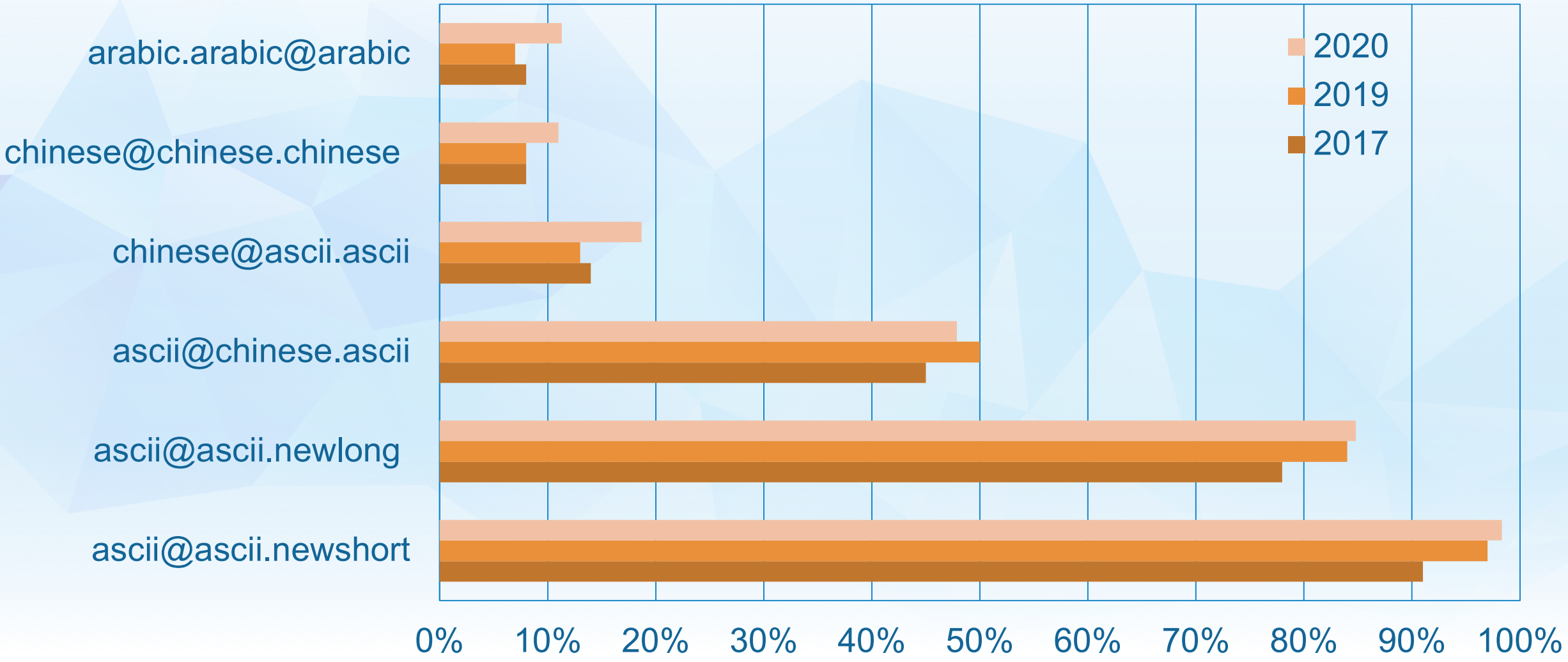
Promote consumer choice, improve competition, and provide broader access to end users.

