Universal Acceptance of Browsers

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About Oxford Information Labs (OXIL)
Oxford Information Labs is a cyber intelligence consultancy specializing in Internet governance, policy development, and research. Supported by a highly innovative technical team, our work is informed by our own longitudinal studies, academic research, database design, data visualization, and development of Internet services that are ‘secure by design’. We apply extensive industry knowledge to our consultancy services, working with government and major Internet players in regulatory, security, Domain Name System (DNS), and educational domains.

Introduction

This research provides an analysis of the Universal Acceptance (UA)-readiness of some of the most widely used browsers worldwide. Criteria for this study was set by ICANN and the UASG, and the findings of this study will be used for future recommendations to improve UA.

Executive Summary

Universal Acceptance (UA) is a cornerstone of a digitally inclusive Internet by ensuring all domain names and email addresses - in any language, script or character - are accepted equally by all Internet-based applications, devices, and systems. This research is essential to achieving UA which, if achieved, would give every person the ability to navigate the Internet using their chosen domain name and email address that best aligns with their culture, interests, language, and script. UA ensures that all domain names, including long new top-level domains (TLDs) and Internationalized Domain Names (IDNs), and email addresses are treated equally and can be used by all Internet-enabled applications, devices, and systems.[1] Our research aims to expand the information and knowledge sharing on UA to make this level of Internet inclusivity more accessible.

The Internet's structure and architecture can often be confusing to understand. Beyond this, the Internet does not provide an equal service to all users of the Internet. This inequality is, in part, due to the unequal experience for users' concerns, language preferences, and preferred scripts. This issue is at the heart of our research. As prior research on UA has shown, not all languages and scripts are treated equally online and our tests and reports hope to further understand the extent to which non-Latin script languages are accepted on browsers.

This study aims to provide research which may help policymakers better understand how the Internet could better accommodate users' choice of script by analyzing the current usability of IDNs and non-Latin script email addresses in browsers. The overall aim of this research is to help create a more inclusive Internet which ensures all domain names and email addresses can be used by all Internet-enabled applications, devices, and systems. Also, the findings of this project hope to identify gaps in UA and build on the findings as presented in the previous 2017 UASG report.

Overall, there was a high level of UA-readiness in browsers. From testing a wide range of international scripts and emails in multiple browsers, the results showed an encouraging picture. The study revealed that there were more difficulties with mobile device environments in regard to UA.

Results Overview

Following the initial report completed in 2017 on the Universal Acceptance of Popular Browsers,[2] this report has been produced to provide an updated version with additional

[1] https://www.icann.org/ua.
[2] UASG016: Universal Acceptance of Popular Browsers: https://uasg.tech/download/uasg-016-ua-of-popular-browser-en/.

testing of behavior around bookmarking and adding favorites with the stance that all the URLs listed should resolve to valid websites in all browsers, and display the URL and “Title” as an end user might expect on all platforms using just the default settings (with no special language settings).

After performing individual tests on browsers selected by the UASG to include the most popular browsers, as well as browsers specific to particular locales, most browsers achieved successful results in regard to UA-readiness. This means that after testing 19 URLs over a total of 14 browsers, most resolved to valid websites in all browsers and displayed the URL and “Title” as an end user might expect on all platforms. This is a substantial improvement of UA-readiness following the results of 2017 which showed that only Internet Explorer on desktop performed completely as expected.

With the addition of testing the validity of saving favorites and bookmarks, however, the results showed that although bookmarks could be saved successfully, they did not always display as an end user would expect.

Overview

The results of the chart show the browser with the highest success rate in the lightest shade of GREEN. The results of the tests revealed that Yandex showed the best UA-readiness out of all the browsers tested. Chrome was second closely followed by Firefox, Opera, and Edge.

	360	Amigo Mail	Atom Mail	Chrome	Edge	Epic Privacy Bro	Firefox	Internet Explorer	Opera	Safari	Samsung Brows	Sogou	UC Browser	Yandex
Windows			1st	3rd	7th	3rd	6th		4th			5th		2nd
Mac OS				2nd	5th	6th	3rd		4th	4th				1st
Linux				2nd			1st		2nd					
Android				3rd	6th	2nd	4th		2nd		5th		7th	1st
IOS				2nd	6th	4th	3rd		5th	2nd				1st

A	Confirm URL is displayed correctly as pasted into the bar
B	Confirm that the correct page was loaded
C	Confirm that the URL is displayed correctly in the bar
D	Confirm that the Page title is displayed correctly in the window / tab
E	Add the url to browser bookmarks / favourites - operation completes without error.
F	Confirm that the url (and where supported page title) display correctly in the correct format as added.

