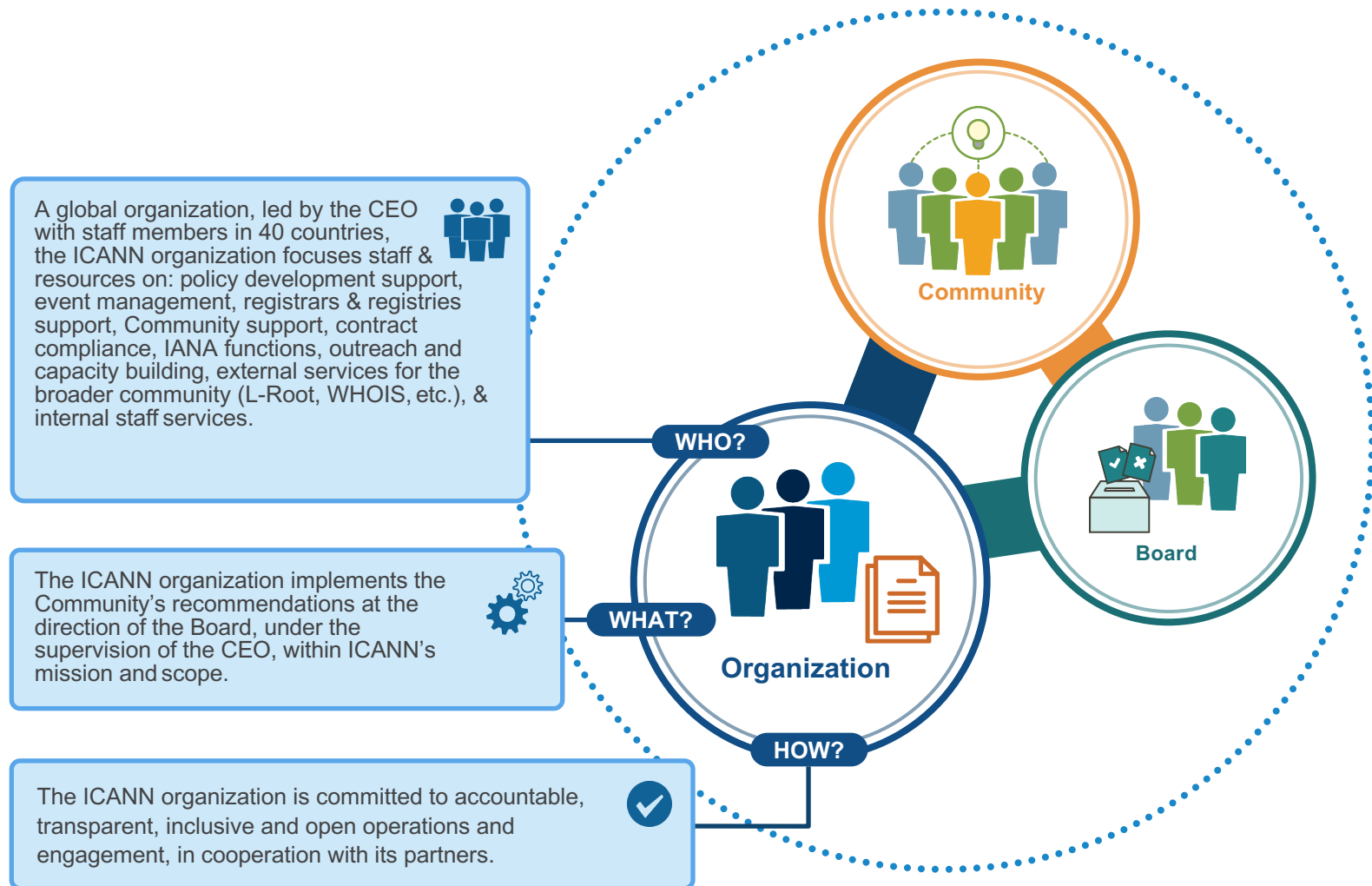




Internationalized Domain Names (IDN) and the Role of Academia

I WACREN 2017 | March 2017

The ICANN Organization



Some of what ICANN organization does



Domain Name System

The domain name system provides addressing for the Internet so people can find websites, send email, and other tasks. The ICANN organization also supports the stability of the DNS through its work, and also its contracts and accreditations.



