Tech Day: Universal Acceptance

Mark Švančárek

Universal Acceptance

Today's Objectives

- Definition of Universal Acceptance
- Universal Acceptance Steering Group
- Challenges
- BiDi Stuff
- Conclusion

Definition of Universal Acceptance

ALL domain names and ALL email addresses should work in ALL Internet-enabled applications, devices and systems

Universal Acceptance Steering Group (UASG)

- A community-based team
  - ICANN's role is that of supporter, provider of funds
- Formed to identify topline issues and proposed solutions, and disseminate best practices
  - Objective: Help software developers and website owners update systems to keep pace with evolving Internet standards
  - Message: Universal Acceptance will enable the next billion users build and access their own spaces and identities online
- **UASG.tech**

UASG Activities

Review Popular Websites, Dev Frameworks, Browsers, OS

Build Use Cases, Test Environments, EAI Community

Outreach Live Workshops, Panel Discussions, Presentations

Writing Knowledge Databases, Whitepapers, Quick Guides

Challenges

- Technical Challenges
  - Challenging old assumptions
  - Updating old software
  - Managing backward-compatibility
- Business Challenges
  - Understanding the opportunity
  - Evaluating return on investment

Today's discussion

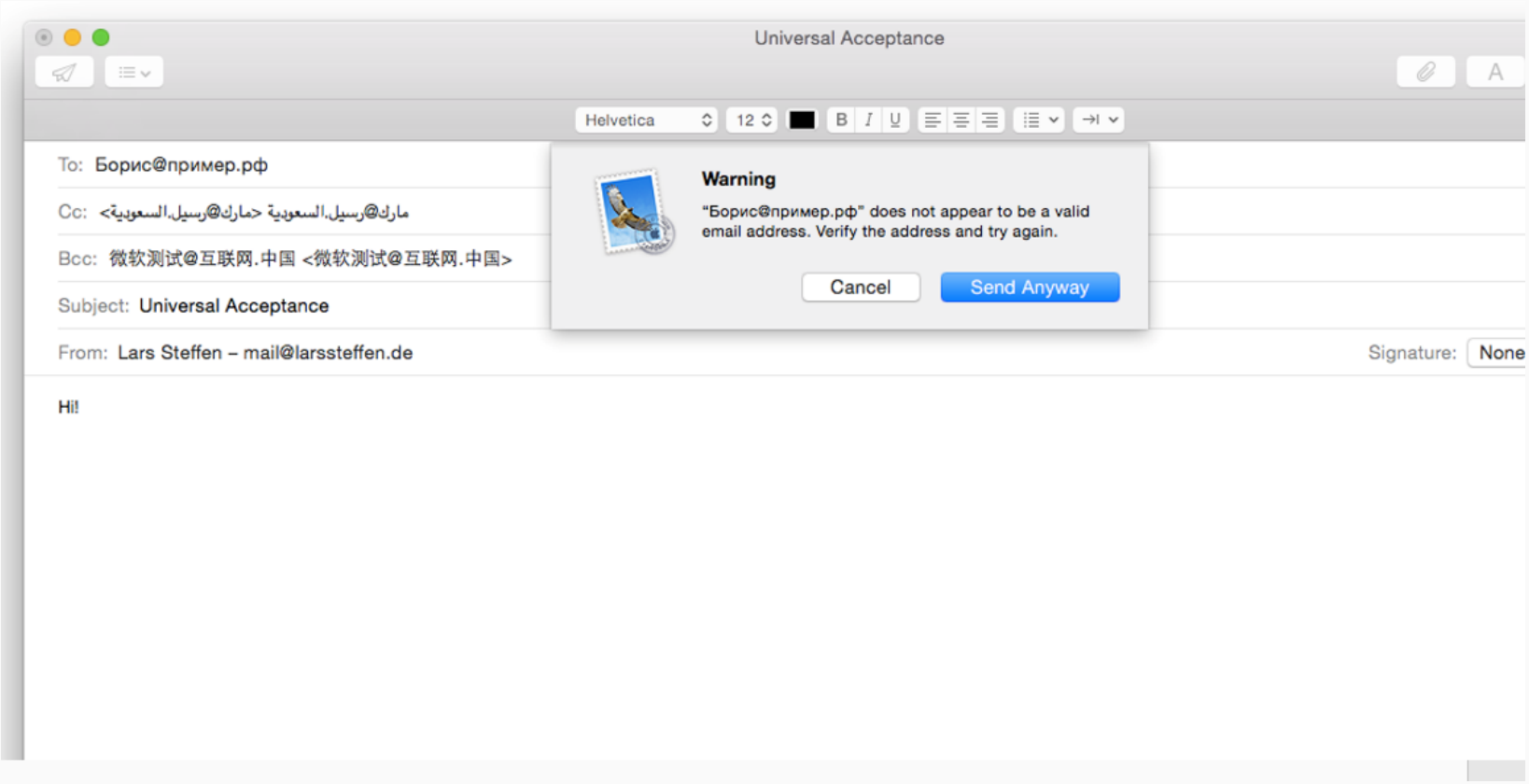
Learn more at **UASG.tech**

Technical Challenges – Old Assumptions

- Sometimes coders make bad assumptions about domain name strings and email address strings
  - This may be because RFCs have changed (e.g. SMTPUTF8)
  - Or standards may be misleading (e.g. HTML5.3 email input type definition)
  - Or standards may not exist (e.g. “linkification”)
- But mostly assumptions are based on previous state of the ecosystem, rather than RFCs (i.e. they may never have been correct assumptions)

Examples of bad assumptions

- Bad assumptions about TLDs
  - Length restrictions, script restrictions, maintaining outdated name lists
- Bad assumptions about email addresses
  - All of the above (domain name part)
  - Regular expressions which aren’t EAI-aware
  - Over-aggressive spam-filtering when scripts are mixed within or between labels
- Bad assumptions about linkification
  - Not understanding user intent


Universal Acceptance
Helvetica
12
To: Борис@пример.рф
Cc: مارك@رسيل.السعودية <مارك@رسيل.السعودية>