The above table was compiled to grade the browsers on the tests above and the results in the Browser Results section.

Comparison of Computer/Desktop Environment vs. Mobile Device

	Passed all tests	Failed tests:
Windows	86	66
Mac OS	42	91
Linux	9	48
Android	48	104
IOS	31	102

The study revealed that there were more difficulties with mobile device environments in regard to UA. This table is taken from the number of total passes of all the tests and showed that the most failures were due to tests F and C (confirm that the URL display is in the correct format as added, and confirm that the URL is displayed correctly in the bar).

Methodology

The 14 browsers tested were chosen by the UASG as being the most popular browsers to test in order to update the existing report done in 2017. The study focused on visually identifiable support for IDNs and Unicode display within core browser software (as opposed to produced HTML content) as it is not practical or possible to use standardized software automation tools to automate the test cases. Each step of testing was executed for each browser/OS/URL combination by human testers with results recorded in Google Sheets spreadsheets for further analysis.

Within each sheet, all combinations of applicable OS and testing URLs were captured as rows and the result for each combination for the given test was captured using a simple checkbox to represent PASS/FAIL as per the example shown below. These were then collated into a summarized results matrix for further analysis during the writing-up phase.

The following tables provide an overview of the URLs used in the evaluation and the results for browsers on desktop and mobile platforms. The URLs were chosen based on the criteria of the UASG.

Operating Systems and Data Sets

As highlighted in the Test Plan, the below information shows the operating systems used during this study for Windows, MacOS, Linux, Android, and iOS.

	Windows 10	**Mac OS 11 (Big Sur)**	**Ubuntu Linux (20.04)**	**iOS 14.6**	**Android 11**
Chrome	91.0	91.0	91.0	91.0	91.0
Safari		14.1.1		14.6	
Firefox	89.0.1	89.0.1	89.0.1	34.1 (Daylight)	89.1.1
Edge	91.0	91.0		46.3.20	46.04

Internet Explorer	11.508				
Opera	77.0	77.0	77.0	3.1.1	64.0
Samsung Browser					14.0
UC Browser	6.0				13.3.8
360	7.5.2				
Sogou	11.0.1				
Yandex.Browser	21.5	21.5		21.5	21.5
Atom Mail.RU	11.0				
Amigo Mail.RU	61.0				
Epic Privacy Browser	87.0	81.4		1.2	1.0.0

The test cases (detailed in the next section) for each browser/OS combination were executed against a set of target internationalized URLs. These were selected using a subset of the lists presented in the UASG004 document with a few additional URLs containing special characters.

The full list of test URLs along with their category and script are detailed in the table below.

	Category	**URL (Root Domain)**	**Script**
1	ASCII.ASCII (new-long)	universal-acceptance-test.international	Long ASCII
2	ASCII.ASCII (new-short)	universal-acceptance-test.icu	Short ASCII
3	IDN.IDN (RTL)	تجربة-القبول-الشامل.موريتانيا	Arabic
4	IDN.IDN	универсальное-принятие-тест.москва	Cyrillic
5	IDN.IDN	सार्वभौमिक-स्वीकृति-परीक्षण.संगठन	Devanagari
6	IDN.IDN	Universales-Akzeptanz-Test.vermögensberatung	Latin
7	IDN.IDN	普遍适用测试.我爱你	Simplified Chinese

8	IDN.ASCII (RTL)	ޔުނިވަރ-ގަބޫލުކުރާ-ޓެސްޓް.com	Thaana
9	IDN.IDN (RTL; U-label.A-label)	تجربة-القبول-الشامل.xn--mgbah1a3hjkrd	Arabic
10	IDN.IDN (RTL; A-label.A-label)	xn-----ctdbabcfhu9c2b9l1acccr4c.xn--mgbah1a3hjkrd	Arabic
11	ASCII.ASCII /Unicode	universal-acceptance-test.icu/测试	Chinese
12	IDN.IDN	ສາກົນ-ການຍອມຮັບ-ທົດລອງ.ລາວ	Lao
13	IDN.IDN	համընդհանուր-ընկալում-թեստ.հայ	Armenian
14	IDN.IDN	უნივერსალური-თავსობადობის-ტესტი.გე	Georgian
15	IDN.IDN	સાર્વત્રિક-સ્વીકૃતિ-પરીક્ષણ.ભારત	Gujarati
16	IDN.IDN	どこでもつかえる.みんな	Japanese
17	IDN.ASCII	épreuve-acceptation-universelle.org	non-NFC normalisation form
18	IDN.IDN	普遍适用测试。我爱你	Chinese Open Dot
19	IDN.IDN	ยูเอทดสอบ.ไทย	Thai