Policy Development

The ICANN organization supports inclusive, open and transparent multi-stakeholder bottom-up consensus based policy development mechanisms.



L-Root

The ICANN organization hosts and supports one of the 13 L-Root infrastructures. At over 150 locations worldwide, L-Root is critical to infrastructure that helps reduce latency and improves performance of the DNS.



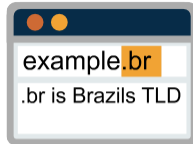
Support and Grow the Community

The ICANN organization engages, nurtures and supports interested stakeholders for active and meaningful participation in ICANN. ICANN connects with stakeholders through outreach and engagement, and meeting & event support.



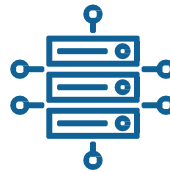
Generic Top-Level Domains

The ICANN organization manages the domain name system's top-level domains. ICANN helps promotes competition and choice in the gTLD marketplace.



Country Code Top-Level Domains

The ICANN organization delegates top-level domains identified with a country code. Management is done by national ccTLD operators.



Protocol Parameters

The ICANN organization, in coordination with the Internet Engineering Task Force, manages protocol parameters by maintaining many of the codes and numbers used in Internet protocols.



Internet Protocol Addresses

By serving as the central repository for IP addresses, the ICANN organization helps coordinate how IP addresses are supplied – preventing repetition and conflicts.



Root Zone Management

The ICANN organization helps manage the root zone through the IANA functions, which involves assigning the operators of top-level domains, such as .bank and .com, and maintaining the technical and administrative details.

IANA Functions

ASCII and Internationalized Domain Names

www.cafe.com

Third Level
Domain

Second Level
Domain

Top Level
Domain (TLD)

ምሳሌ.ኢትዮጵያ

IDN Second
Level
Domain

IDN Top Level
Domain (TLD)

Forming ASCII Labels

Use only Letters

- Letters [a-z]

