



# Arabic Domain Names

## SaudiNIC's Experiences and Initiatives Relate to UA

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# Agenda

- About SaudiNIC
- SaudiNIC Previous Work
  - IDN Assessment reports
  - Raseel – An Arabic Email System
- What's Next?

# About SaudiNIC

- **Administering** the domain name space under:
  - (.sa) since 1995
  - (.تيدوعسلا) since 2010.
- Operated by a government organization:
  - CITC (Communication and Information Technology Commission)
- Coordinating with **regional** and **international** bodies in order to present the local community needs
- Leading the local and regional communities efforts towards supporting **Arabic language** in Domain Names since **2001** (more than **15** years of experience)

# SaudiNIC Previous Work

## Arabic IDN pilot projects

- GCC Pilot Project (2004-2005)
- Arab League (2005 - 2009)

## Tools, algorithms and solutions to manage variants:

- Master Key Algorithm
- Filters
- Variant Management System (VMS)

## IDN Assessment Reports

## Arabic Email Project (Raseel)

# IDN Assessment Reports

Conducted and Published a number of IDN Assessment Reports:

**2007**

- [IDN Top Level Domain Evaluations and Testing Report](#)
- with the cooperation of the Arabic Domain Name Pilot Project Team.

**2010**

- Arabic IDN Test Results for Browsers
- [Mozilla Firefox](#) & [Microsoft IE](#)

**2014**

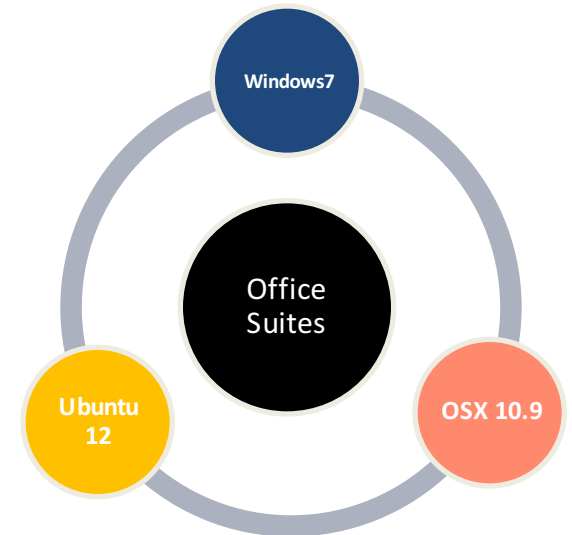
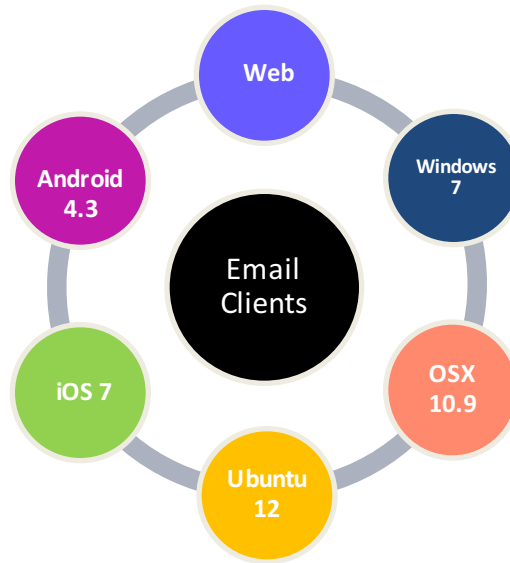
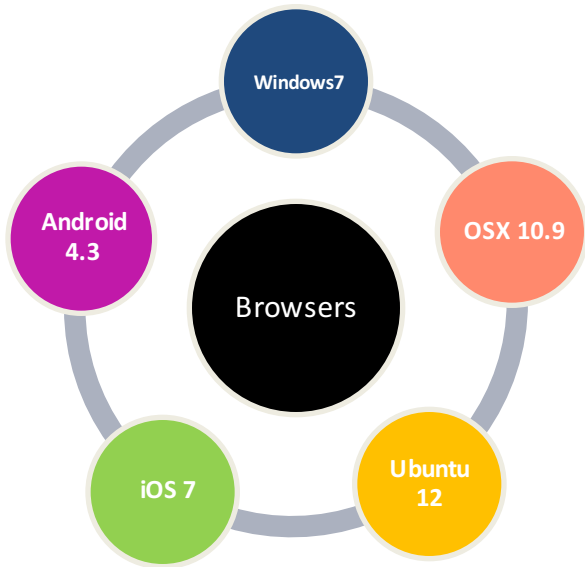
- [IDN Assessment Report](#)

- Goal:
  - to study and assess end-user experiences regarding IDNA implementations for Arabic domain names.
- Covered many areas and behaviors
- Developed
  - methodology for Test Case Modeling and Generation
  - online system to capture results

- IDNA support  $\neq$  browsers' address bars support.
- User acceptance for IDNA is less than 1%  
(Excluding address bar in some web browsers)
  - It's been more than 10 years since the publication of IDNA RFCs, and still less than 1%!
- How long do we need for Internationalized Email (IDN Email) to be fully deployed!
  - Do we need to wait 10+ years to get a 1% acceptance!
- RFCs are not enough, we need accelerators.

- Need to cover new aspects in different technologies:
  - Variants in domain names
  - Variants in Email accounts (user part)
  - Variants in search engines
- Need to have Automation
  - To host IDNs with Variant (DNS, Web, Mail ..etc)
  - To host Email Accounts with Variant