Browser Results

Testing was performed on Windows, MacOS, and Ubuntu Linux and no variations were found in the results for a particular browser when running on different desktop platforms.

A	Confirm URL is displayed correctly as pasted into the bar
B	Confirm that the correct page was loaded
C	Confirm that the URL is displayed correctly in the bar
D	Confirm that the page title is displayed correctly in the window/tab
E	Add the URL to browser bookmarks/favorites - operation completes without error
F	Confirm that the URL (and where supported page title) displays correctly in the correct format as added

Overall, there was a high level of UA-readiness from testing a wide range of international scripts and emails in multiple browsers. The results showed an encouraging picture in regard to UA-readiness with positive results for Chinese Open Dot URLs and right-to-left (RTL) scripts.

The tables on the following pages show the results of the tests performed with green (Y) representing a pass on all tests, orange representing a failure of 2 or less tests, and red representing a failure of 3 or more tests.

Windows

A	Confirm URL is displayed correctly as pasted into the bar
B	Confirm that the correct page was loaded
C	Confirm that the URL is displayed correctly in the bar
D	Confirm that the Page title is displayed correctly in the window / tab
E	Add the url to browser bookmarks / favourites - operation completes without error.
F	Confirm that the url (and where supported page title) display correctly in the correct format as added.

URL/ Browser	360	Amigo Mail	Atom Mail	Chrome	Edge	Epic Privacy Bro	Firefox	Internet Explorer	Opera	N/A Safari	N/A Samsung Brows	Sogou	UC Browser	Yandex
universal-acceptance-test.international	NOT TESTABLE	NOT TESTABLE	Y	Y	Y	Y	Y	NOT TESTABLE	Y	N/A	N/A	Y	NOT TESTABLE	Y
universal-acceptance-test.icu	NOT TESTABLE	NOT TESTABLE	Y	Y	Y	Y	Y	NOT TESTABLE	Y	N/A	N/A	Y	NOT TESTABLE	Y