Bcc: 微软测试@互联网.中国 <微软测试@互联网.中国>
Subject: Universal Acceptance
From: Lars Steffen – mail@larssteffen.de
Signature: None
Hi!
Warning
"Борис@пример.рф" does not appear to be a valid email address. Verify the address and try again.
Cancel
Send Anyway

Technical Challenges – Updating Old Software

- It's usually not hard to update an individual piece of software to use latest versions of Unicode, IDNA, SMTP, etc.
  - Usually, it's more like a "Bug Fix" than like a "Design Change Request"
- The tricky parts are:
  - Finding **ALL** the instances in the software which use or make assumptions about domain names, URLs, URIs, and email addresses
  - Identifying all the use cases which must be tested
  - Managing bi-directional strings
  - "Linkification"
- No one wants to fix software which is already working unless the business opportunity is clear

Managing backward compatibility: Email Address Internationalization (EAI)

Managing Backward Compatibility - EAI

- Email Address Internationalization (EAI) creates a new email stream, parallel to the legacy email stream
  - Services must advertise support for SMTPUTF8
  - STMPUTF8 systems can interop with SMTP systems, but the reverse is not true

- Attempts to make SMTP systems interop with SMTPUTF8 systems is collectively known as “downgrading”
  - In general it doesn’t work

More about email “downgrading”

- UASG supports a single “downgrading” technique: “Downgrading with Aliasing”
  - An email provider can offer an EAI user an ASCII email alias, and decide “on the fly” which address to use for each To: or CC: destination
  - Coremail and XgenPlus both use this technique
- But other transformations are not allowed
  - Don’t ever attempt to transform an address if you do not manage the mailbox
  - Don’t send ACE encoding (punycode) in the local part
  - If you receive ACE-encoded local parts, don’t transform into a Unicode equivalent

Fun fact

Suppose I want mailbox = “孫悟空” on Outlook.com

- Note that ACE(孫悟空) = “xn--98sy4jmv0a”

Q: Can my non-SMTPUTF8 friend expect `xn--98sy4jmv0a@outlook.com` to work when sending me email?

A: NO

- `xn--98sy4jmv0a@outlook.com` is already an existing mailbox, and attempting to use it as a downgrading transformation will cause messages to go to the wrong destination!
- You cannot make assumptions about mailboxes you don’t manage!