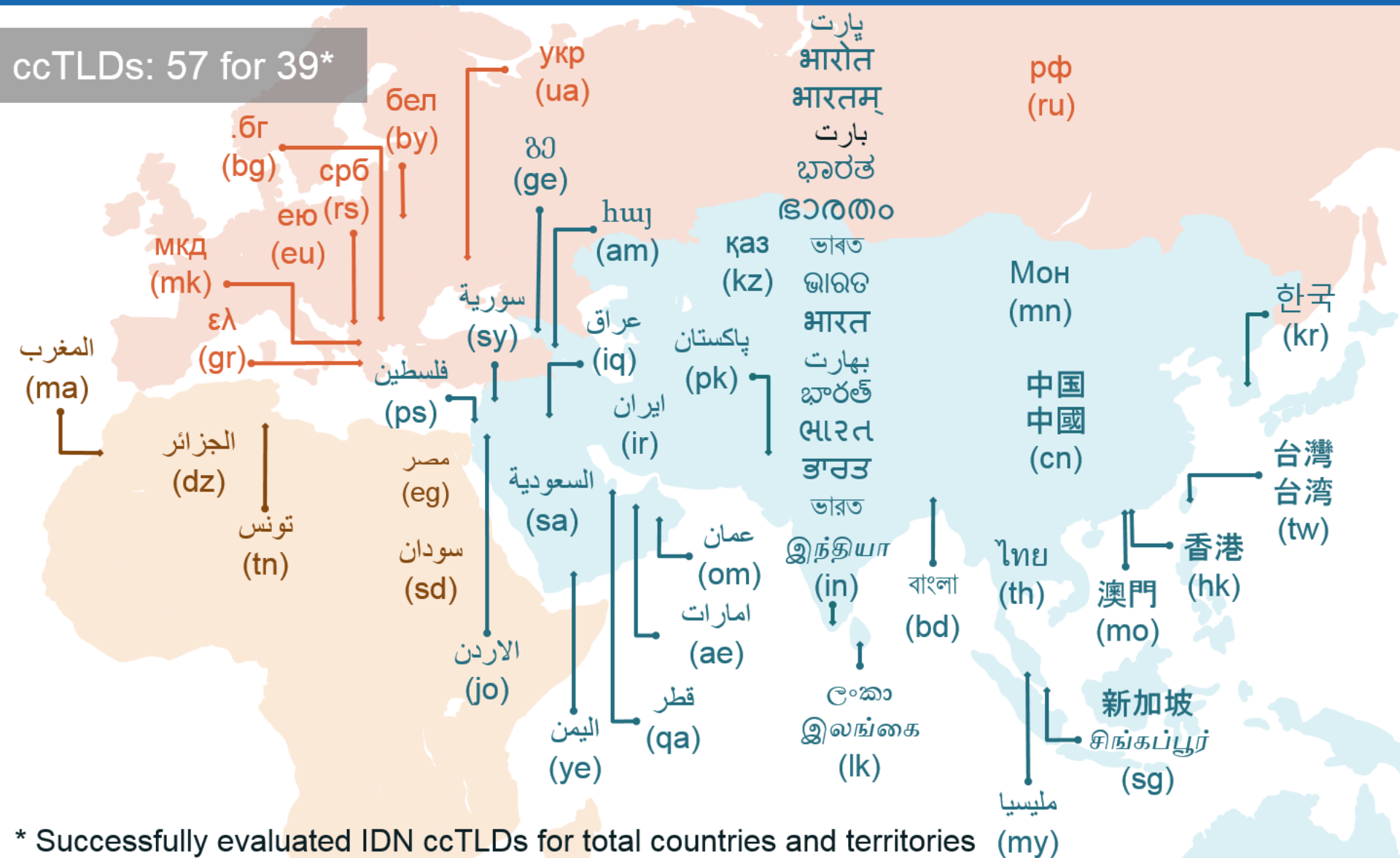
Label length = 63

Syntax of IDN TLD

U-Label, constrained
by the “letter” principle

- *What is a “letter” in a script?*
- *Are all “letters” unique in a script?*

IDN Country Code Top-Level Domains



Root Zone LGR Procedure

Generation Panels