تجربة-القبول.الشامل.موريتانيا	NOT TESTABLE	NOT TESTABLE	Y	Y	F	Y	F	NOT TESTABLE	Y	N/A	N/A	B, C, D, E, F	NOT TESTABLE	Y
универсальное-принятие-тест.москва	NOT TESTABLE	NOT TESTABLE	Y	Y	F	Y	F	NOT TESTABLE	Y	N/A	N/A	Y	NOT TESTABLE	Y
सार्वभौमिक-स्वीकृति-परीक्षण.संगठन	NOT TESTABLE	NOT TESTABLE	Y	Y	F	Y	F	NOT TESTABLE	F	N/A	N/A	Y	NOT TESTABLE	Y
Universales-Akzeptanz-Test.vermögensberatung	NOT TESTABLE	NOT TESTABLE	Y	Y	F	Y	F	NOT TESTABLE	F	N/A	N/A	Y	NOT TESTABLE	Y
普遍适用测试.我爱你	NOT TESTABLE	NOT TESTABLE	Y	Y	F	Y	F	NOT TESTABLE	F	N/A	N/A	Y	NOT TESTABLE	Y
.com	NOT TESTABLE	NOT TESTABLE	A, C	A, C, F	A, F	A, C	C, F	NOT TESTABLE	A, F	N/A	N/A	A, C, F	NOT TESTABLE	F
تجربة-القبول-الشامل.xn--mgbah1a3hjkrd	NOT TESTABLE	NOT TESTABLE	A	A, C, F	A, C, F	A, C	C, F	NOT TESTABLE	A, C, F	N/A	N/A	A, B, C, D, E, F	NOT TESTABLE	C, F
xn-----ctdbabcfhu9c2b9l1acccr4c.xn--mgbah1a3hjkrd	NOT TESTABLE	NOT TESTABLE	C	C, F	C, F	C	C, F	NOT TESTABLE	C, F	N/A	N/A	B, C, D, E, F	NOT TESTABLE	C, F
universal-acceptance-test.icu/测试	NOT TESTABLE	NOT TESTABLE	Y	Y	F	Y	F	NOT TESTABLE	F	N/A	N/A	F	NOT TESTABLE	C, F
ยูเอทดสอบ.ไทย	NOT TESTABLE	NOT TESTABLE	Y	Y	F	Y	F	NOT TESTABLE	F	N/A	N/A	Y	NOT TESTABLE	Y
ສາກົນ-ການຍອມຮັບ-ທົດລອງ.ລາວ	NOT TESTABLE	NOT TESTABLE	Y	Y	F	B, C, D, E, F	F	NOT TESTABLE	Y	N/A	N/A	B, C, D, E, F	NOT TESTABLE	Y
համընդհանուր-ընկալում-թեստ.հայ	NOT TESTABLE	NOT TESTABLE	Y	Y	F	Y	F	NOT TESTABLE	Y	N/A	N/A	Y	NOT TESTABLE	Y
უნივერსალური-თავსობადობის-ტესტი.გე	NOT TESTABLE	NOT TESTABLE	Y	Y	F	Y	F	NOT TESTABLE	Y	N/A	N/A	Y	NOT TESTABLE	Y
සාර්ව්‍යිස-ස්වීකෘති-පරීක්ෂා.ඔෂස	NOT TESTABLE	NOT TESTABLE	Y	Y	F	Y	F	NOT TESTABLE	Y	N/A	N/A	Y	NOT TESTABLE	Y
どこでもつかえる.みんな	NOT TESTABLE	NOT TESTABLE	Y	Y	F	Y	F	NOT TESTABLE	Y	N/A	N/A	Y	NOT TESTABLE	Y
épreuve-acceptation-universelle.org	NOT TESTABLE	NOT TESTABLE	Y	Y	F	Y	F	NOT TESTABLE	Y	N/A	N/A	Y	NOT TESTABLE	Y
普遍适用测试。我爱你	NOT TESTABLE	NOT TESTABLE	C, F	C, F	C, F	C, F	D, F	NOT TESTABLE	Y	N/A	N/A	Y	NOT TESTABLE	C, F