Current Status of EAI – Email Address Internationalization

* UASG is creating an EAI evaluation program
  * Evaluate quality of support for non-ASCII mailbox names and good practice around presentations of IDNs
* Phase 1: The ability to send to and receive from EAI Addresses
  * Google, Office365, Outlook.com, Postfix, Exim, Halon, Outlook, and more claim compliance
* Phase 2: The ability to host non-ASCII mailbox names and domain names
  * Coremail, XgenPlus, Raseal, OpenFind, Throughwave all claim compliance

Examples: Bi-directional Email Addresses

Left to Right (LTR) Scripts

Username Domain TLD

user@example.app

Right to Left (RTL) Scripts

TLD Domain Username

app.مثال @المستخدم

More Examples of (imaginary) Email Addresses including IDNs

user@example.みんな	(Uses internationalized TLD)
user@大坂.info	(Uses internationalized 2nd level domain)
用戸@example.lawyer	(Uses internationalized user name and new gTLD)

Hard problem:

Unicode + Bi-Directionality + Linkification

The Unicode Bidi Algorithm (UBA)

* UBA is a very useful, general, and standard approach to displaying text that contains right-to-left scripts, such as Arabic and Hebrew. But there are situations in which it is awkward to use and/or is visually confusing.

* IRLs (internationalized URLs)
  * Also applies to file paths and email addresses in addition to scheme IRIs

http://www.unicode.org/cldr/utility/bidi.jsp

Quick Bidi Intro

* Hebrew/Arabic text is normally displayed right-to-left (RTL)
* Even pure Hebrew & pure Arabic (no foreign words) can contain bidirectional text
* Digits are always displayed “left to right” (LTR) except for N’Ko
* Neutral characters can be displayed LTR or RTL
* Unicode Bidi Algorithm (UBA) specifies the classifications of Unicode characters and their visual layout
* IRIs with schemes like `http` have LTR

Linkification

* **UASG010** – Quick Guide to Linkification
* Modern software sometimes automatically creates a hyperlink by a user simply typing in a string that looks like a web address, email name or network path.

EXAMPLE: Typing “www.icann.org” into an email message → http://www.icann.org

* Application accepted a string and dynamically determined it should create a hyperlink to an Internet Location (URL/IRL)
* Users have expectations and developers need to code for those expectations.
  * In this example, “http:” and “www” were indicators of user intent

What’s the problem?

“Logical” Order*

http://ثق.يب.شس

http://exchange.ثق.شس

UBA LTR ¶

http://ثق.يب.شس

http://exchange.ثق.شس

UBA RTL ¶

http://شس.يب.ثق

http://exchange.شس.ثق

Readable Order

http://ثق.يب.شس

http://exchange.ثق.شس

http://شس.يب.ثق

http://exchange.شس.ثق

Unicode: Bidirectional Character Types

Category	Type	Description	General Scope
Strong	L	Left-to-Right	LRM, most alphabetic, syllabic, Han ideographs, non-European or non-Arabic digits, ...
	LRE	Left-to-Right Embedding	LRE
	LRO	Left-to-Right Override	LRO
	R	Right-to-Left	RLM, ALM, Hebrew alphabet, and related punctuation
	AL	Right-to-Left Arabic	Arabic, Thaana, and Syriac alphabets, most punctuation specific to those scripts, ...
	RLE	Right-to-Left Embedding	RLE
	RLO	Right-to-Left Override	RLO
Weak	PDF	Pop Directional Format	PDF
	EN	European Number	European digits, Eastern Arabic-Indic digits, ...
	ES	European Number Separator	Plus sign, minus sign
	ET	European Number Terminator	Degree sign, currency symbols, ...
	AN	Arabic Number	Arabic-Indic digits, Arabic decimal and thousands separators, ...
	CS	Common Number Separator	Colon, comma, full stop (period), No-break space, ...
	NSM	Nonspacing Mark	Characters marked Mn (Nonspacing_Mark) and Me (Enclosing_Mark) in the Unicode Character Database
	BN	Boundary Neutral	Most formatting and control characters, other than those explicitly given types above
Neutral	B	Paragraph Separator	Paragraph separator, appropriate Newline Functions, higher-level protocol paragraph determination
	S	Segment Separator	Tab
	WS	Whitespace	Space, figure space, line separator, form feed, General Punctuation spaces, ...
	ON	Other Neutrals	All other characters, including OBJECT REPLACEMENT CHARACTER

UBA example

Caps = Arabic Text here in logical order

ADDRESS 1234 56th st.