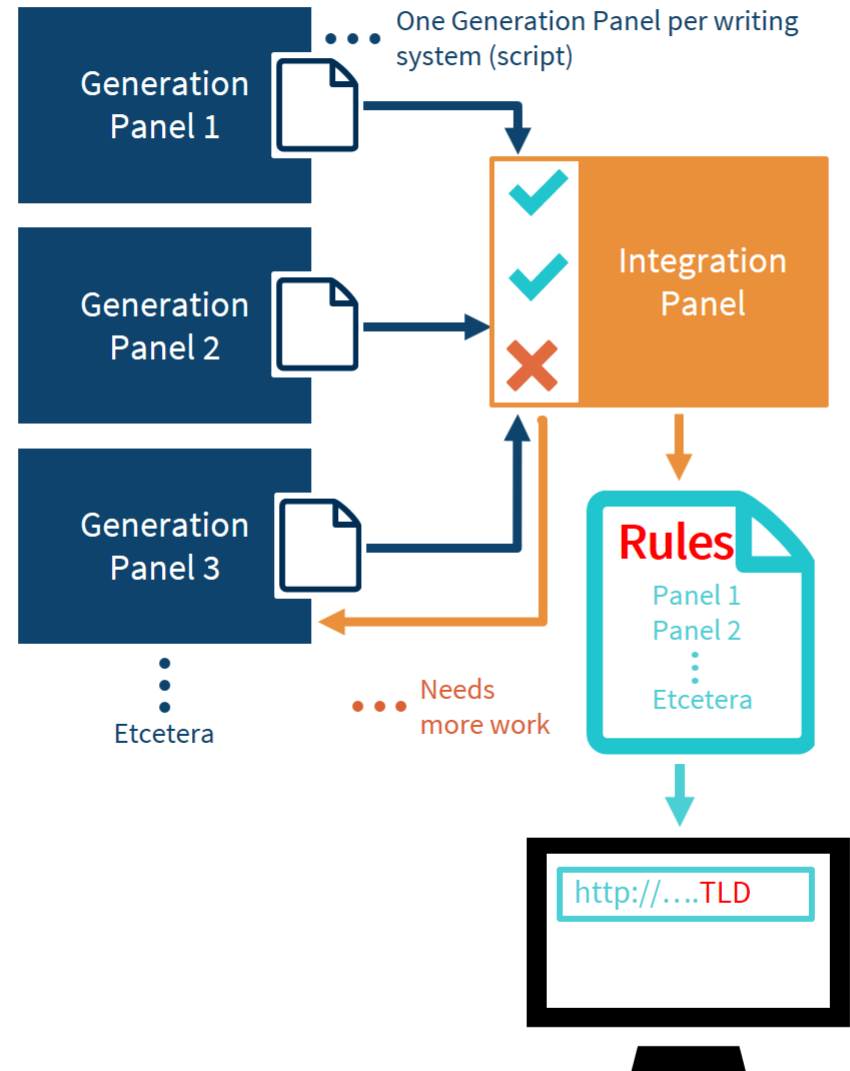
- Generate proposals for script specific LGRs, based on community expertise and requirements

Integration Panel

- Integrates them into common Root Zone LGR while minimizing the risk to Root Zone as shared resource

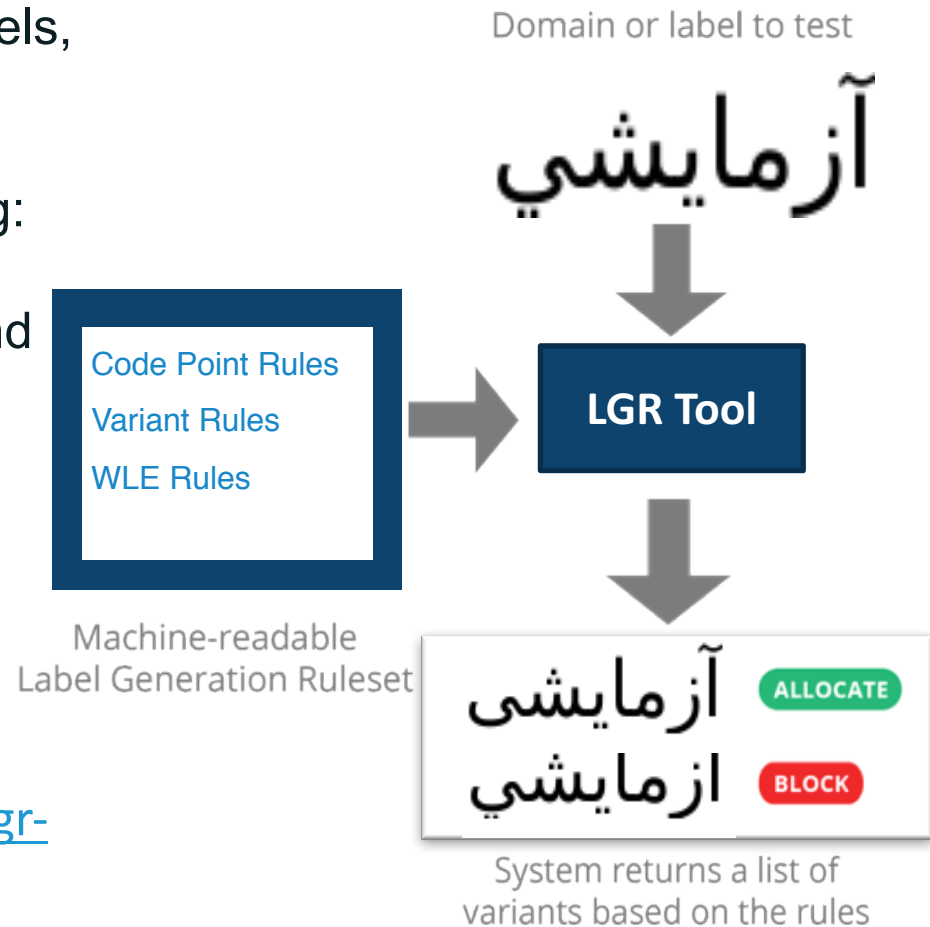
Label Generation Rules (LGR)