Categories to Support for UA Readiness

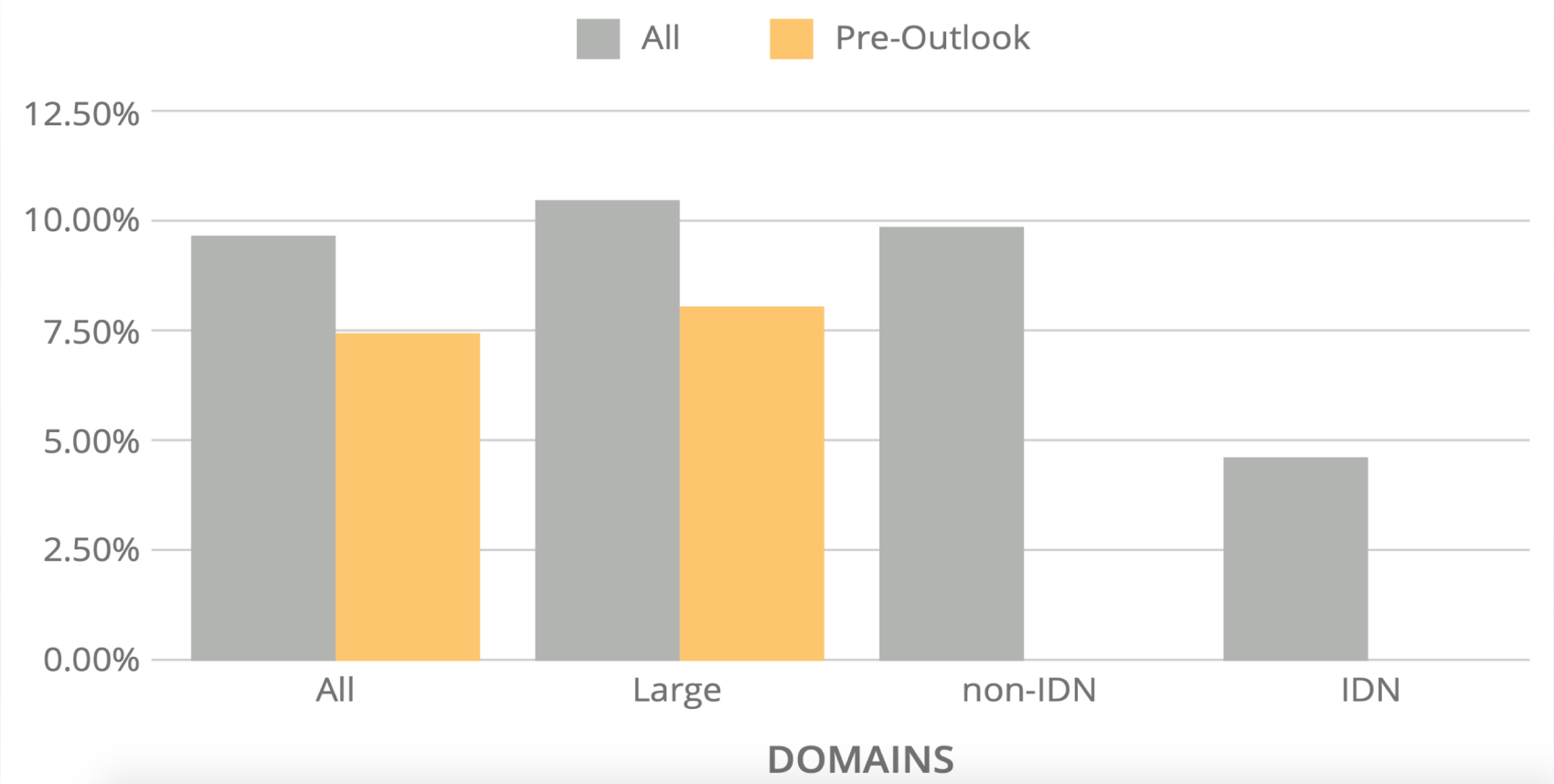
- **Domain Names**
  - **Newer** top-level domain names: example.sky
  - **Longer** top-level domain names: example.abudhabi
  - **Internationalized** domain names 普遍接受-测试.世界
- **Internationalized email addresses (EAI)**:
  - ASCII@**IDN** marc@société.org
  - **Unicode**@ASCII ईमेल@example.com
  - **Unicode@IDN** 测试@普遍接受-测试.世界
  - **Unicode@IDN**; right to left scripts ای-میل@مثال.موقع



Acceptance of Email Addresses in Websites Globally



Estimated Support of EAI in Email Systems Under All TLDs



Only 9.7% of the domains sampled were EAI ready;
based on mail servers found through MX records in zones of All, Large, non-IDN and IDN TLDs.
For details on methodology, see UASG021D: EAI Readiness in TLDs

Email Address Internationalization (EAI)

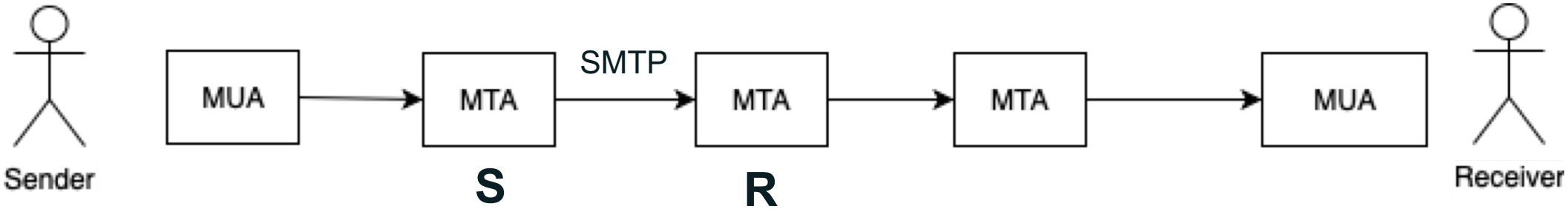
Pre-Requisites for Setting up EAI

- Normalize Unicode (UTF-8) string before processing, storing, etc. For IDNs use NFC form: e + ` (è: U+0065 U+0300) → è (U+00E8).
- Support both representations of IDN labels: U-label and A-label. U-Label is used for displaying and comparing; A-label for processing.
  - exâmple => exmple-xta => xn--exmple-xta
- Always use IDNA2008, not the older IDNA2003 version.
- Do not use code/libraries that have a static list of top-level domains (TLDs) as these change often. See IANA list for TLDs, with regular updates.
- Do not use regex for user input validation of internationalized identifiers. Use IDNA2008 libraries for IDN; EAI local part may be difficult to validate.

