SANOG 35

New gTLDs, IDNs and Domain Name Industry in Pakistan

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Karachi, Pakistan

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Chair of TF-AIDN
Member of Latin Script GP

# AGENDA

- Domain Names and DNS
- New gTLD
- Internationalized Domain Names (IDNs)
- Universal Acceptance
- Brief on TF-AIDN
- Domain Names Industry in Pakistan
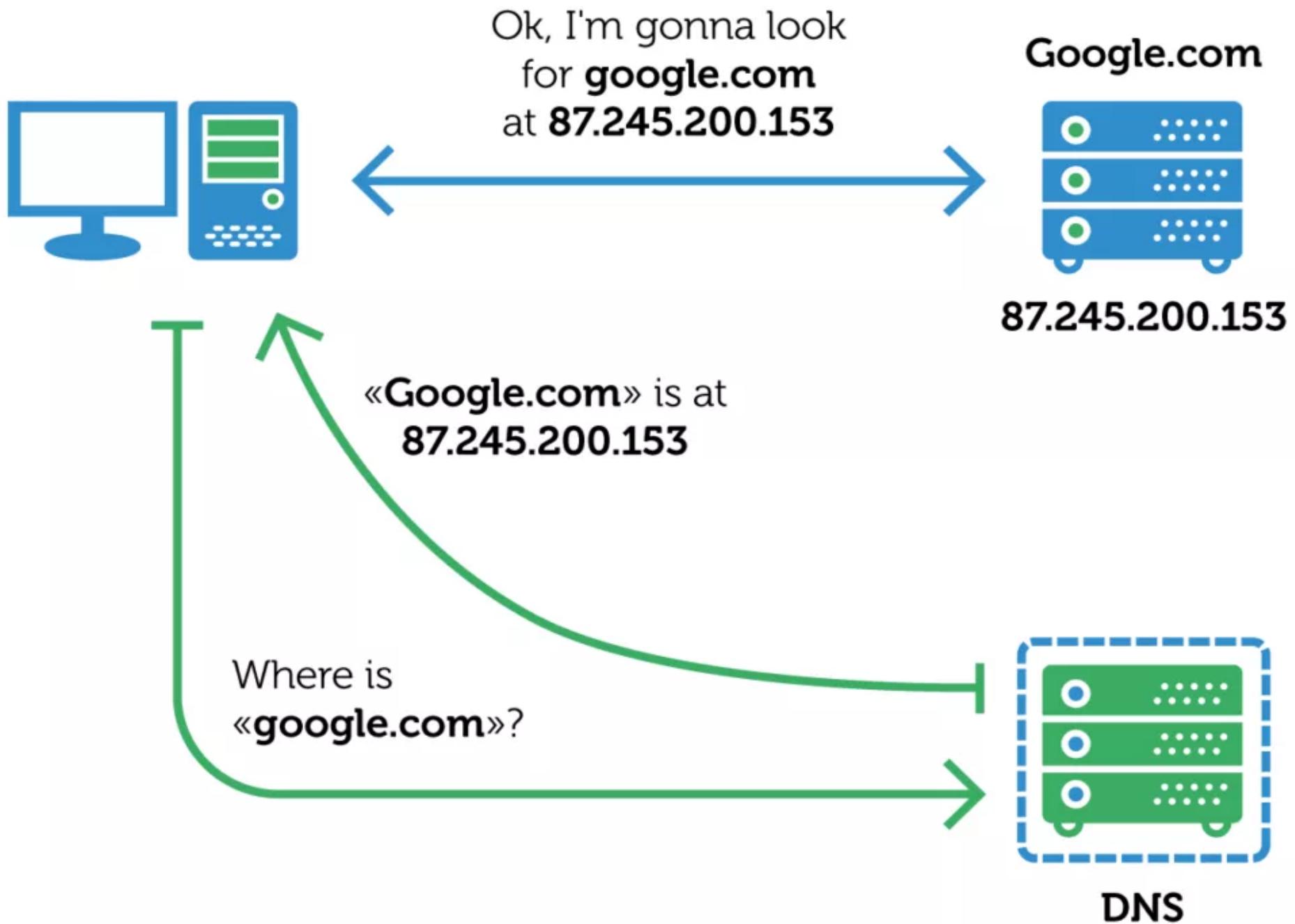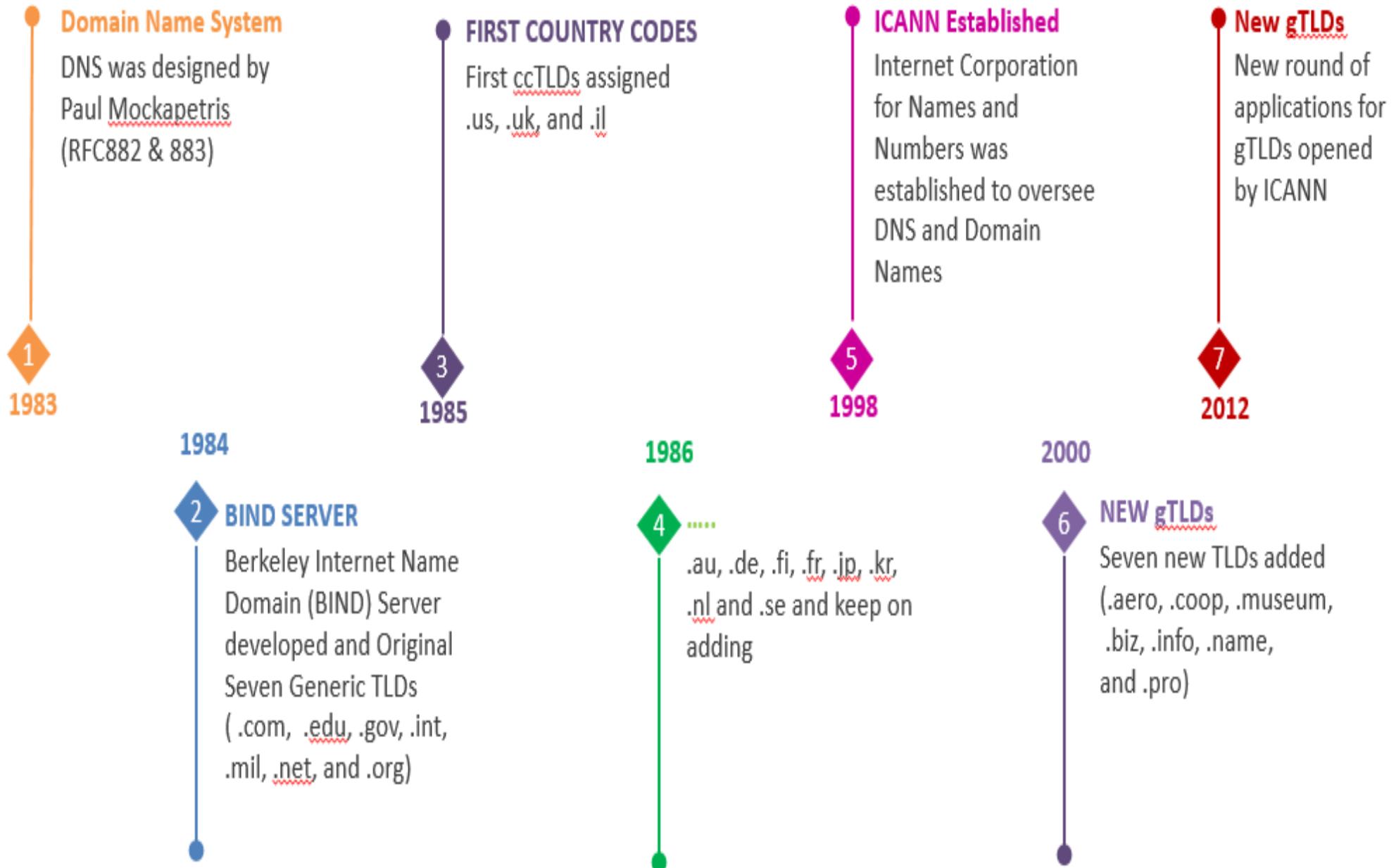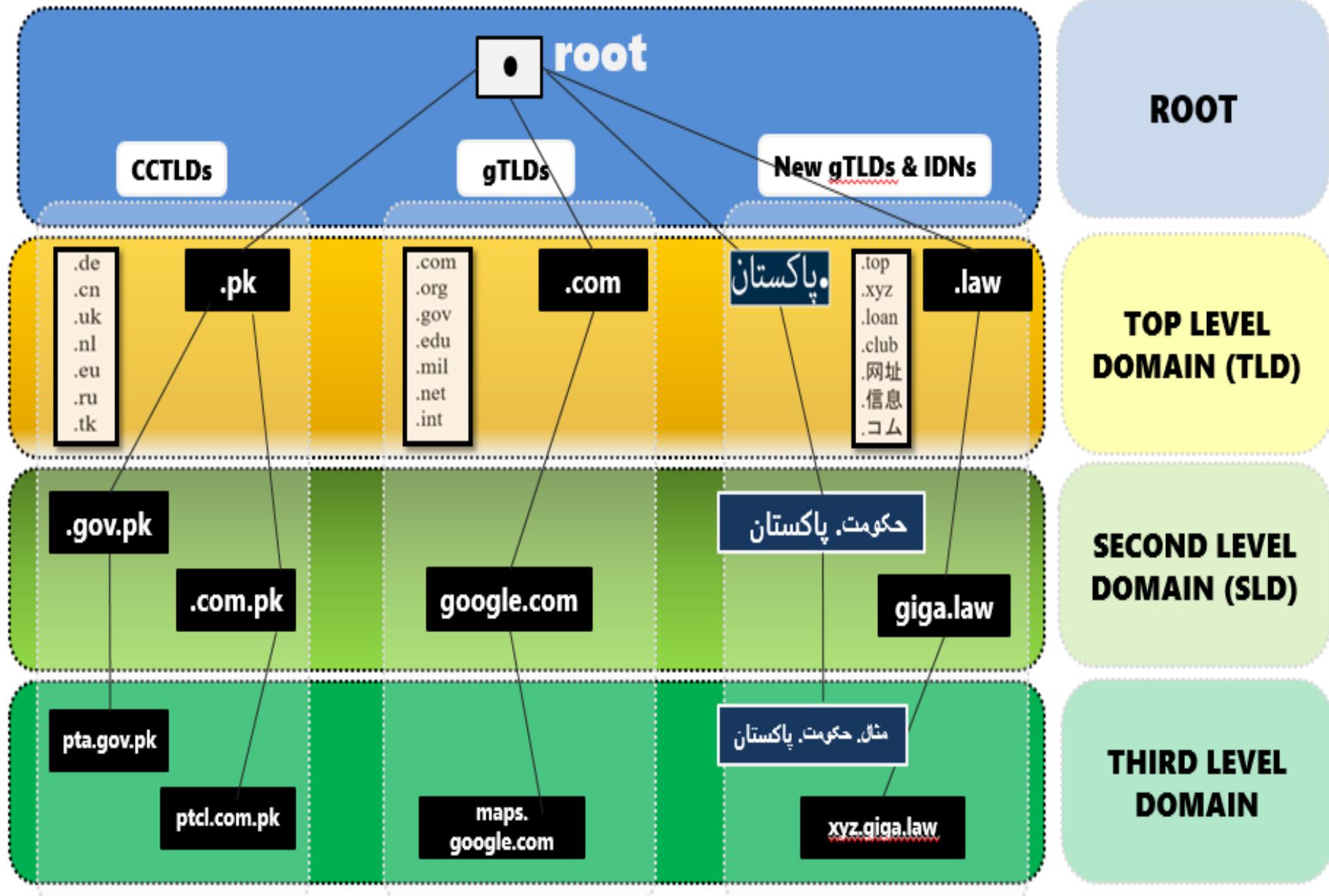
Ok, I'm gonna look for **google.com** at **87.245.200.153**