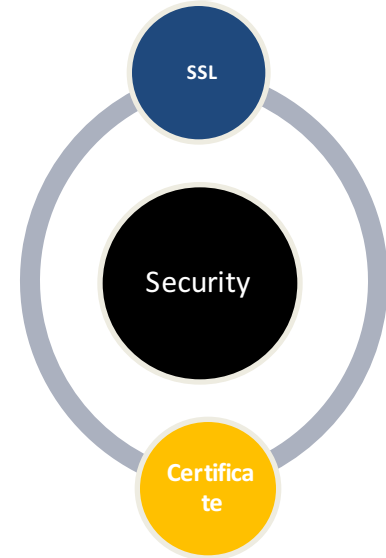
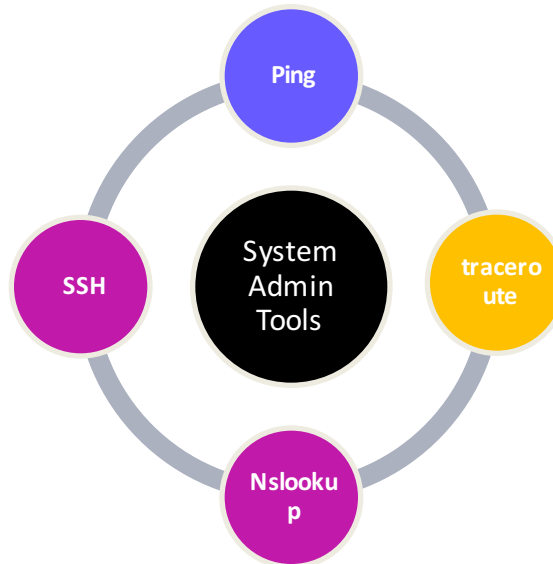
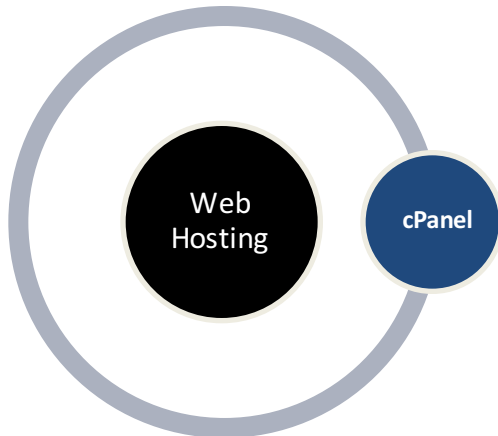
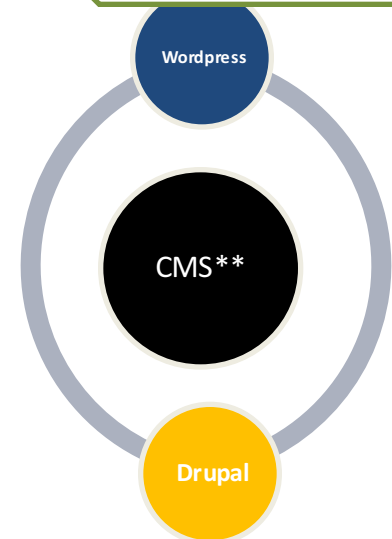
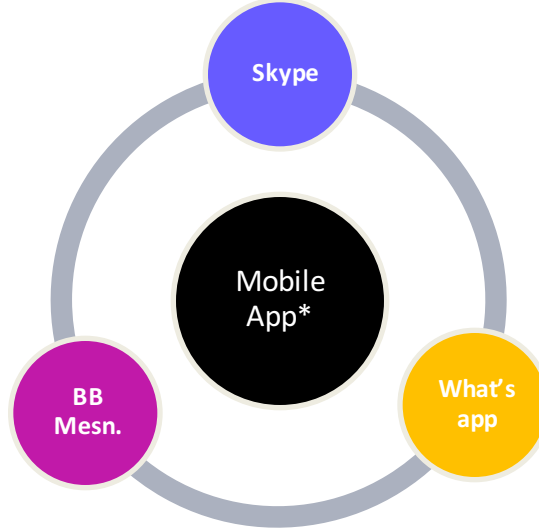
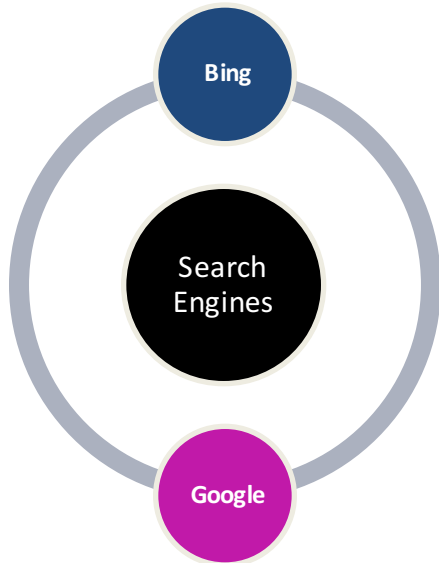




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# IDN Assessment Reports - 2014

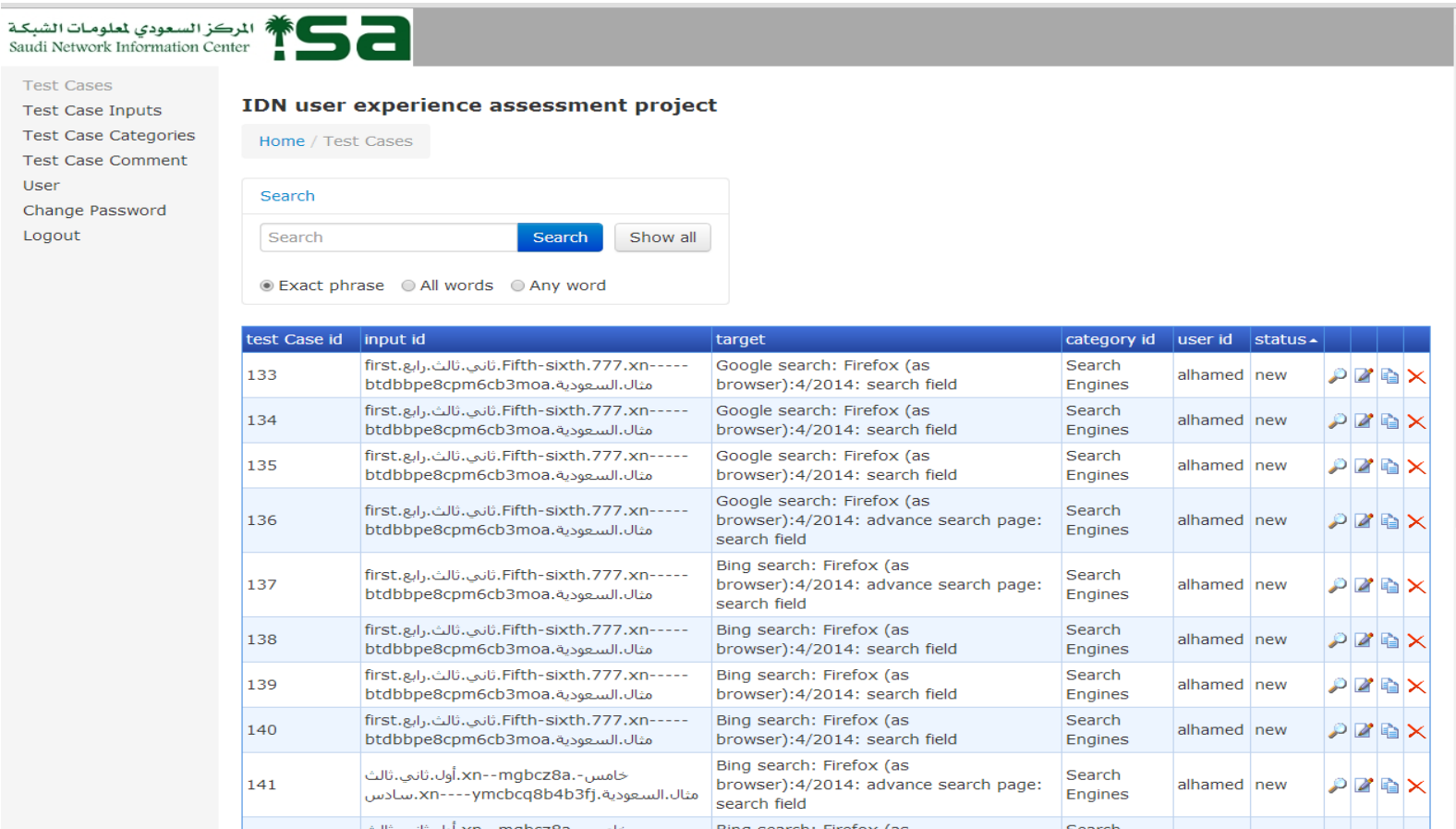
## Scope



We Generate about **190** test cases.