- Which labels are permissible
- Which variant labels exist
- Which variant labels may be allocated



LGR Toolset (beta)

- ◉ Label Generation Rulesets (LGRs) used to generate domain name labels, per [RFC 7940](https://tools.ietf.org/html/rfc7940)
- ◉ LGR Toolset allows for the following:
 - Create a LGR
 - Use a LGR to validate label and variants
 - Manage LGRs
- ◉ Online beta deployment
 - Visit <https://lgrtool.icann.org/>
- ◉ Open source package(s) release
 - Released at github: [lgr-core](#), [lgr-django](#), [munidata](#)
- ◉ [User guide](#) available for further details



Status of LGR Development

Label Generation Rules (LGR)

March 2017

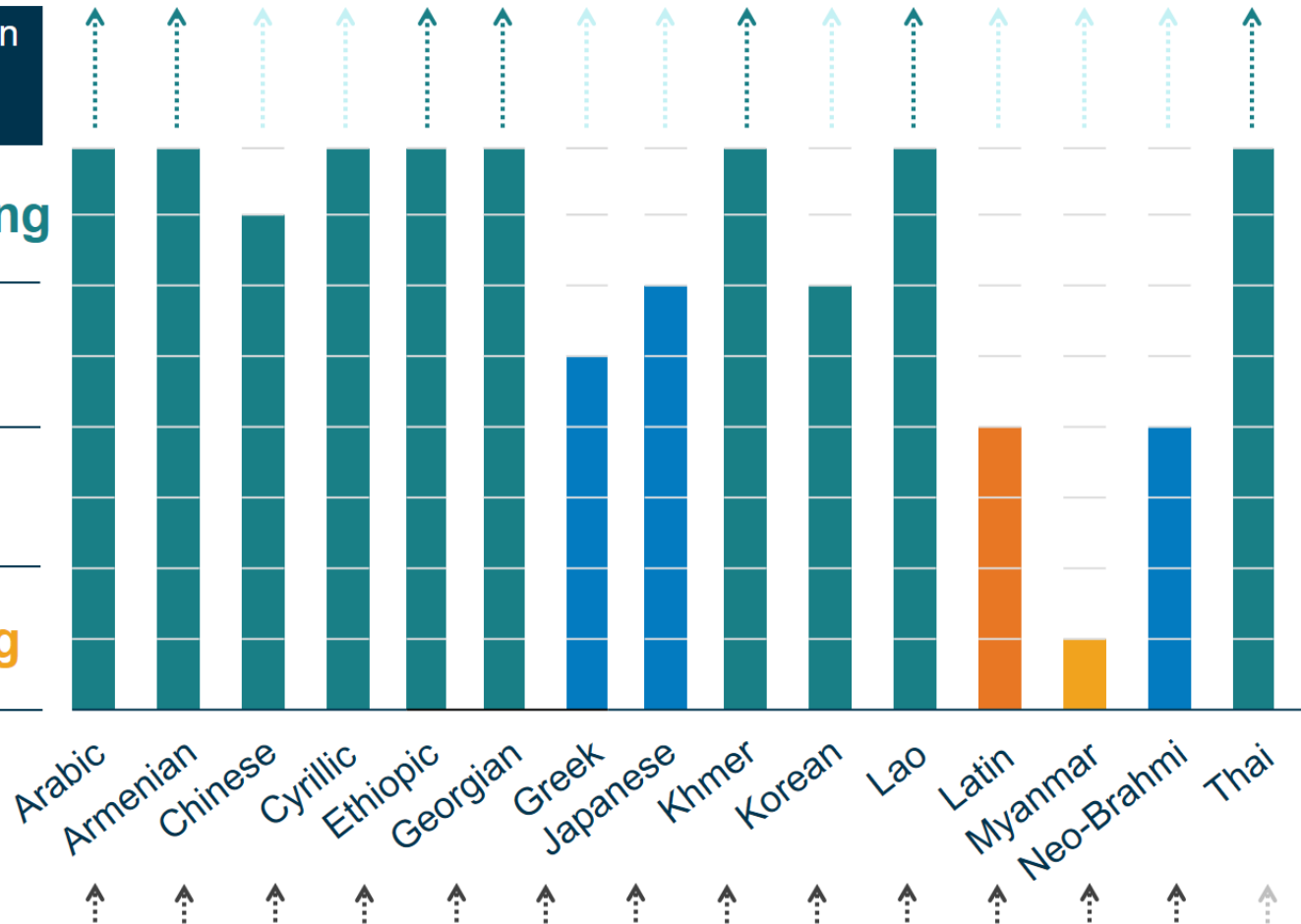
Generation
Panel
Status

Finalizing