Google.com

87.245.200.153

«**Google.com**» is at **87.245.200.153**

Where is «**google.com**»?

DNS

Origin of DNS and Domain Names

Domain Name System

DNS was designed by Paul Mockapetris (RFC882 & 883)

1

1983

FIRST COUNTRY CODES

First ccTLDs assigned .us, .uk, and .il

3

1985

ICANN Established

Internet Corporation for Names and Numbers was established to oversee DNS and Domain Names

5

1998

New gTLDs

New round of applications for gTLDs opened by ICANN

7

2012

1984

2 **BIND SERVER**

Berkeley Internet Name Domain (BIND) Server developed and Original Seven Generic TLDs (.com, .edu, .gov, .int, .mil, .net, and .org)

1986

4 .....

.au, .de, .fi, .fr, .jp, .kr, .nl and .se and keep on adding

2000

6 **NEW gTLDs**

Seven new TLDs added (.aero, .coop, .museum, .biz, .info, .name, and .pro)

DNS Hierarchy and Top Level Ds

ROOT

● root

CCTLDs · gTLDs · New gTLDs & IDNs

TOP LEVEL DOMAIN (TLD)

.de .cn .uk .nl .eu .ru .tk · .pk · .com .org .gov .edu .mil .net .int · .com · پاکستان. · .top .xyz .loan .club .网址 .信息 .コム · .law

SECOND LEVEL DOMAIN (SLD)

.gov.pk · .com.pk · google.com · حکومت. پاکستان · giga.law

THIRD LEVEL DOMAIN

pta.gov.pk · ptcl.com.pk · maps. google.com · مثال. حکومت. پاکستان · xyz.giga.law