H161			
<b>Browsers</b>			
<b>Types (OS/APP)</b> Firefox Chrome Safari MS IE	<b>Address bar Test Cases</b> View Mode Edit mode Auto-complete Copy & Paste Fonting Alignment (R/L) SSL, WiFi Protocol Icon URL Shorten	<b>Study Test Cases</b> Clickable auto recognition Copy & Paste	<b>URLs</b> Protocol and IDN http://IDN http://IDN/ Protocol , IDN and folder http://IDN/ http://IDN/folder http://IDN/folder/ Protocol , IDN , folder, query http://IDN/~/page.php?name=1&label=123 http://IDN/folder/page.php?name=1&label=123 http://IDN/folder/~/page.php?name=1&label=123 Web http://IDN/folder/~/page.php?name=1&label=123&label=123 http://IDN/~/folder/STB/page.php?name=1&label=123 http://ASCII.IDN_U-label(245)_A-label(123)/folder/STB/page.php?name=1&label=123&label=123
<b>Email Clients</b>			
<b>Types (OS/APP)</b> Outlook Win Live Thunderbird Apple Mail Web Based Outlook	<b>Browser Test Cases</b> Edit mode Copy & Paste All tests address book	<b>Study Test Cases</b> Clickable Auto recognition Copy & Paste	<b>URLs</b> Full IDN email IDN@IDN Partial IDN email ASCII@IDN ASCII@U-label(245)_A-label(123)_U-label ASCII@U-label(245)_ASCII_U-label(123)_A-label
<b>Office Apps</b>			
<b>Types (OS/APP)</b> Native MS Office Web Excel	<b>Test Cases</b> Clickable Auto recognition Copy & Paste	email url	<b>URLs</b> http://IDN/~/folder/STB/page.php?name=1&label=123
<b>Social Media</b>			
<b>Types (OS/APP)</b> Facebook Twitter LinkedIn Instagram YouTube WhatsApp Email	<b>Account Test Cases</b> Create accounts using IDN email A-label email	<b>Study Test Cases</b> Clickable Auto recognition Copy & Paste	<b>URLs</b> Full IDN email IDN@IDN Partial IDN email ASCII@IDN ASCII@U-label(245)_A-label(123)_U-label ASCII@U-label(245)_ASCII_U-label(123)_A-label
<b>Search Engines</b>			
<b>Types (OS/APP)</b> Bing	<b>Search word Test Cases</b> Use search filters like "site:"	<b>Search result Test Cases</b> Advance search (البحث المتقدم)	<b>URLs</b> Protocol and IDN

Developed a test case control web application



The screenshot shows a web application interface for managing test cases. The header includes the ISA logo and the text 'المركز السعودي لمعلومات الشبكة Saudi Network Information Center'. A navigation menu on the left lists: Test Cases, Test Case Inputs, Test Case Categories, Test Case Comment, User, Change Password, and Logout. The main content area is titled 'IDN user experience assessment project' and contains a search bar with a 'Search' button and a 'Show all' button. Below the search bar are radio buttons for search criteria: 'Exact phrase' (selected), 'All words', and 'Any word'. A table displays a list of test cases with columns for test Case id, input id, target, category id, user id, status, and action icons.

test Case id	input id	target	category id	user id	status				
133	first.ثالث.رابع.ثاني.Fifth-sixth.777.xn---- btddbpe8cpm6cb3moa.مثال.السعودية.	Google search: Firefox (as browser):4/2014: search field	Search Engines	alhamed	new				
134	first.ثالث.رابع.ثاني.Fifth-sixth.777.xn---- btddbpe8cpm6cb3moa.مثال.السعودية.	Google search: Firefox (as browser):4/2014: search field	Search Engines	alhamed	new				
135	first.ثالث.رابع.ثاني.Fifth-sixth.777.xn---- btddbpe8cpm6cb3moa.مثال.السعودية.	Google search: Firefox (as browser):4/2014: search field	Search Engines	alhamed	new				
136	first.ثالث.رابع.ثاني.Fifth-sixth.777.xn---- btddbpe8cpm6cb3moa.مثال.السعودية.	Google search: Firefox (as browser):4/2014: advance search page: search field	Search Engines	alhamed	new				
137	first.ثالث.رابع.ثاني.Fifth-sixth.777.xn---- btddbpe8cpm6cb3moa.مثال.السعودية.	Bing search: Firefox (as browser):4/2014: advance search page: search field	Search Engines	alhamed	new				
138	first.ثالث.رابع.ثاني.Fifth-sixth.777.xn---- btddbpe8cpm6cb3moa.مثال.السعودية.	Bing search: Firefox (as browser):4/2014: search field	Search Engines	alhamed	new				
139	first.ثالث.رابع.ثاني.Fifth-sixth.777.xn---- btddbpe8cpm6cb3moa.مثال.السعودية.	Bing search: Firefox (as browser):4/2014: search field	Search Engines	alhamed	new				
140	first.ثالث.رابع.ثاني.Fifth-sixth.777.xn---- btddbpe8cpm6cb3moa.مثال.السعودية.	Bing search: Firefox (as browser):4/2014: search field	Search Engines	alhamed	new				
141	خامس.-xn--مبغبز8ا.أول.ثاني.ثالث مثال.السعودية.ymcbcq8b4b3fj.xn----	Bing search: Firefox (as browser):4/2014: advance search page: search field	Search Engines	alhamed	new				
	خامس.-xn--مبغبز8ا.أول.ثاني.ثالث	Bing search: Firefox (as	Search						

Target	Acceptable	Not-acceptable
Browsers	60%	40%
Email clients	6%	94%
Office Suites	2%	98%
System Admin Tools	3%	97%
Search Engines	14%	86%
Mobile Apps	13%	87%
CMS	0%	100%
Security	0%	100%
Web Hosting	0%	100%



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# IDN Assessment Reports - 2014

Browser: Address bar

Examples

The screenshot shows a web browser window with a Google search page. The address bar contains the URL: `https://www.google.com/search?q=first.ثاني.ثالث.رابع.Fifth-sixth.777.xn-----btddbpe8cpm6cb3moa.مثال.السعودية.&q=first.ثاني.ثالث.رابع.Fifth-sixth.777.xn-----btddbpe8cpm6cb3moa.مثال.السعودية.`. The search box also contains the same query. The search results show that no documents were found for this query.