Seated

Active

Forming



28+ Scripts
19+
Generation
Panels

Other:

- Hebrew
- Sinhala
- Thaana

Maximal Starting Repertoire (MSR)

Linguistic Diversity in Africa

- ◉ More than 3000 languages in Africa





















- ⊙ Writing systems include:

- Ge'ez (Ethiopic)
- N'ko
- Tifinagh
- Vai
- ...
- Arabic (introduced)
- Latin (introduced)

የሰው ፡ ልጅ ፡ ሁሉ ፡ ሲወለድ ፡ ነጻና ፡ በክብርና ፡ በመብትም ፡
እኩልነት ፡ ያለው ፡ ነው ፡ የተፈጥሮ ፡ የማስተዋልና ፡ ሕሊናው ፡
ሰላለው ፡ አንዱ ፡ ሌላውን ፡ በወንድማማችነት ፡ መንፍስ ፡
መመልከት ፡ የገባዋል ።

ቆብዳዊ ስህተት ውስጥ የሆኑ ጉዳዮች ስህተት ውስጥ ሲገኙ
 ከፊት ለፊት ሆኖ፣ ቆብዳዊ ጉዳዮች ስህተት ውስጥ ሲገኙ
 ቆብዳዊ ጉዳዮች ስህተት ውስጥ ሲገኙ፣ ቆብዳዊ ጉዳዮች
 ስህተት ውስጥ ሲገኙ፣ ቆብዳዊ ጉዳዮች ስህተት ውስጥ
 ሲገኙ፣ ቆብዳዊ ጉዳዮች ስህተት ውስጥ ሲገኙ፣ ቆብዳዊ
 ጉዳዮች ስህተት ውስጥ ሲገኙ፣ ቆብዳዊ ጉዳዮች ስህተት
 ውስጥ ሲገኙ፣ ቆብዳዊ ጉዳዮች ስህተት ውስጥ ሲገኙ፣