1930 total number of applications received

911
North America

675
Europe

24
South America

17
Africa

303
Asia Pacific

New gTLDs Application Status: (as of 31 December 2019)
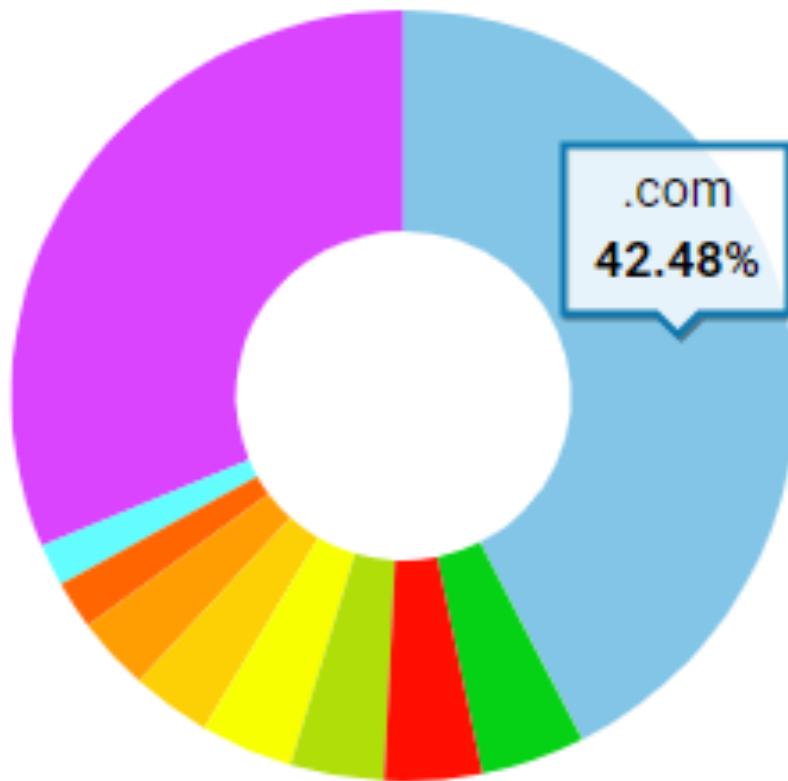
1.	*Total Applications Submitted*	1930
2.	Completed New gTLD Program	1235
3.	Applications Withdrawn	642
4.	Applications that Will Not Processed / Not Approved	41
5.	Currently in consideration	12

TLDs Market Share

S. No.	Type of TLD	Number of TLDs	Domains registered	Market Share
1.	New gTLDs	1,246	50555429	13.63%
2.	Generic TLDs	7	185065885	49.89%
3.	Country TLDs	323	135333223	36.48%
4.	All TLDs	1,572	370954537	100%

Top TLDs distribution

By number of registered domains
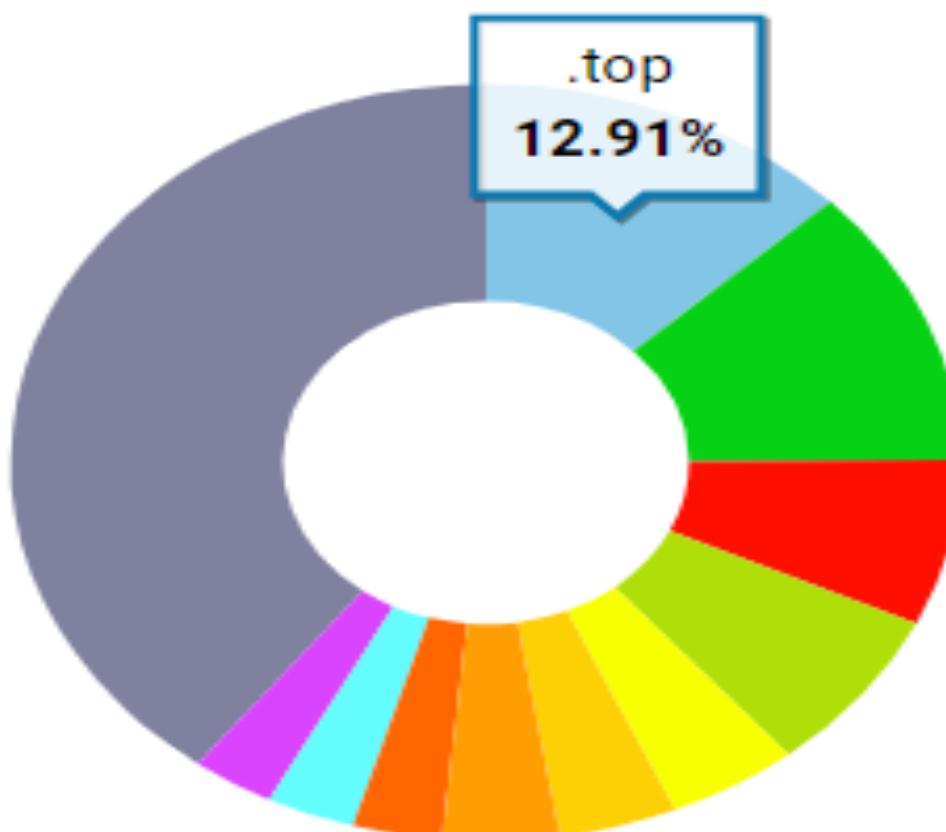
●	.com	42.48%
●	.net	4.30%
●	.tk	4.00%
●	.de	3.87%
●	.cn	3.83%
●	.uk	3.28%
●	.org	3.11%
●	.ru	2.02%
●	.top	1.76%
●	Others	31.36%

.com
42.48%

https://domainnamestat.com/

Top New gTLDs

Top TLDs distribution
By number of registered domains

●	.top	12.91%
●	.info	11.98%
●	.xyz	7.10%
●	.icu	7.04%
●	.biz	4.47%
●	.club	4.03%
●	.site	3.96%
●	.vip	3.04%
●	.online	3.03%
●	.loan	2.83%
●	Others	39.63%

Why Internationalize Domain Names?

More and more people around the world, once unconnected, are online.

Number of Internet Users Worldwide***

2000	2014	2020
413M	2.9B	5B expected
		more language communities join

What has changed with Top-Level Domains?

DOMAIN NAME
Latin letters a to z without accents or symbols.

.org

.com

.uk

2009

INTERNATIONALIZED DOMAIN NAMES ADDED
Characters from different scripts.

.عرب

(.arab)

.中国

(.china)

.рф

(.rf)

ASCII VERSUS UNICODE

ASCII	UNICODE
A character encoding standard for electronic communication	A computing industry standard for consistent encoding, representation, and handling of text expressed in most of the world's writing systems
Stands for American Standard Code for Information Interchange	Stands for Universal Character Set
Supports 128 characters	Supports a wide range of characters
Uses 7 bits to represent a character	Uses 8bit, 16bit or 32bit depending on the encoding type
Requires less space	Requires more speace