Your search - **first.ثاني.ثالث.رابع.Fifth-sixth.777.xn-----btddbpe8cpm6cb3moa.مثال.السعودية.** - did not match any documents.

Suggestions:

- Make sure all words are spelled correctly.
- Try different keywords.
- Try more general keywords.



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# IDN Assessment Reports - 2014

Examples

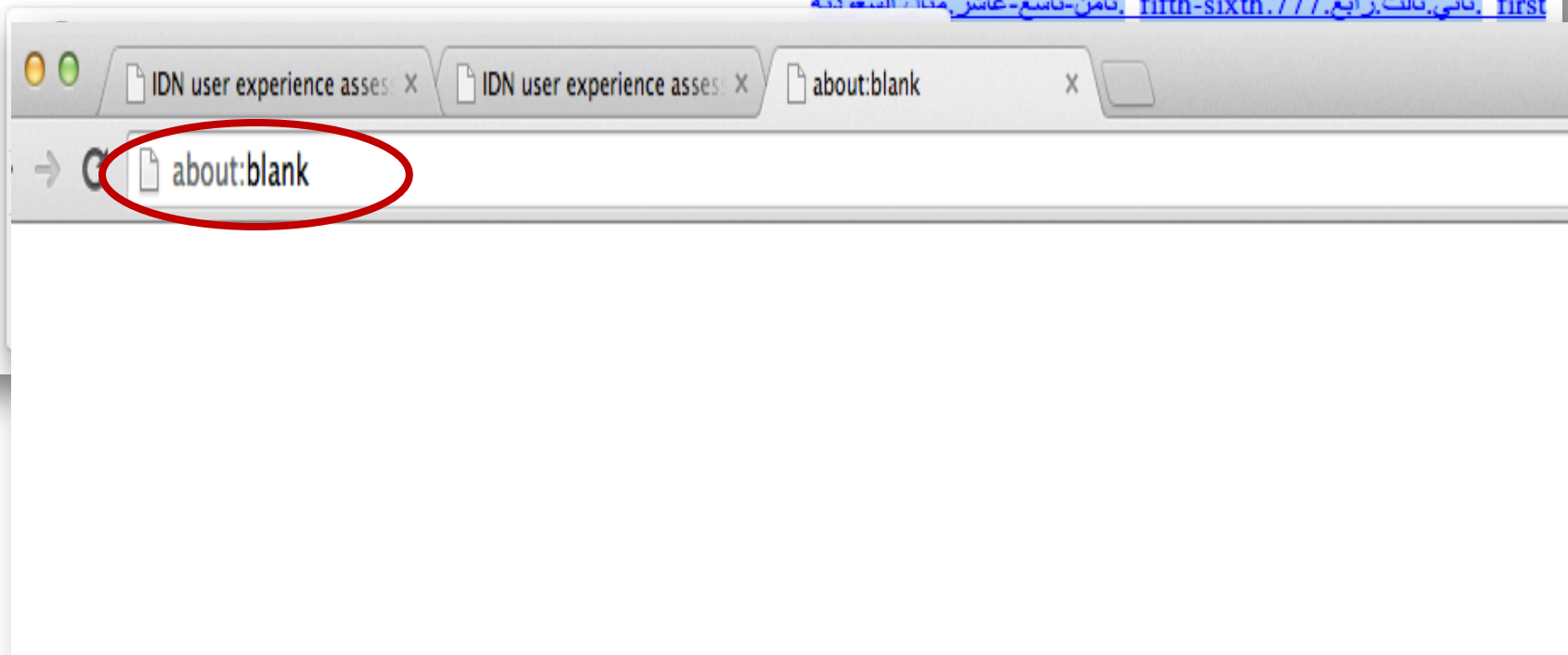
Browser: [Hyperlink](#)

الرابط الأول:

أول.ثاني.ثالث.رابع.خامس-سادس.سابع-ثامن.مثال.السعودية

الرابط الثاني:

first.ثاني.ثالث.رابع.fifth-sixth.777.ثامن-تاسع-عاشر.مثال.السعودية



# IDN Assessment Reports - 2014

Examples

Browser: **SSL Certificate**



https://...  
أول، ثاني، ثالث، رابع، خامس - سادس، سابع - ثامن، مثال، السعودية

طاقات العربية

xn--igb0el.xn--mgbh6fqa.xn--  
mgbhb3h.xn--mgbcz8a.xn----  
ymcbzivbc0n.xn----  
ymcbcq8b4b3fj.xn--mgbh0fb.xn--  
mgberp4a5d4ar  
Identity not verified

Permissions Connection

The identity of this website has not been verified.  
• Server's certificate does not match the URL.  
[Certificate Information](#)

Your connection to xn--igb0el.xn--mgbh6fqa.xn--mgbhb3h.xn--mgbcz8a.xn----ymcbzivbc0n.xn----ymcbcq8b4b3fj.xn--mgbh0fb.xn--mgberp4a5d4ar is encrypted with 128-bit encryption.  
The connection uses TLS 1.2.  
The connection is encrypted and authenticated using AES\_128\_GCM and uses DHE\_RSA as the key exchange mechanism.

Site information  
You have never visited this site before today.  
[What do these mean?](#)

SSL certificate info.





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# IDN Assessment Reports - 2014

Examples

Browser: Copy&Paste

The screenshot shows a browser window with the following elements:

- Address bar: `أول.ثاني.ثالث.رابع.خامس-سادس...`
- Page title: `IDN user experience asses`
- Page content: `أول.ثاني.ثالث.رابع.خامس-سادس.سابع-ثامن.مثال.السعودية`
- Page title (Arabic): `صفحة الاختبار للنطاقات العربية`

Below the browser window, a text editor window titled "Untitled - Edited" is shown with the following text circled in red:

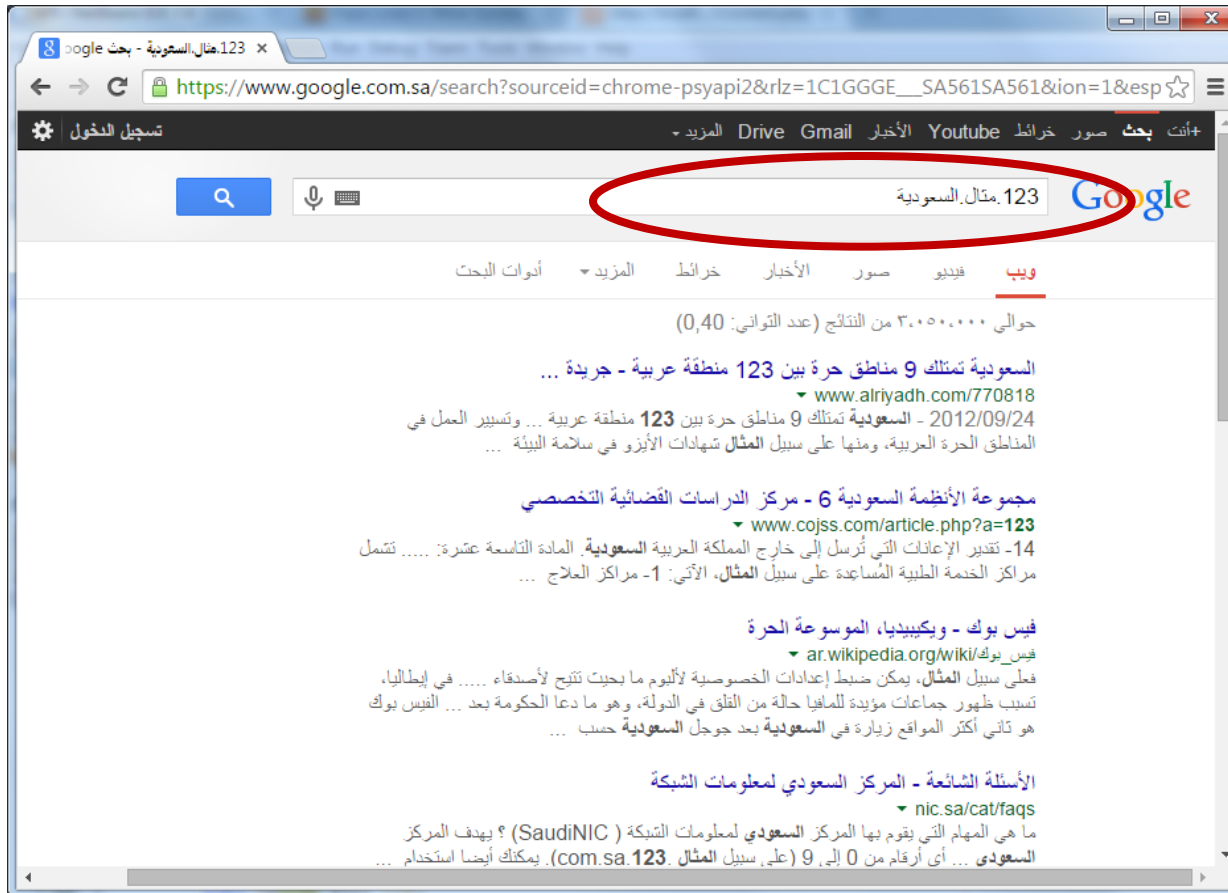
```
http://xn--igb0el.xn--mgbh6fqa.xn--mgbhb3h.xn--mgbcz8a.xn---ymcbzivbc0n.xn---ymcbcq8b4b3fj.xn--mgbh0fb.xn--mgberp4a5d4ar/
```

After copy and past the domain!

# IDN Assessment Reports - 2014

Examples

Browser: IDNA 2010



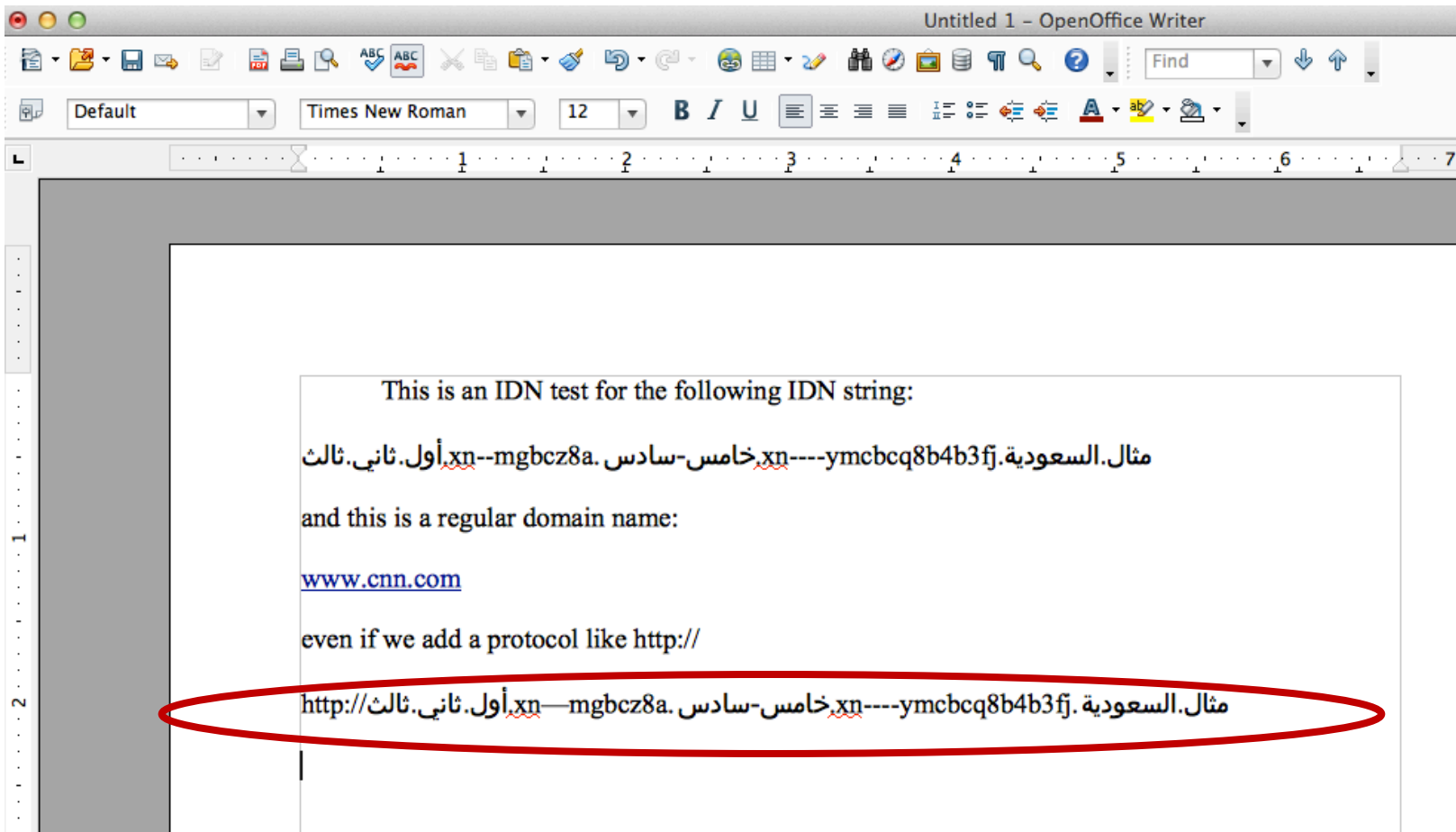
All Browsers  
didn't support  
IDNA 2010 !