MacOS

A	Confirm URL is displayed correctly as pasted into the bar													
B	Confirm that the correct page was loaded													
C	Confirm that the URL is displayed correctly in the bar													
D	Confirm that the Page title is displayed correctly in the window / tab													
E	Add the url to browser bookmarks / favourites - operation completes without error.													
F	Confirm that the url (and where supported page title) display correctly in the correct format as added.													
	N/A	N/A	N/A					N/A			N/A	N/A	N/A	
URL/ Browser	360	Amigo Mail	Atom Mail	Chrome	Edge	Epic Privacy Bro	Firefox	Internet Explorer	Opera	Safari	Samsung Brows	Sogou	UC Browser	Yandex
universal-acceptance-test.international	N/A	N/A	N/A	Y	Y	B, C, D, E, F	Y	N/A	Y	Y	N/A	N/A	N/A	Y
universal-acceptance-test.icu	N/A	N/A	N/A	Y	Y	B, C, D, E, F	Y	N/A	Y	Y	N/A	N/A	N/A	Y
تجربة-القبول-الشامل.موريتانيا	N/A	N/A	N/A	Y	F	B, C, D, E, F	F	N/A	F	F	N/A	N/A	N/A	Y
универсальное-принятие-тест.москва	N/A	N/A	N/A	Y	F	B, C, D, E, F	F	N/A	F	F	N/A	N/A	N/A	Y
सार्वभौमिक-स्वीकृति-परीक्षण.संगठन	N/A	N/A	N/A	Y	F	B, C, D, E, F	F	N/A	F	F	N/A	N/A	N/A	Y
Universales-Akzeptanz-Test.vermögensberatung	N/A	N/A	N/A	Y	F	B, C, D, E, F	F	N/A	F	C, F	N/A	N/A	N/A	Y
普遍适用测试.我爱你	N/A	N/A	N/A	Y	F	B, C, D, E, F	F	N/A	F	F	N/A	N/A	N/A	Y
ترسيخ-قبول-تجربة-اختبار.com	N/A	N/A	N/A	A, C, F	A, C, F	A, B, C, D, E, F	C, F	N/A	A, C, F	A, C, F	N/A	N/A	N/A	F
تجربة-القبول-الشامل.xn--mgbah1a3hjkrd	N/A	N/A	N/A	A, C, F	A, C, F	B, C, D, E, F	C, F	N/A	A, C, F	A, C, F	N/A	N/A	N/A	C, F
xn-----ctdbabcfhu9c2b9l1acccr4c.xn--mgbah1a3hjkrd	N/A	N/A	N/A	C, F	C, F	B, C, D, E, F	C, F	N/A	C, F	C	N/A	N/A	N/A	C, F
universal-acceptance-test.icu/测试	N/A	N/A	N/A	Y	F	B, C, D, E, F	F	N/A	F	B, C, D, E, F	N/A	N/A	N/A	C, F
ยูเอทดสอบ.ไทย	N/A	N/A	N/A	Y	F	B, C, D, E, F	F	N/A	F	F	N/A	N/A	N/A	Y
ສາກົນ-ການຍອມຮັບ-ທົດລອງ.ລາວ	N/A	N/A	N/A	Y	F	B, C, D, E, F	F	N/A	F	C, F	N/A	N/A	N/A	Y
համընդհանուր-ընկալում-թեստ.հայ	N/A	N/A	N/A	Y	F	B, C, D, E, F	F	N/A	F	F	N/A	N/A	N/A	Y
უნივერსალური-თავსობადობის-ტესტი.გე	N/A	N/A	N/A	Y	F	B, C, D, E, F	F	N/A	F	C	N/A	N/A	N/A	Y
સાર્વત્રિક-સ્વીકૃતિ-પરીક્ષા.ભારત	N/A	N/A	N/A	Y	F	B, C, D, E, F	F	N/A	F	Y	N/A	N/A	N/A	Y
どこでもつかえる.みんな	N/A	N/A	N/A	Y	F	B, C, D, E, F	F	N/A	F	Y	N/A	N/A	N/A	Y
épreuve-acceptation-universelle.org	N/A	N/A	N/A	Y	F	B, C, D, E, F	Y	N/A	Y	Y	N/A	N/A	N/A	Y
普遍适用测试。我爱你	N/A	N/A	N/A	C, F	C, F	B, C, D, E, F	C, F	N/A	C, F	B, C, D, E, F	N/A	N/A	N/A	C, F

Linux

A	Confirm URL is displayed correctly as pasted into the bar
B	Confirm that the correct page was loaded
C	Confirm that the URL is displayed correctly in the bar
D	Confirm that the Page title is displayed correctly in the window / tab
E	Add the url to browser bookmarks / favourites - operation completes without error.
F	Confirm that the url (and where supported page title) display correctly in the correct format as added.