IDNA RFCs or Standards

3490: IDNs in Applications (IDNA) 2003

http://www.rfc-editor.org/rfc/rfc3490.txt

5895: IDNA 2008 protocol

https://tools.ietf.org/html/rfc5891

3491: Nameprep: A Stringprep Profile for IDNs

http://www.rfc-editor.org/rfc/rfc3491.txt

3492: Punycode: A Bootstring encoding of Unicode for IDNA

http://www.rfc-editor.org/rfc/rfc3492.txt
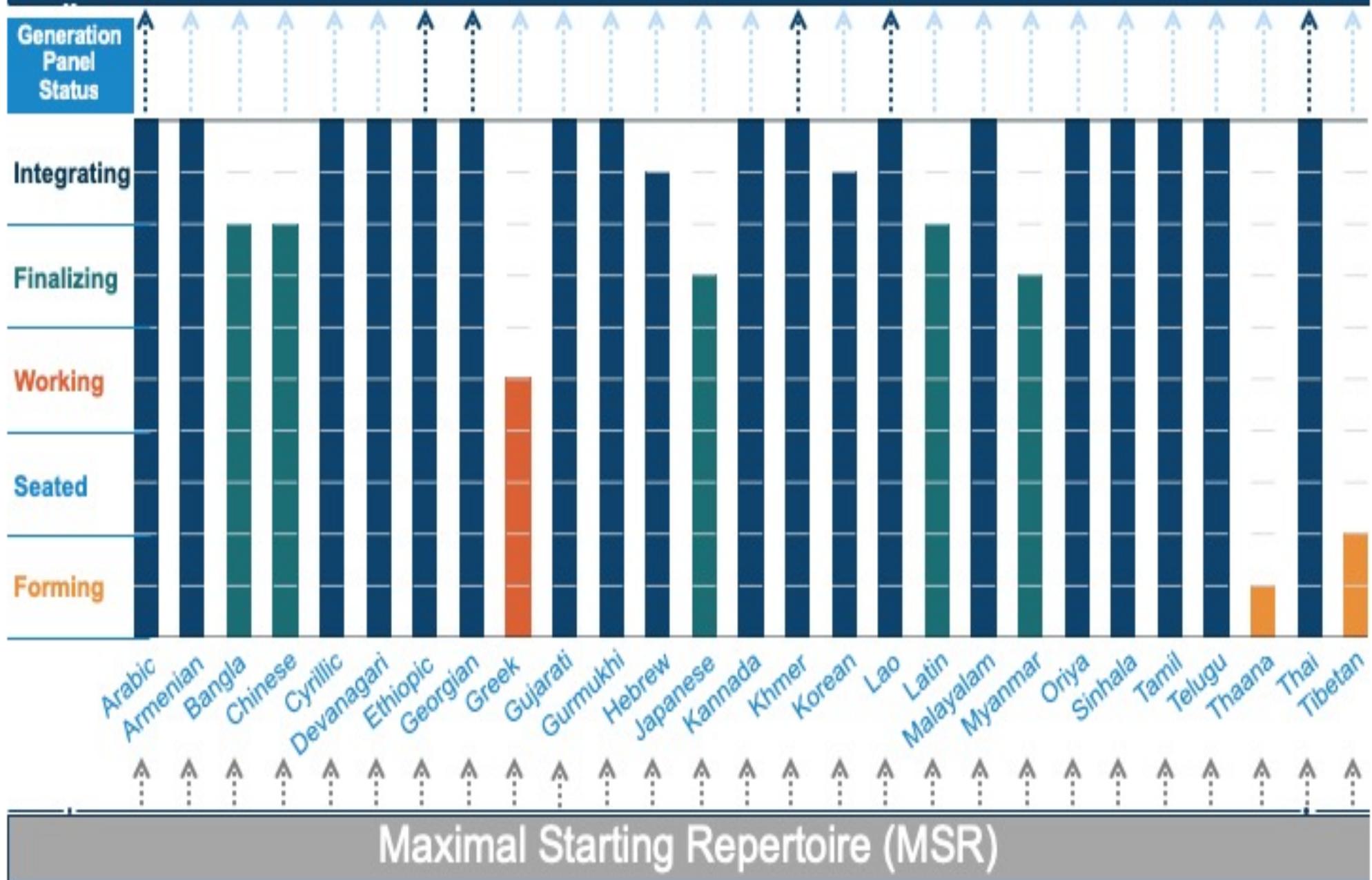
| IDN Domain Name	The Punycode
adıdas.de	http://xn--addas-o4a.de/
rolęx.com	xn--rolx-nu5a.com
rołex.com	xn--roex-11a.com
airfrȧnce.com	xn--airfrnce-rx0d.com
大坂.info	xn--uesx7b.info
googĺe.com	xn--googe-95a.com
みんな. 大坂	xn--q9jyb4c.xn--uesx7b
iƙea.com	xn--iea-f6a.com
پاکستان.حکومت	xn--mgbai9azgqp6j.xn--pgbf6el89b
rołex.com	xn--roex-11a.com
starƀucks.com	xn--starucks-hpd.com

Writing Systems of the World

Legend:
- Latin
- Cyrillic
- Hangeul (featural)
- Other alphabets
- Arabic
- Other abjads
- Devanagari
- Other abugidas
- Syllabaries
- Logographies