It has been out there  
for more than 5 years

# IDN Assessment Reports - 2014

Office Tools

Examples



Untitled 1 - OpenOffice Writer

Default Times New Roman 12 B / U

This is an IDN test for the following IDN string:

مثال.السعودية.فج3ب4ب8ق8بم-ي-خامس-سادس.أول.ثاني.ثالث.xn--mgbcz8a

and this is a regular domain name:

[www.cnn.com](http://www.cnn.com)

even if we add a protocol like http://

<http://مثال.السعودية.فج3ب4ب8ق8بم-ي-خامس-سادس.أول.ثاني.ثالث.xn--mgbcz8a>

# IDN Assessment Reports - 2014

Search Engine

Examples

numbers ranging from:

Then narrow your results by...

language:

any language

region:

any region

last update:

anytime

site or domain:

مثال.السعودية

terms appearing:

anywhere in

SafeSearch:

Show most

reading level:

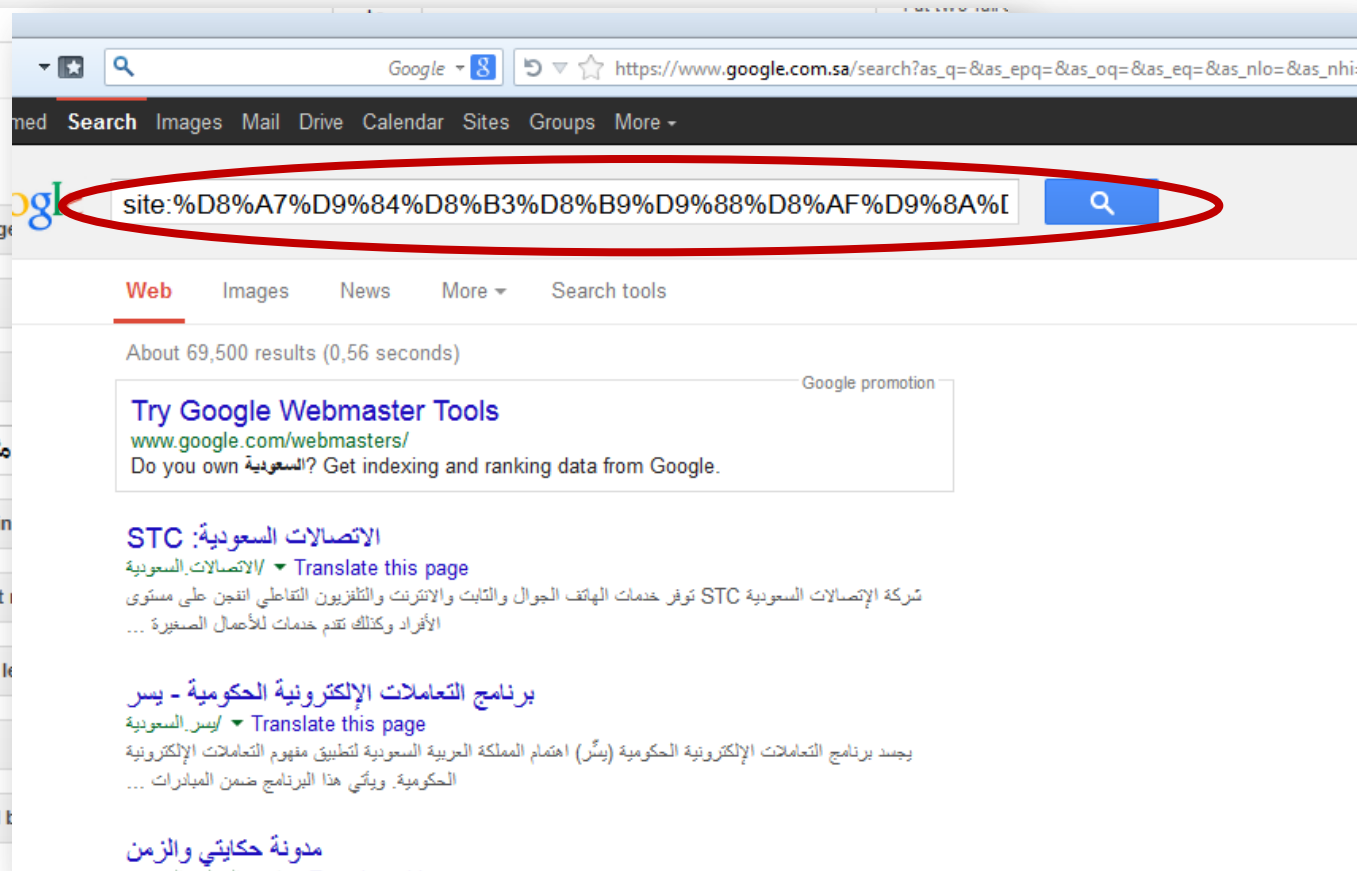
no reading le

file type:

any format

usage rights:

not filtered b



Google

https://www.google.com.sa/search?as\_q=&as\_epq=&as\_oq=&as\_eq=&as\_nlo=&as\_nhi=

Search Images Mail Drive Calendar Sites Groups More

site:%D8%A7%D9%84%D8%B3%D8%B9%D9%88%D8%AF%D9%8A%[

Web Images News More Search tools

About 69,500 results (0,56 seconds)

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STC: الاتصالات السعودية  
الاتصالات.السعودية / Translate this page  
شركة الإتصالات السعودية STC توفر خدمات الهاتف الجوال والتاب والانترنت والتلفزيون التقاطي النجمن على مستوى الأفراد وكذلك تقدم خدمات للأعمال الصغيرة ...

برنامج التعاملات الإلكترونية الحكومية - يسر  
يسر.السعودية / Translate this page  
يحدد برنامج التعاملات الإلكترونية الحكومية (يسر) اهتمام المملكة العربية السعودية لتطبيق مفهوم التعاملات الإلكترونية الحكومية. ويأتي هذا البرنامج ضمن المبادرات ...