	N/A	N/A	N/A		N/A	N/A		N/A		N/A	N/A	N/A	N/A	N/A
URL/ Browser	360	Amigo Mail	Atom Mail	Chrome	Edge	Epic Privacy Bro	Firefox	Internet Explorer	Opera	Safari	Samsung Brows	Sogou	UC Browser	Yandex
universal-acceptance-test.international	N/A	N/A	N/A	Y	N/A	N/A	Y	N/A	Y	N/A	N/A	N/A	N/A	N/A
universal-acceptance-test.icu	N/A	N/A	N/A	Y	N/A	N/A	Y	N/A	Y	N/A	N/A	N/A	N/A	N/A
تجربة-القبول-الشامل.موريتانيا	N/A	N/A	N/A	F	N/A	N/A	F	N/A	F	N/A	N/A	N/A	N/A	N/A
универсальное-принятие-тест.москва	N/A	N/A	N/A	F	N/A	N/A	F	N/A	F	N/A	N/A	N/A	N/A	N/A
सार्वभौमिक-स्वीकृति-परीक्षण.संगठन	N/A	N/A	N/A	F	N/A	N/A	F	N/A	F	N/A	N/A	N/A	N/A	N/A
Universales-Akzeptanz-Test.vermögensberatung	N/A	N/A	N/A	F	N/A	N/A	F	N/A	F	N/A	N/A	N/A	N/A	N/A
普遍适用测试.我爱你	N/A	N/A	N/A	F	N/A	N/A	F	N/A	F	N/A	N/A	N/A	N/A	N/A
ދިސިރު-ގަބޫލުކުރާ-ޓެސްޓް.com	N/A	N/A	N/A	A, C, F	N/A	N/A	C, F	N/A	A, C, F	N/A	N/A	N/A	N/A	N/A
تجربة-القبول-الشامل.xn--mgbah1a3hjkrd	N/A	N/A	N/A	A, C, F	N/A	N/A	C, F	N/A	A, C, F	N/A	N/A	N/A	N/A	N/A
xn-----ctdbabcfhu9c2b9l1acccr4c.xn--mgbah1a3hjkrd	N/A	N/A	N/A	C, F	N/A	N/A	C, F	N/A	C, F	N/A	N/A	N/A	N/A	N/A
universal-acceptance-test.icu/测试	N/A	N/A	N/A	F	N/A	N/A	F	N/A	F	N/A	N/A	N/A	N/A	N/A
ยูเอทดสอบ.ไทย	N/A	N/A	N/A	F	N/A	N/A	F	N/A	F	N/A	N/A	N/A	N/A	N/A
ສາກົນ-ການຍອມຮັບ-ທົດລອງ.ລາວ	N/A	N/A	N/A	F	N/A	N/A	F	N/A	F	N/A	N/A	N/A	N/A	N/A
համընդհանուր-ընկալում-թեստ.հայ	N/A	N/A	N/A	F	N/A	N/A	F	N/A	F	N/A	N/A	N/A	N/A	N/A
უნივერსალური-თავსობადობის-ტესტი.გე	N/A	N/A	N/A	F	N/A	N/A	F	N/A	F	N/A	N/A	N/A	N/A	N/A
સાર્વત્રિક-સ્વીકૃતિ-પરીક્ષણ.ભારત	N/A	N/A	N/A	F	N/A	N/A	F	N/A	F	N/A	N/A	N/A	N/A	N/A
どこでもつかえる.みんな	N/A	N/A	N/A	F	N/A	N/A	F	N/A	F	N/A	N/A	N/A	N/A	N/A
épreuve-acceptation-universelle.org	N/A	N/A	N/A	Y	N/A	N/A	Y	N/A	Y	N/A	N/A	N/A	N/A	N/A
普遍适用测试。我爱你	N/A	N/A	N/A	C, F	N/A	N/A	C, F	N/A	C, F	N/A	N/A	N/A	N/A	N/A

Android

A	Confirm URL is displayed correctly as pasted into the bar
B	Confirm that the correct page was loaded
C	Confirm that the URL is displayed correctly in the bar
D	Confirm that the Page title is displayed correctly in the window / tab
E	Add the url to browser bookmarks / favourites - operation completes without error.
F	Confirm that the url (and where supported page title) display correctly in the correct format as added.