The unlabeled scripts of India are:
(west) Gurmukhi, Gujarati, Kannada, Malayalam,
and (east) Tamil, Telugu, Oriya, Bengali.
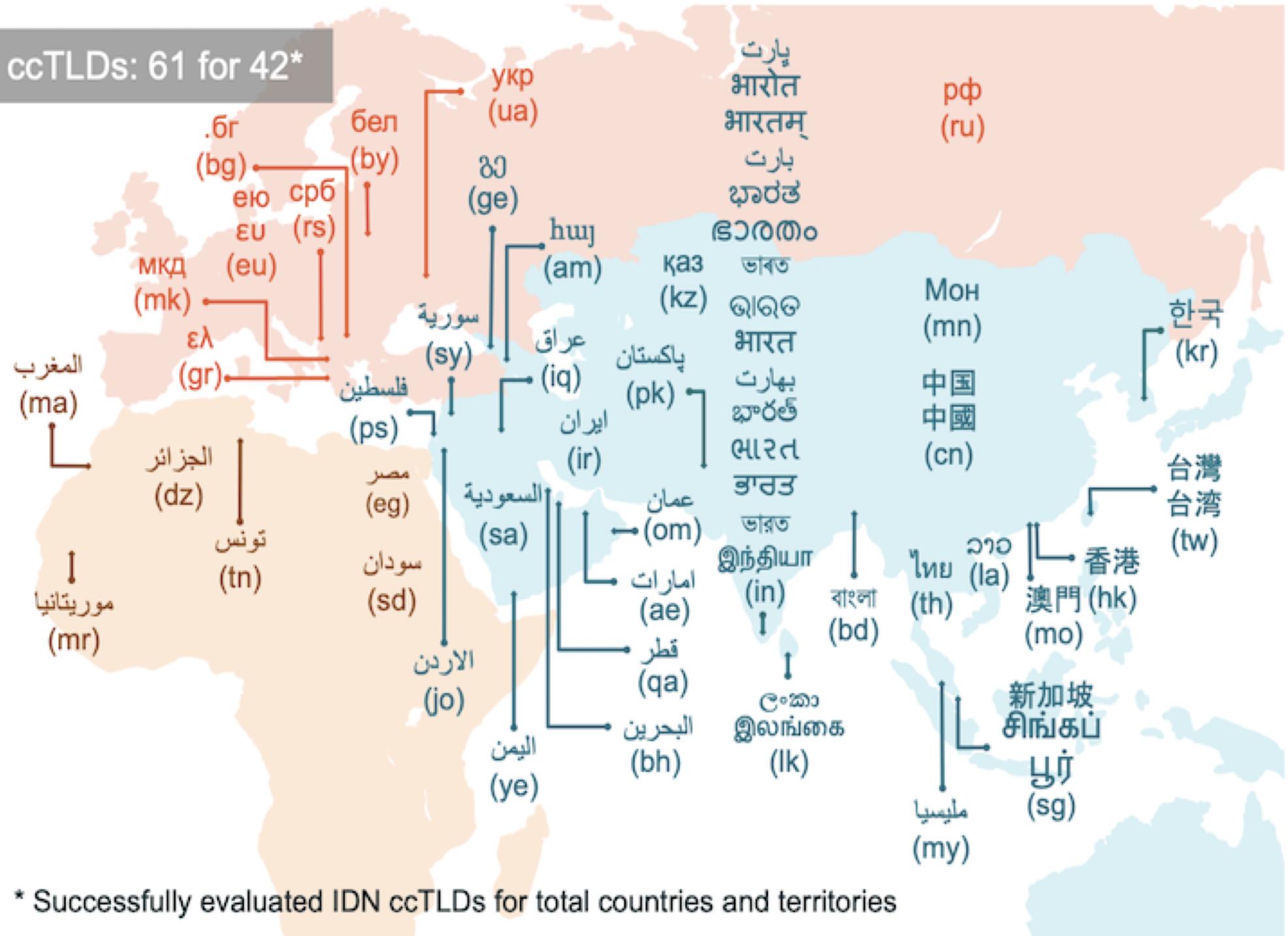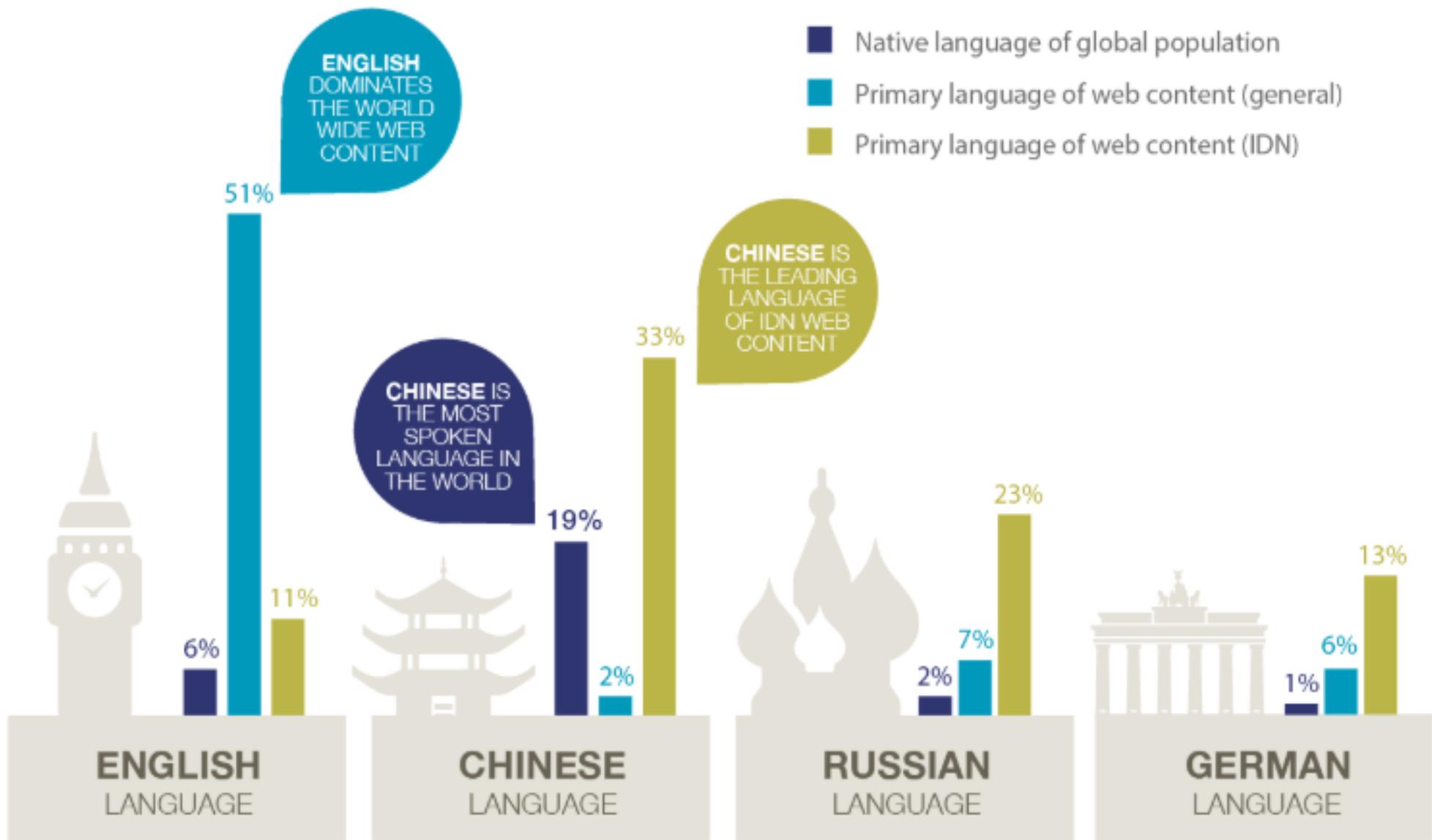
Root Zone Label Generation Rules (RZ-LGR)

Source: ICANN

ccTLDs: 61 for 42*

бг. (bg) • ею ευ (eu) • срб (rs) • бел (by) • укр (ua) • рф (ru)
мкд (mk) • ελ (gr) • ge (ge) • hwj (am) • پارت भारोत भारतम् بارت ಭಾರತ భారత్ ভারত भारत بھارت ਭਾਰਤ भारत ভারত இந்தியா (in)
المغرب (ma) • فلسطين (ps) • سورية (sy) • عراق (iq) • قاز (kz)
الجزائر (dz) • تونس (tn) • مصر (eg) • سودان (sd) • الأردن (jo) • السعودية (sa) • ایران (ir) • عمان (om) • امارات (ae) • قطر (qa) • البحرين (bh) • اليمن (ye)
موريتانيا (mr)
پاکستان (pk)
Мон (mn) • 中国 中國 (cn)
한국 (kr)
台灣 台湾 (tw)
香港 (hk) • 澳門 (mo)
بنغلا (bd) • ไทย (th) • ລาວ (la)
ලංකා இலங்கை (lk)
新加坡 சிங்கப் பூர் (sg)
ماليسيا (my)

* Successfully evaluated IDN ccTLDs for total countries and territories

Source: ICANN

Web content is more linguistically diverse with IDNs

Legend:
- Native language of global population (dark blue)
- Primary language of web content (general) (teal)
- Primary language of web content (IDN) (olive)

ENGLISH DOMINATES THE WORLD WIDE WEB CONTENT

CHINESE IS THE MOST SPOKEN LANGUAGE IN THE WORLD

CHINESE IS THE LEADING LANGUAGE OF IDN WEB CONTENT

ENGLISH LANGUAGE
- 6%
- 51%
- 11%

CHINESE LANGUAGE
- 19%
- 2%
- 33%

RUSSIAN LANGUAGE
- 2%
- 7%
- 23%

GERMAN LANGUAGE
- 1%
- 6%
- 13%

https://idnworldreport.eu/infographics/idns-support-linguistic-diversity/

World Map Growth of IDNs

Total IDNs

< 1000:
< 10000:
< 100000:
< 1000000:

○ 2009 ○ 2010 ○ 2011 ○ 2012 ○ 2013 ○ 2014 ○ 2015 ○ 2016 ○ 2017 ◉ 2018

https://idnworldreport.eu/maps/idn-world-map/

Approx 9 million IDNs (Dec 2018)

Universal Acceptance Steering Group (UASG)

Universal Acceptance Technology and EAI Working Groups
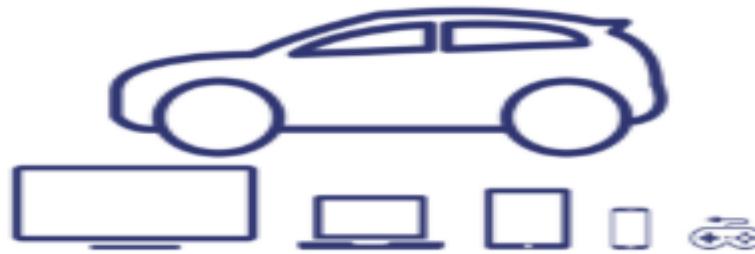
Universal Acceptance Measurement Working Group