The Characters of the N'Ko Script

consonants										
	m	l	k	r	d	c'	j	t	p	b
										
	n	v	w	h	ɲ	ɗ	f	gb	s	rr

$\Sigma \Gamma \Delta \Theta \iota \circ \imath$, $\circ \kappa \kappa \circ \imath \sqsubset \circ \text{HH} \circ \imath + + \text{H} \circ \text{H} \circ \imath \wedge \Sigma \text{H} \circ \text{HH} \Sigma \gamma \circ \imath \sqsubset \Theta \circ \sqcup \circ \imath \wedge \Sigma$
 $\text{H} \chi \sqcup \circ \text{Q} \sqsubset \circ \wedge \gamma \Sigma \text{Ж} \circ \text{O} \text{H} \circ \imath - \Upsilon \circ \text{O} \circ \imath + \circ \sqsubset \Theta \circ \kappa \sqcup \Sigma + \wedge \text{H} \circ \text{V} \circ \circ \text{H} :$
 $\gamma \circ \Theta \circ \text{H} \kappa \circ \Lambda - + \Sigma \text{H} \Sigma + \circ \chi \sqsubset \circ + + \chi \circ \text{O} \circ \Theta \circ \imath.$

Contribution from Africa

- ⦿ Work completed
 - Arabic Script LGR Proposal
 - Ethiopic Script LGR Proposal
- ⦿ Work under progress
 - [Latin Script LGR Proposal by Latin Panel](#)
- ⦿ Work to start – as needed by the community
 - Other scripts used in Africa

Arabic Script LGR Proposal for TLDs

	060	061	062	063	064	065	066	067	068	069	06A	06B	06C	06D	06E	06F		075	076	077		08A	08B	08C	08D	08E	08F
0	ا	ب	ت	ث	ج	ح	خ	د	ذ	ر	ز	س	ش	ص	ض	ط	ظ	0	ي	ف	ق	0	ك	گ	خ	ع	ف
1	آ	أ	إ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	1	ب	ث	ج	1	ب	ث	ج	ب	ث
2	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	2	ب	ث	ج	2	ب	ث	ج	ب	ث
3	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	3	ب	ث	ج	3	ب	ث	ج	ب	ث
4	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	4	ب	ث	ج	4	ب	ث	ج	ب	ث
5	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	5	ب	ث	ج	5	ب	ث	ج	ب	ث
6	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	6	ب	ث	ج	6	ب	ث	ج	ب	ث
7	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	7	ب	ث	ج	7	ب	ث	ج	ب	ث
8	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	8	ب	ث	ج	8	ب	ث	ج	ب	ث
9	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	9	ب	ث	ج	9	ب	ث	ج	ب	ث
A	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	A	ب	ث	ج	A	ب	ث	ج	ب	ث
B	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	B	ب	ث	ج	B	ب	ث	ج	ب	ث
C	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	C	ب	ث	ج	C	ب	ث	ج	ب	ث
D	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	D	ب	ث	ج	D	ب	ث	ج	ب	ث
E	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	E	ب	ث	ج	E	ب	ث	ج	ب	ث
F	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	أ	F	ب	ث	ج	F	ب	ث	ج	ب	ث