مدونة حكايتي والزمن

Advanced Search



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# IDN Assessment Reports - 2014

System Admin Tools - **SSH**

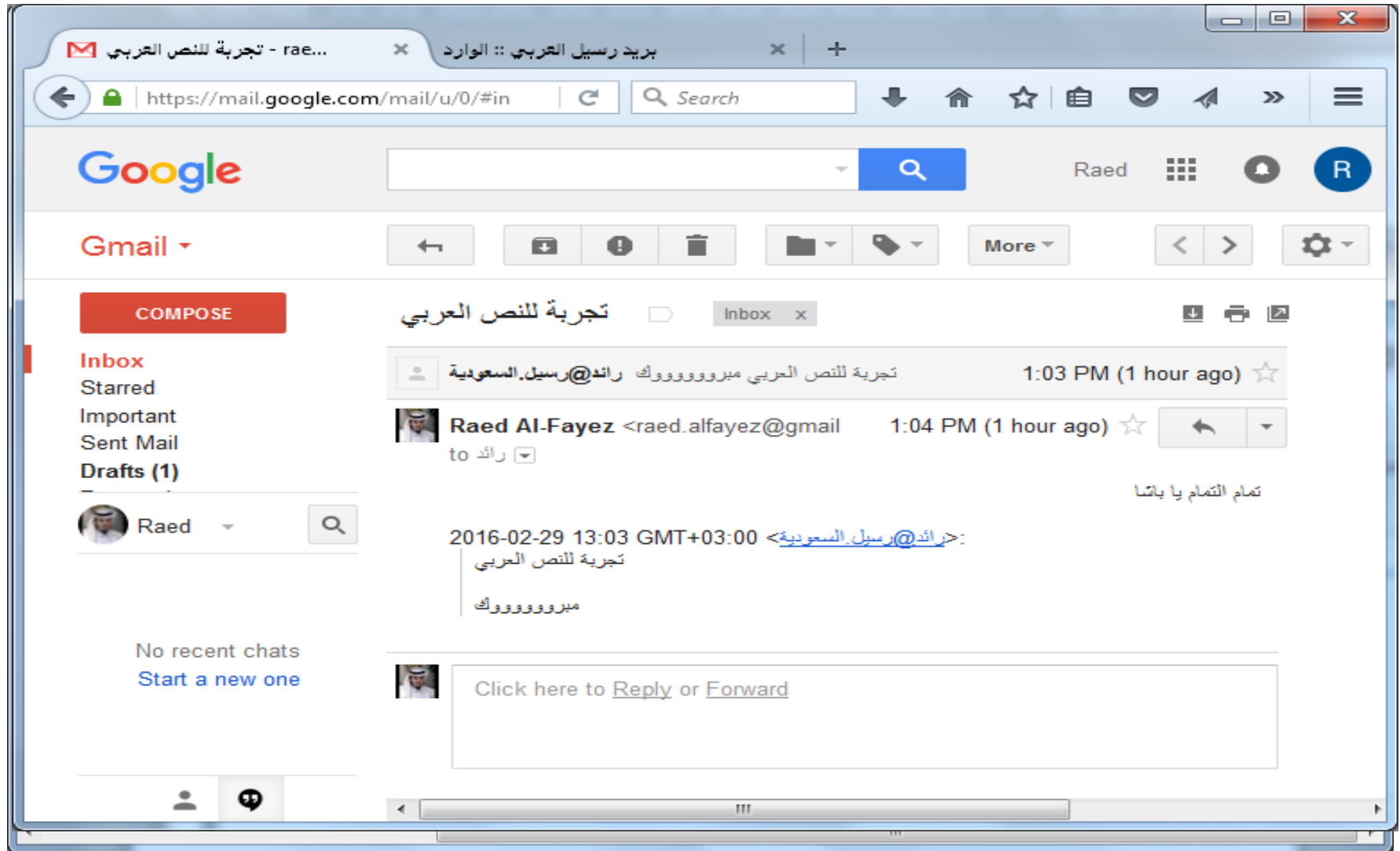
Examples

```
User-2:~ Alhamed$  
User-2:~ Alhamed$  
User-2:~ Alhamed$ ssh alhamed@مثال.السعودية.xn---ymcbcq8b4b3fj.خاص-ساس.xn--mgbcz8a.أول.ثاني.ثالث  
The authenticity of host '(::1)' can't be established.  
RSA key fingerprint is 76:c7:22:73:30:ed:90:c6:5c:a4:71:91:e1:03:08:29.  
Are you sure you want to continue connecting (yes/no)? yes  
Warning: Permanently added ' (RSA) to the list of known hosts.  
Password:  
bash:مثال.السعودية.xn---ymcbcq8b4b3fj.خاص-ساس.xn--mgbcz8a.أول.ثاني.ثالث: command not found  
User-2:~ Alhamed$
```

# Raseel – An Arabic Email System

- Phase I (2010~2013):
  - A pilot project to test Arabic email addresses
  - Built before the EAI RFCs
    - Using a hack: convert the user part of the email address to Punycode
    - Implemented plugins for Outlook and Roundcube to display the Arabic addresses correctly.
  - Work with existing Email Servers and old RFCs.
- Phase II (2016+):
  - Built based on the new EAI RFCs using standard EAI addresses
    - Postfix, Horde/Roundcube and Archiveopteryx
  - Still in a beta version and not open for public.
  - Successful test internally and with Gmail.

# Raseel – An Arabic Email System



The screenshot shows a Gmail inbox interface. The browser address bar displays the URL <https://mail.google.com/mail/u/0/#in>. The Gmail header includes the Google logo, a search bar, and the user's name "Raed". The left sidebar shows the "COMPOSE" button and the "Inbox" section, which is starred and contains "Important", "Sent Mail", and "Drafts (1)". The main content area shows an email from "Raed Al-Fayez" with the subject "تجربة للنص العربي" (Arabic Text Experience). The email body contains the text "ميروووووك" (Mirooooook) and a timestamp of "2016-02-29 13:03 GMT+03:00". The email is marked as "تمام التمام يا باشا" (All done, boss). The bottom of the interface shows a "Click here to Reply or Forward" button.

# Raseel – An Arabic Email System

## Findings

- Almost 3 years since the EAI RFCs were published and until now there are almost no support (or very limited) in:
  - Email servers (SMTP, IMAP, POP),
  - Email providers (Gmail, Hotmail, Yahoo)
  - Emails clients (Webmail, Application)
- Need to have a protection mechanism for the user part of the emails addresses (similar to IDN variants)

ريد@سريل.دوعسلاية	ريد@سريل.دوعسلاية
Farsi Yeh (U+06CC)	Arabic Yeh(U+064A)

- Automatic tools to configure and manage variants (Domain, User Accounts).
- Boosting the adoption of the new EAI RFC by ISP and service providers.