Universal Acceptance Coordination Group

Local Initiatives Working Group

Universal Acceptance Communications Working Group

The Elements of Universal Acceptance

Task Force on Arabic Script IDNs
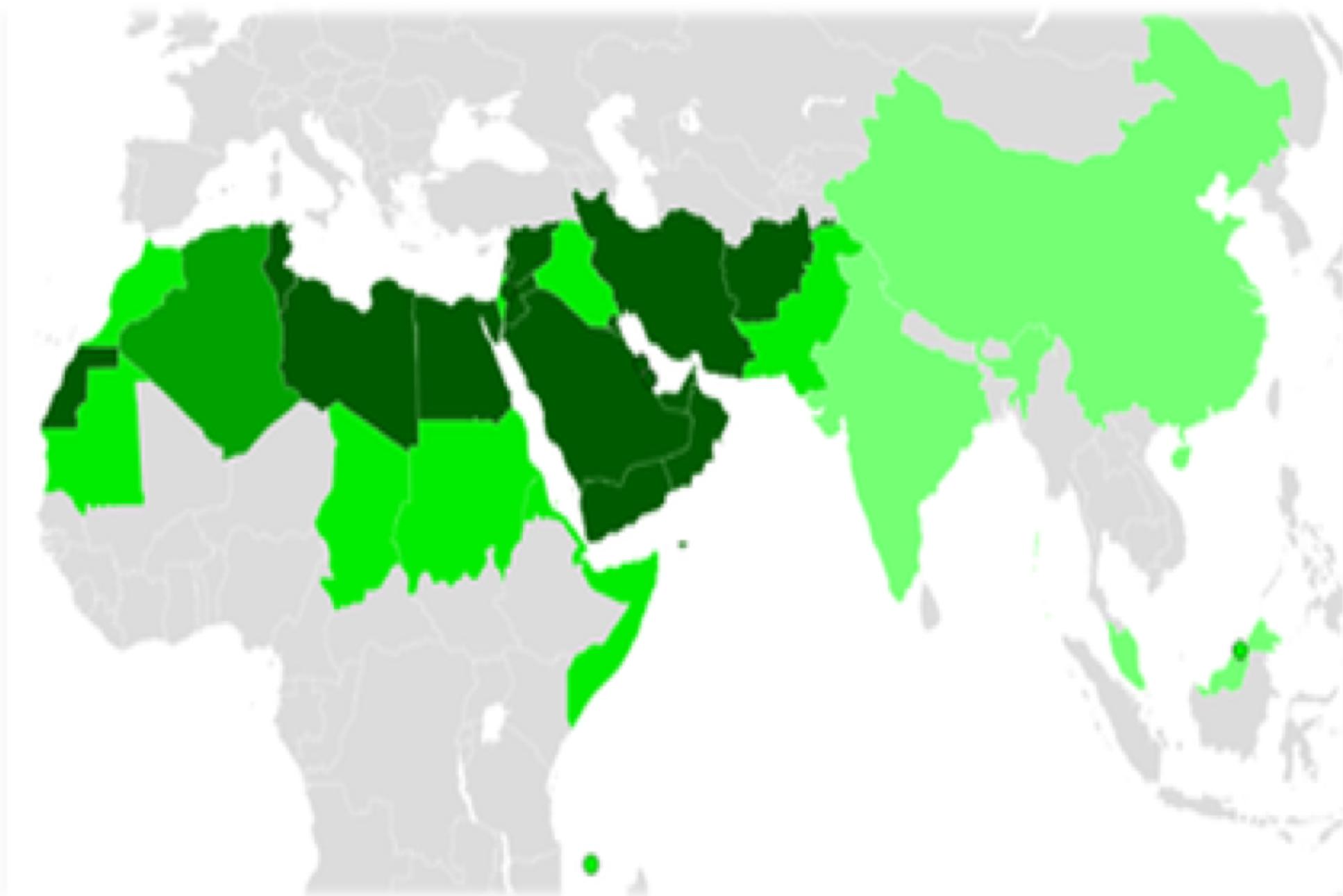
Creation and oversight by community based Middle East Strategy Working Group (MESWG)

Diverse representation in the group

Root zone LGR proposal has been finalized

Completed 2nd level LGR for four languages and working on establishing test bed for testing EAI of Arabic Script

Region of Arabic Script

Arabic Script IDN TLDs till 15-01-2019

كوم.	سودان.	العليان.	إختبار.
مصر.	سورية.	المغرب.	ابوظبي.
ماليسيا.	شبكة.	امارات.	آزمايشى.
موبايلي.	عراق.	ايران.	اتصالات.
موريتانيا.	عرب.	بارت.	ارامكو.
موقع.	عمان.	بازار.	الاردن.
همراه.	فلسطين.	بيتك.	البحرين.
پاكستان.	قطر.	بهارت.	الجزائر.
پارت.	كاثوليك.	تونس.	السعودية.

Source: https://tld-list.com/tlds-from-a-z

Universal Acceptance : Arabic Script

Zero width joining characters (ZWJ)
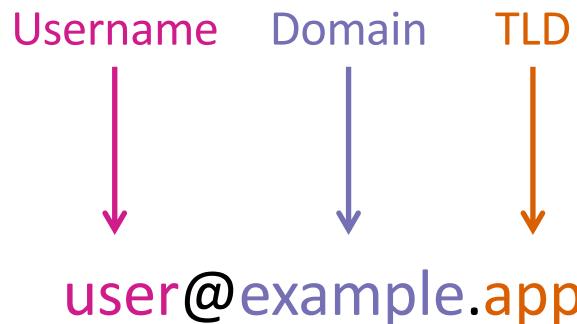
Zero width Non joining characters (ZWNJ)

Combining marks

Bi Directional

Arabic Script IDN Unicode Table
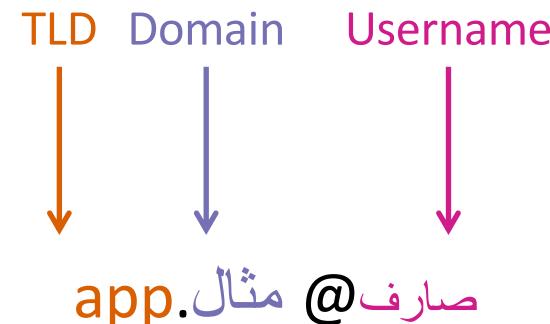
Email Address Internationalized (EAI) Testbed

Left to Right (LTR) Scripts

Username Domain TLD

user@example.app

Right to Left (RTL) Scripts

TLD Domain Username

app.مثال@صارف

More Examples of (imaginary) Email Addresses including IDNs

user@example.پاکستان   (IDN TLD)

user@احمد.info   (Second level IDN)

بلوچ@example.lawyer   (IDN user name with new gTLD)

IDN Security

Phishing

Homoglyphs

Variants

Variants

S.No.	Code points cannot co-occur within a label	Notes
1	0643 and 06A9	ك and ک
2	0643 and 06AA	ك and ڪ
3	06CC and 0649	ی and ى
4	06C1 and 0647	ہ and ه
5	06C1 and 06D5	ہ and ە
6	0647 and 06D5	ه and ە
7	0647 and 06BE	ه and ھ
8	0629 and 06C3	ة and ۃ

Generating all variants for "پاکستان" (067E 0627 06A9 0633 062A 0627 0646) (IDN ccTLD for Pakistan)