What users mean (RTL para, display order):

1234 56th st. SSERDDA

What UBA concludes:

.56th st 1234 SSERDDA

Resolving IRIs using UBA

Logical order

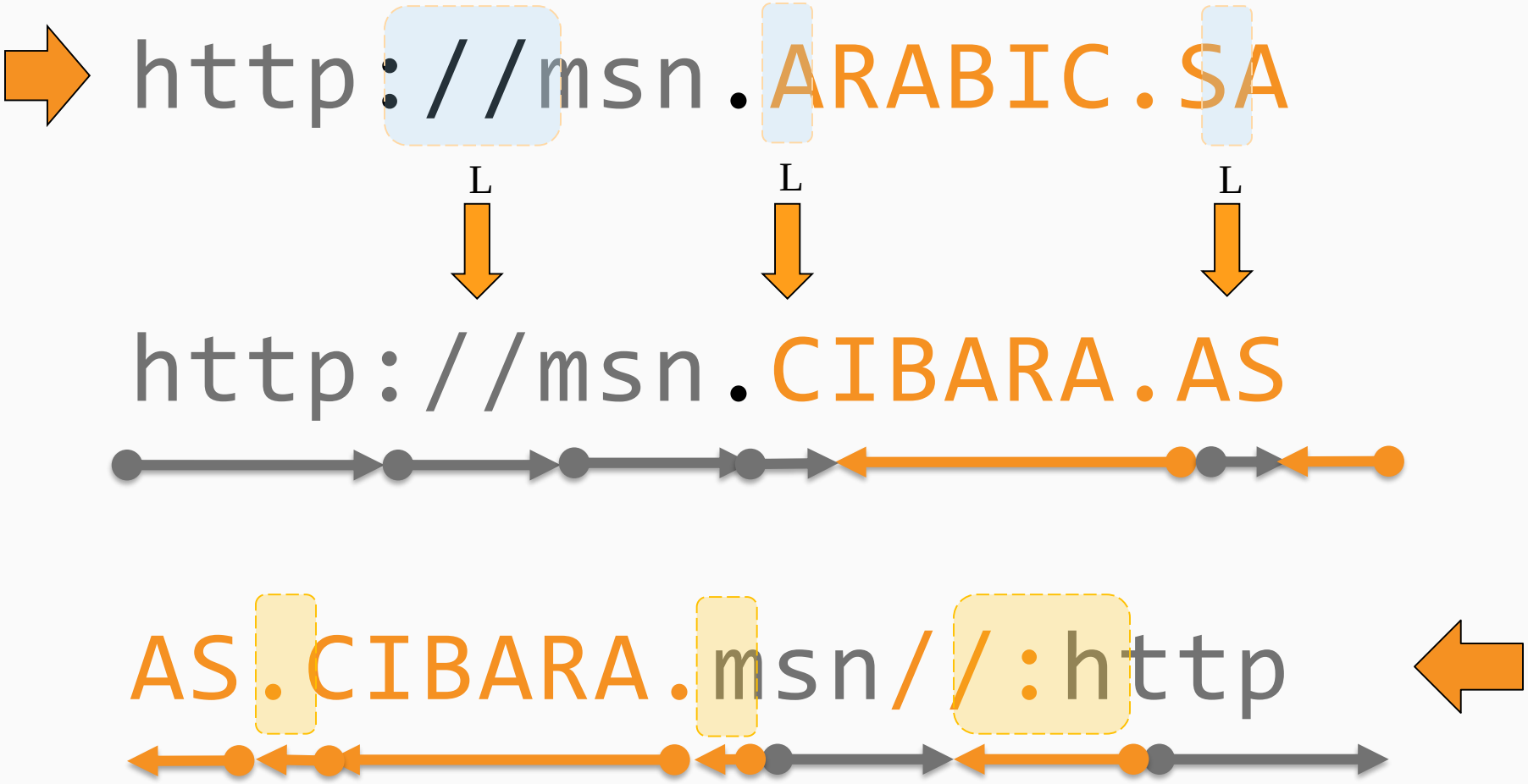
http://msn.ARABIC.SA

Display order

http://msn. AS.CIBARA

AS.CIBARA.http://msn

Resolving IRIs Readably



Summary: Possible Readable Layouts

“Fields” flow in consistent direction:

* LTR
* RTL
* First strong character
* Paragraph

User context or predilection may influence preference. Paragraph choice best default.

Further information about UA

* Visit www.uasg.tech
* Email info@uasg.tech
* Subscribe www.uasg.tech/subscribe
* Report problems www.uasg.tech/global-support-centre
* Check out your web site https://github.com/uasg/uac-crawler
* Help define email address regexes
  https://www.ietf.org/archive/id/draft-seantek-mail-regexen-02.txt

* Get started with Universal Acceptance Quick Guides!