Email Protocol Changes for EAI

- SMTP
  - Is augmented to support EAI.
  - Has a signaling flag (SMTPUTF8) to specify support of EAI.
  - All SMTP servers in the path must support EAI to successfully deliver the email.
- POP/IMAP
  - Are augmented to properly support EAI.
  - Have a signaling flag to specify support of EAI.

SMTPUTF8 Example



Server S forwarding an email to server R

S: <connect>
R: 220 receive.net ESMTP
S: EHLO sender.org
R: 250-8BITMIME
R: 250-**SMTPUTF8**
R: 250 PIPELINING
S: MAIL FROM:<猫王@普遍接受-测试.世界> **SMTPUTF8**
R: 250 Sender accepted
S:RCPT TO:<ray@receive.net>
R:250 Recipient accepted

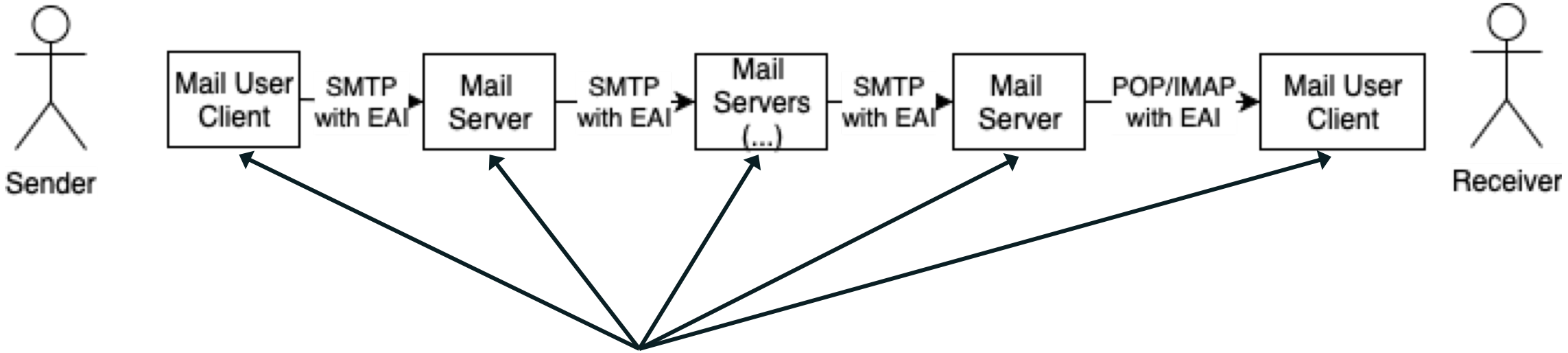
Specific SMTPUTF8 Signaling (EAI support)

SMTPUTF8 Example

S:DATA
R:354 Send your message
S:From: 猫王 <猫王@普遍接受-测试.世界>
S:To: ray@receive.net
S:Subject: 我们要吃午饭吗?
S:
S:How about lunch at 12:30?
S:.
R:250 Message accepted 389dck343fg34
S:QUIT
R:221 Sayonara

Email itself

Protocol Changes, Delivery Path Considerations



To send and receive an email with EAI:

- All email parties involved in the delivery path have to be updated for EAI support.
- If a single SMTP server in the path does not support EAI, then the email is not delivered.

Protocol Changes, Delivery Path Considerations

- What happens when one email (SMTP) server in the path does not support EAI?
  - The last server trying to send to the next hop:
    - Sends back to the sender user a report of unable to deliver.
    - Drops the email.
  - Similar to reports that a sender receives when an email address does not exist.

Additional Considerations

- Case folding:
  - In ASCII, email users expect the equivalence of lowercase and uppercase. For example, PETER@example.com and peter@example.com will be delivered to the same mailbox.
  - Typically for EAI, such case folding functionality is not automatically implemented in most EAI-ready software.
- SPAM:
  - EAI emails may be considered as spam by spam filtering software even when proper SPF/DKIM records are enabled.
- Software/Services:
  - Not every server/client software and services support EAI.

Some Relevant Materials

- See https://uasg.tech for a complete list of reports.
  - Universal Acceptance Quick Guide: UASG005
  - Introduction to Universal Acceptance: UASG007
  - Quick Guide to EAI: UASG014
  - EAI – A Technical Overview: UASG012
  - EAI – Evaluation of Major Email Software and Services: UASG021B
  - Universal Acceptance Readiness Framework: UASG026

Thank You

- Access all UA documents and presentations at website: https://uasg.tech
- Access details of ongoing work from wiki pages: https://community.icann.org/display/TUA
- Register to participate or listen in the UA discussion list at: https://uasg.tech/subscribe
- Register to participate in UA working groups here

- For more information, email info@uasg.tech or UAProgram@icann.org

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