Variant: پاکستاں (067E 0627 0643 0633 062A 0627 06BA)
Variant: پاکستان (067E 0627 0643 0633 062A 0627 0646)
Variant: پاکستاں (067E 0627 06AA 0633 062A 0627 06BA)
Variant: پاکستان (067E 0627 06AA 0633 062A 0627 0646)
Variant: پاکستاں (067E 0627 06A9 0633 062A 0627 06BA)

1200 variants generated for "پاکستان" (067E 0627 06A9 0633 062A 0627 0646)
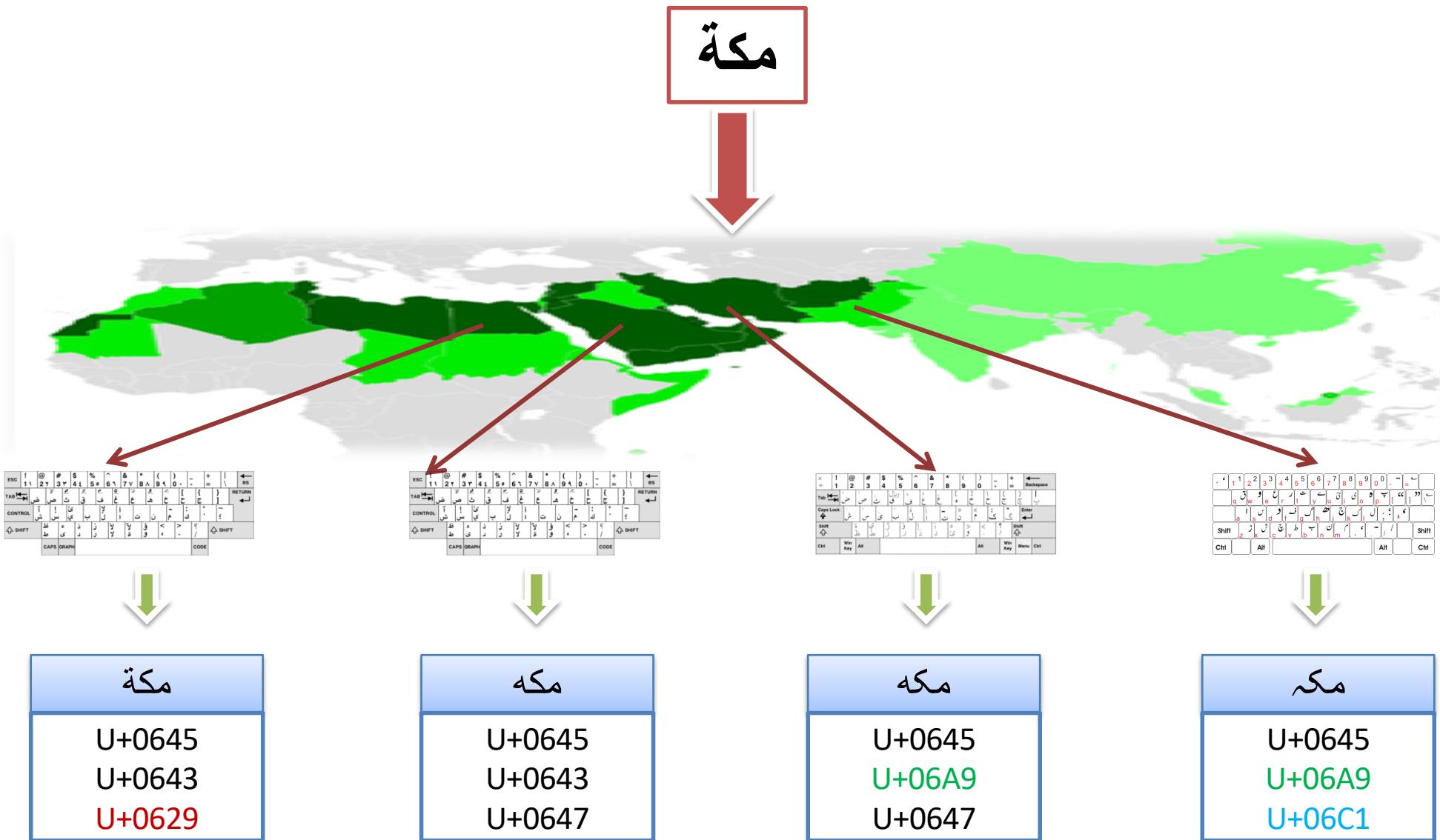
By disposition: { allocatable=5, blocked=1194, original=1 }

● پڑ پڑ
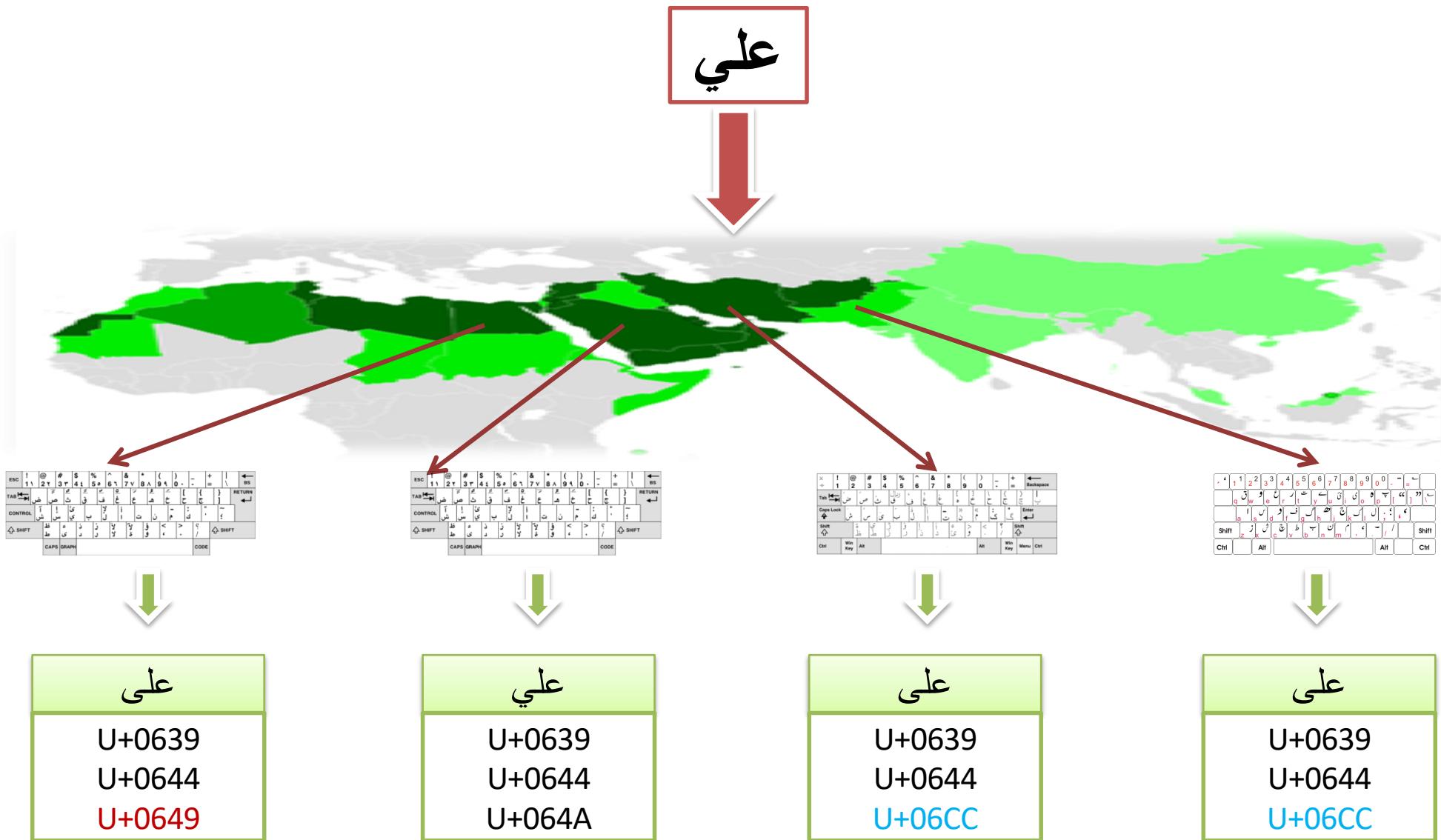
(U+0691)   (U+0631 + U+0615 رٕ)