# What is Next?

A comprehensive study should be done regularly to measure the IDN UA

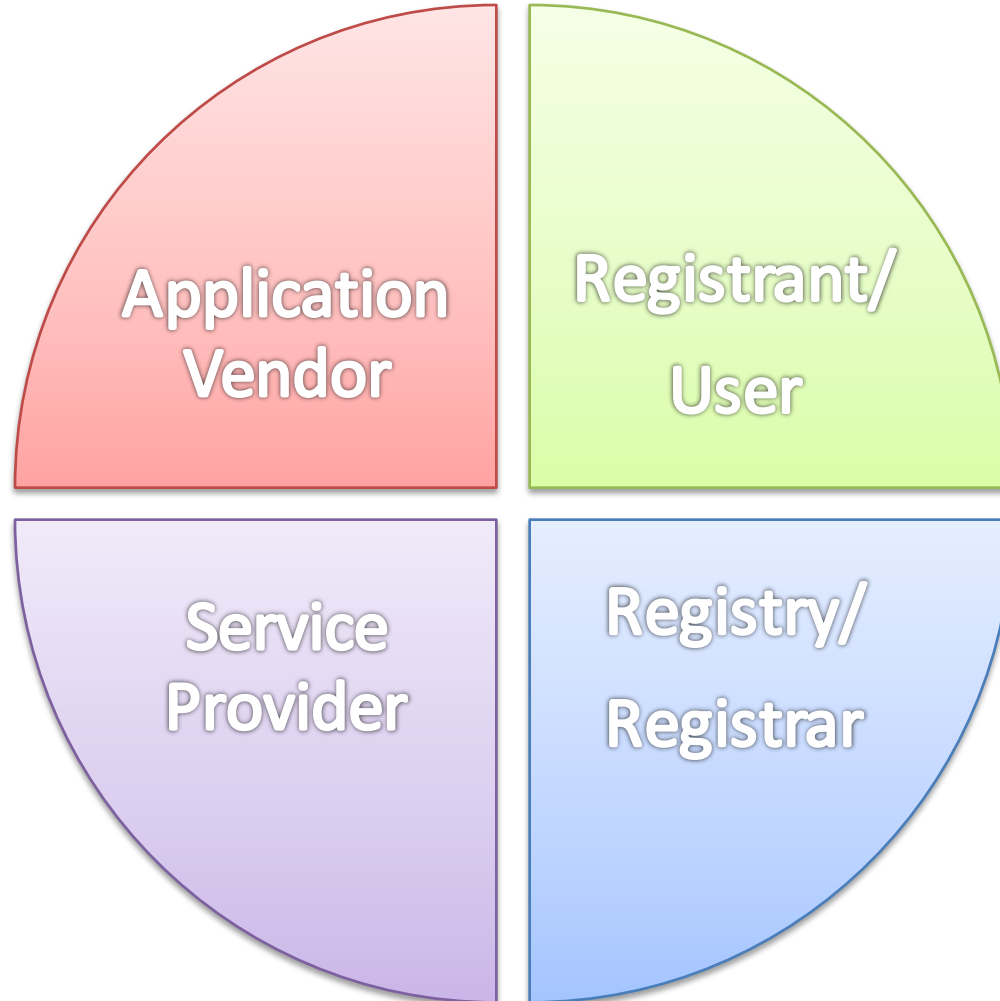
It should focus on all major players and cover all possible challenges

Recommendations should be delivered and discussed with relative parties



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# UA Challenges vs Main Players



Registrant

Sample

## Lack of awareness

- IDN is not well-known or recognized
- IDN is not well-known or recognized
- Misconception about IDNs
  - No need for IDNs !
  - No need for ASCII domain names !!
  - IDNs Benefits are not realized
  - IDN will make isolated internets
- IDN variants are not understood or known
- Variant tables are not known and universal
- Variant management challenges
- Hosting and using IDNs
- Hosting and using IDN variants
- Registrant will use his/her keyboard based on his/her language knowledge.

## Usability

- The proper selection of available variants to be enabled at the language or script levels.
- Why allocatable variants are not the same across different IDN-TLD registries?

## Technical issues

- Working with IDNs and ASCII equivalents (i.e., “xn--“ versions of IDN domain names)
- Working or editing IDN’s zone files.
- Different input devices (keyboards)
- No standard or common way to work with IDN and its variants
- Language specific issues (Right-to-left direction, display, interface)

## Registry/ Registrar

Sample

### Security issues

- No protection to the TLD name space
- Missing some code points when defining variants
- Variants for the reserve list

### Cross Registries

- Unified terminologies
- There should be a common (agreed) protection to secure any name space.

### Full IDN support

- Ignoring the fact that IDNs are generated using input devices (keyboards) that are language based  
Therefore, some (registries) are adopting only one huge script-wide table (with mixed languages)
- No easy or direct way to enable variants
- There should be one key for all variants
- For enhancing and decreasing the number of variants they should be based on character positions
- International Reachability
- Study the whole Script
- No easy interface for variant management
- Consistent variant list
- Whois should support IDN and Variants

### Lack of IDN support as part of registration information, e.g.:

- Registration system (web-interface and EPP)
- Refuse IDN Email (EAI)
- Refuse IDN Name servers
- Tools provided by the registry (whois, DNS checker..etc..).
- Sending and receiving IDN emails (EAI)

# Service Provider

Sample

## Hosting

- Does not accept IDN
- How to point all variants to the main domain (e.g. web/mail)?
- The absence of technical solutions to host variants automatically.
- Create account and login
- Accept IDN Email (EAI)
- Accept IDN Name servers

## Web Email Services

- Sending and receiving EAI
- Display IDN and EAI correctly

## Others

- Create account and login
- IDN Email

## DNS Hosting

- Create account and login
- Accept IDN Email (EAI)
- Accept IDN Name servers

# Service Provider

Sample

- **Search Engine**
- display results
- site search

## Browsers

- Reachability
- Visibility
- Ability to edit
- Auto completion
- Ability to copy and paste
- Text alignment
- SSL information
- Protocol representation
- URL auto recognition
- Ability to click

## Social Media

- Create account
- IDN email
- A-label email

## Office Applications

- Clickable
- Auto recognition
- Copy and paste

## Software Tools

- IDN hosts

## Email clients

- Handling IDN and EAI in the View mode
- Handling IDN and EAI in the Edit mode
- Handling IDN and EAI when doing copy/paste
- Handling IDN and EAI in All fields  
(To, CC, BCC, body, etc.)
- Handling IDN and EAI in Address book

## Others

- Webmaster
- Content Management
- Security

*Thank you*

شك

رًا

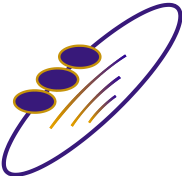
ةرايز مكنكمي تامولعملا نم ديزملا:

For more information you can visit:



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nic.sa

هيئة الاتصالات وتقنية المعلومات  
Communications and Information Technology Commission



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