	N/A	N/A	N/A					N/A		N/A		N/A		
URL/ Browser	360	Amigo Mail	Atom Mail	Chrome	Edge	Epic Privacy Bro	Firefox	Internet Explorer	Opera	Safari	Samsung Brows	Sogou	UC Browser	Yandex
universal-acceptance-test.international	N/A	N/A	N/A	Y	Y	Y	Y	N/A	Y	N/A	Y	N/A	Y	Y
universal-acceptance-test.icu	N/A	N/A	N/A	Y	Y	Y	Y	N/A	Y	N/A	Y	N/A	Y	Y
تجربة-القبول-الشامل.موريتانيا	N/A	N/A	N/A	F	B, C, D, E, F	B, C, D, E, F	F	N/A	F	N/A	F	N/A	B, C, D, E, F	Y
универсальное-принятие-тест.москва	N/A	N/A	N/A	F	F	Y	F	N/A	F	N/A	C, F	N/A	F	Y
सार्वभौमिक-स्वीकृति-परीक्षण.संगठन	N/A	N/A	N/A	F	F	Y	F	N/A	F	N/A	F	N/A	F	Y
Universales-Akzeptanz-Test.vermögensberatung	N/A	N/A	N/A	F	F	Y	F	N/A	F	N/A	F	N/A	B, C, D, E, F	Y
普遍适用测试.我爱你	N/A	N/A	N/A	F	F	Y	F	N/A	F	N/A	F	N/A	F	Y
ދުނިޔެ-ޤަބޫލުކުރާ-ޓެސްޓް.com	N/A	N/A	N/A	C, F	A, C, F	A, C, F	F	N/A	F	N/A	C, F	N/A	F	F
تجربة-القبول-الشامل.xn--mgbah1a3hjkrd	N/A	N/A	N/A	C, F	B, C, D, E, F	B, C, D, E, F	C, F	N/A	C, F	N/A	C, F	N/A	B, C, D, E, F	C, F
xn-----ctdbabcfhu9c2b9l1acccr4c.xn--mgbah1a3hjkrd	N/A	N/A	N/A	C	B, C, D, E, F	B, C, D, E, F	C, F	N/A	C, F	N/A	C	N/A	B, C, D, E, F	C, F
universal-acceptance-test.icu/测试	N/A	N/A	N/A	F	F	Y	F	N/A	F	N/A	C, F	N/A	F	C, F
ยูเอทดสอบ.ไทย	N/A	N/A	N/A	F	F	Y	F	N/A	F	N/A	F	N/A	F	Y
ສາກົນ-ການຍອມຮັບ-ທົດລອງ.ລາວ	N/A	N/A	N/A	F	B, C, D, E, F	B, C, D, E, F	F	N/A	Y	N/A	B, C, D, E, F	N/A	B, C, D, E, F	B, C, D, E, F
համընդհանուր-ընկալում-թեստ.հայ	N/A	N/A	N/A	Y	F	Y	F	N/A	Y	N/A	F	N/A	B, C, D, E, F	Y
უნივერსალური-თავსობადობის-ტესტი.გე	N/A	N/A	N/A	Y	F	Y	F	N/A	Y	N/A	F	N/A	B, C, D, E, F	Y
સાર્વત્રિક-સ્વીકૃતિ-પરીક્ષણ.ભારત	N/A	N/A	N/A	Y	F	Y	F	N/A	Y	N/A	F	N/A	C, F	Y
どこでもつかえる.みんな	N/A	N/A	N/A	Y	F	Y	F	N/A	Y	N/A	F	N/A	C, F	Y
épreuve-acceptation-universelle.org	N/A	N/A	N/A	Y	F	Y	F	N/A	Y	N/A	F	N/A	C, F	F
普遍适用测试。我爱你	N/A	N/A	N/A	C, F	F	B, F	C, F	N/A	C, F	N/A	E, F	N/A	C, F	C, F

iOS

A	Confirm URL is displayed correctly as pasted into the bar
B	Confirm that the correct page was loaded
C	Confirm that the URL is displayed correctly in the bar
D	Confirm that the Page title is displayed correctly in the window / tab
E	Add the url to browser bookmarks / favourites - operation completes without error.
F	Confirm that the url (and where supported page title) display correctly in the correct format as added.