Registrant will use his/her keyboard

علي

علی	علي	علی	علی
U+0639	U+0639	U+0639	U+0639
U+0644	U+0644	U+0644	U+0644
U+0649	U+064A	U+06CC	U+06CC
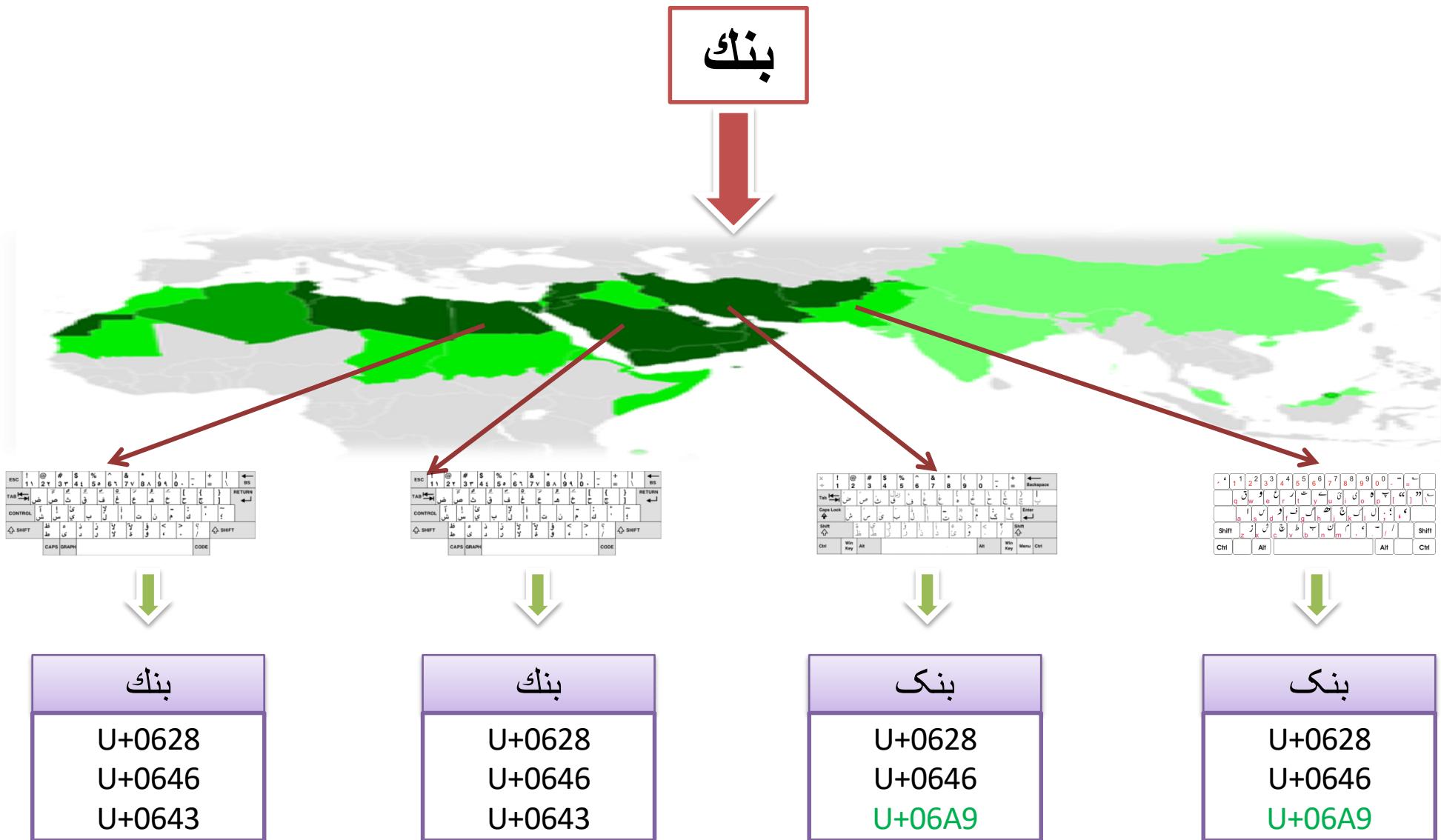
Source: SaidNIC

Registrant will use his/her keyboard

بنك

بنك
U+0628
U+0646
U+0643

بنك
U+0628
U+0646
U+0643

بنک
U+0628
U+0646
U+06A9

بنک
U+0628
U+0646
U+06A9

Source: SaidNIC

Domains 289,746

%age 0.08%

.PK 28,395
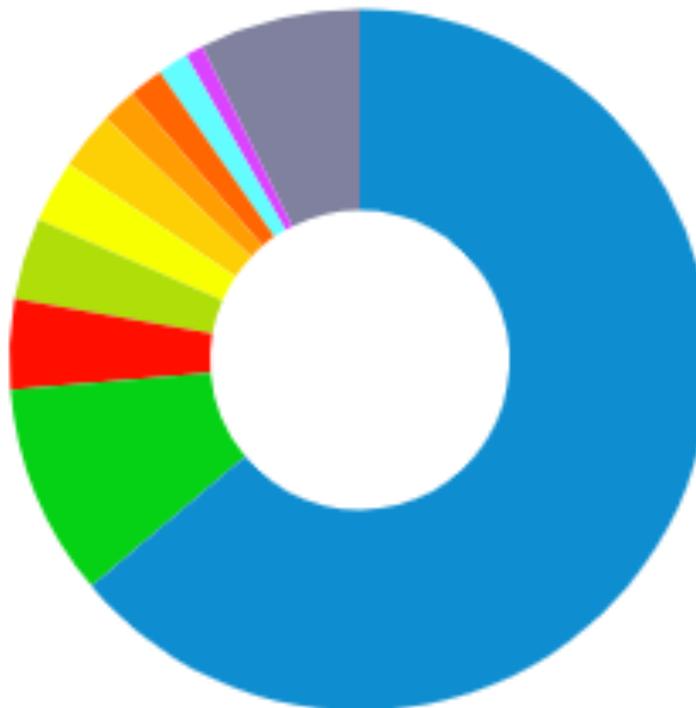
.پاکستان

Top TLDs in Pakistan

- ● .com   63.86%
- ● .pk   9.80%
- ● .org   4.13%
- ● .net   3.76%

شكراً

شكريہ

با سپاس

تشکر

تریما کاسیہ

Thanks

Merci