	N/A	N/A	N/A					N/A			N/A	N/A	N/A	
URL/ Browser	360	Amigo Mail	Atom Mail	Chrome	Edge	Epic Privacy Bro	Firefox	Internet Explorer	Opera	Safari	Samsung Brows	Sogou	UC Browser	Yandex
universal-acceptance-test.international	N/A	N/A	N/A	Y	Y	Y	Y	N/A	Y	Y	N/A	N/A	N/A	Y
universal-acceptance-test.icu	N/A	N/A	N/A	Y	Y	Y	Y	N/A	Y	Y	N/A	N/A	N/A	Y
تجربة-القبول-الشامل.موريتانيا	N/A	N/A	N/A	F	B, C, D, E, F	F	C, F	N/A	B, C, D, E, F	C, F	N/A	N/A	N/A	Y
универсальное-принятие-тест.москва	N/A	N/A	N/A	F	B, C, D, E, F	C, F	C, F	N/A	C, F	B, C, D, E, F	N/A	N/A	N/A	Y
सार्वभौमिक-स्वीकृति-परीक्षण.संगठन	N/A	N/A	N/A	F	B, C, D, E, F	C, F	C, F	N/A	C, F	F	N/A	N/A	N/A	Y
Universales-Akzeptanz-Test.vermögensberatung	N/A	N/A	N/A	F	B, C, D, E, F	C, F	C, F	N/A	C, F	F	N/A	N/A	N/A	Y
普遍适用测试.我爱你	N/A	N/A	N/A	F	B, C, D, E, F	C, F	C, F	N/A	C, F	F	N/A	N/A	N/A	Y
[illegible].com	N/A	N/A	N/A	F	C, F	C, F	C, F	N/A	A, C, F	A, C, F	N/A	N/A	N/A	F
تجربة-القبول-الشامل.xn--mgbah1a3hjkrd	N/A	N/A	N/A	C, F	B, C, D, E, F	C, F	C, F	N/A	A, B, C, D, E, F	A, C, F	N/A	N/A	N/A	C, F
xn-----ctdbabcfhu9c2b9l1acccr4c.xn--mgbah1a3hjkrd	N/A	N/A	N/A	C, F	B, C, D, E, F	C, F	F	N/A	B, C, D, E, F	C, F	N/A	N/A	N/A	C, F
universal-acceptance-test.icu/测试	N/A	N/A	N/A	C, F	C, F	C, F	F	N/A	F	C, F	N/A	N/A	N/A	C, F
ยูเอทดสอบ.ไทย	N/A	N/A	N/A	F	B, C, D, E, F	B, C, F	C, F	N/A	C, F	F	N/A	N/A	N/A	Y
ສາກົນ-ການຍອມຮັບ-ທົດລອງ.ລາວ	N/A	N/A	N/A	F	B, C, D, E, F	C, F	F	N/A	C, D, E, F	C, F	N/A	N/A	N/A	Y
համընդհանուր-ընկալում-թեստ.հայ	N/A	N/A	N/A	F	B, C, D, E, F	C, F	F	N/A	C, F	Y	N/A	N/A	N/A	Y
უნივერსალური-თავსობადობის-ტესტი.გე	N/A	N/A	N/A	F	B, C, D, E, F	C, F	F	N/A	C, F	C, F	N/A	N/A	N/A	Y
સાર્વત્રિક-સ્વીકૃતિ-પરીક્ષણ.ભારત	N/A	N/A	N/A	F	B, C, D, E, F	C, F	F	N/A	C, F	Y	N/A	N/A	N/A	Y
どこでもつかえる.みんな	N/A	N/A	N/A	F	B, C, D, E, F	C, F	F	N/A	C, F	Y	N/A	N/A	N/A	Y
épreuve-acceptation-universelle.org	N/A	N/A	N/A	F	C, F	Y	F	N/A	C, F	Y	N/A	N/A	N/A	Y
普遍适用测试。我爱你	N/A	N/A	N/A	C, F	B, C, D, E, F	C, D, E, F	B, C, D, E, F	N/A	B, C, D, E, F	B, C, D, E, F	N/A	N/A	N/A	C, F

Observations

From testing a wide range of international scripts in multiple browsers, the results showed an encouraging picture.

Findings

1. Browsers showed positive results overall in terms of UA-readiness when pasting URLs into the browser (Test A and C) with only some of the RTL scripts (Thaana and Arabic) displaying differently than the end user would expect in some browsers (often reversing the order of ASCII and non-ASCII components).

2. Despite a positive showing of UA-readiness overall, the results of the saving favorites and bookmarks testing showed that although bookmarks could be saved successfully, they did not always display as an end user would expect.

Caveats

Due to security concerns encountered during the testing phase, it was not possible to access the UASG test web page from the identified versions of Internet Explorer, Amigo Mail, and UC Browser. Therefore it was agreed in consultation with the UASG to omit these browsers from the study.

Conclusion and Recommendations

In considering the results for this study, the general outlook of UA-readiness within modern web browsers is largely positive with almost every tested browser handling the paste and subsequent navigation of all internationalized URLs correctly, resulting in a perfectly usable browsing experience for sites hosted using IDNs.

These findings are perhaps unsurprising due to the strong support for Unicode in modern operating systems and therefore in software platforms used to develop browsers allowing for reliable presentation of internationalized content. However, it was especially encouraging to note that both RTL scripts and technically challenging examples such as the Chinese Open Dot use case resulted in a valid resolution of the URL to the correct page in almost every instance.

The one obvious area for improvement for browser vendors is in the handling of bookmarking for IDNs with a number of vendors listing previously stored bookmarks using Punycode conversions which have little or no significance to a reader. This was in some ways an unexpected finding due to the strong adherence to Unicode presentation observed in the other tests, including frequent promotion to Unicode for display in URL bars when pasting Punycode URLs.