Included in LGR



Excluded by GP



Excluded by MSR



Excluded by IDNA2008

Ethiopic Script LGR Proposal for TLDs

	120	121	122	123	124	125	126	127	128	129	12A	12B		12C	12D	12E	12F	130	131	132	133	134	135	136	137		138	139		2D8	2D9	2DA	2DB	2DC	2DD	
0	ሀ	ሐ	ሰ	ሰ	ቀ	ቐ	በ	ተ	ኀ	ነ	አ	ኸ	0	ኸ	ዐ	ዠ	ደ	ጀ	ጐ	ጠ	ጰ	ፀ	ፐ	፳	፳	0	፳	፳	0	ሐ	ሐ	ሐ	ሐ	ሐ	ሐ	0
	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	12A0	12B0		12C0	12D0	12E0	12F0	1300	1310	1320	1330	1340	1350	1360	1370		1380	1390		2D80	2D90	2DA0	2DB0	2DC0	2DD0	
1	ሁ	ሑ	ሱ	ሱ	ቀ	ቐ	ቡ	ቱ	ኀ	ነ	አ	ኸ	1	ሁ	ዐ	ዠ	ደ	ጀ	ጐ	ጠ	ጰ	ፀ	ፐ	፳	፳	1	ሁ	ሁ	1	ሐ	ሐ	ሐ	ሐ	ሐ	ሐ	1
	1201	1211	1221	1231	1241	1251	1261	1271	1281	1291	12A1	12B1		12C1	12D1	12E1	12F1	1301	1311	1321	1331	1341	1351	1361	1371		1381	1391		2D81	2D91	2DA1	2DB1	2DC1	2DD1	
2	ሂ	ሒ	ሲ	ሲ	ቀ	ቐ	ቢ	ቲ	ኀ	ነ	አ	ኸ	2	ሂ	ዐ	ዠ	ደ	ጀ	ጐ	ጠ	ጰ	ፀ	ፐ	፳	፳	2	ሂ	ሂ	2	ሐ	ሐ	ሐ	ሐ	ሐ	ሐ	2
	1202	1212	1222	1232	1242	1252	1262	1272	1282	1292	12A2	12B2		12C2	12D2	12E2	12F2	1302	1312	1322	1332	1342	1352	1362	1372		1382	1392		2D82	2D92	2DA2	2DB2	2DC2	2DD2	
3	ሃ	ሓ	ሳ	ሳ	ቀ	ቐ	ቢ	ቲ	ኀ	ነ	አ	ኸ	3	ሃ	ዐ	ዠ	ደ	ጀ	ጐ	ጠ	ጰ	ፀ	ፐ	፳	፳	3	ሃ	ሃ	3	ሐ	ሐ	ሐ	ሐ	ሐ	ሐ	3
	1203	1213	1223	1233	1243	1253	1263	1273	1283	1293	12A3	12B3		12C3	12D3	12E3	12F3	1303	1313	1323	1333	1343	1353	1363	1373		1383	1393		2D83	2D93	2DA3	2DB3	2DC3	2DD3	
4	ሄ	ሐ	ሴ	ሴ	ቀ	ቐ	ቢ	ቲ	ኀ	ነ	አ	ኸ	4	ሄ	ዐ	ዠ	ደ	ጀ	ጐ	ጠ	ጰ	ፀ	ፐ	፳	፳	4	ሄ	ሄ	4	ሐ	ሐ	ሐ	ሐ	ሐ	ሐ	4
	1204	1214	1224	1234	1244	1254	1264	1274	1284	1294	12A4	12B4		12C4	12D4	12E4	12F4	1304	1314	1324	1334	1344	1354	1364	1374		1384	1394		2D84	2D94	2DA4	2DB4	2DC4	2DD4	
5	ህ	ሐ	ሴ	ሴ	ቀ	ቐ	ቢ	ቲ	ኀ	ነ	አ	ኸ	5	ህ	ዐ	ዠ	ደ	ጀ	ጐ	ጠ	ጰ	ፀ	ፐ	፳	፳	5	ህ	ህ	5	ሐ	ሐ	ሐ	ሐ	ሐ	ሐ	5
	1205	1215	1225	1235	1245	1255	1265	1275	1285	1295	12A5	12B5		12C5	12D5	12E5	12F5	1305	1315	1325	1335	1345	1355	1365	1375		1385	1395		2D85	2D95	2DA5	2DB5	2DC5	2DD5	
6	ህ	ሐ	ሴ	ሴ	ቀ	ቐ	ቢ	ቲ	ኀ	ነ	አ	ኸ	6	ህ	ዐ	ዠ	ደ	ጀ	ጐ	ጠ	ጰ	ፀ	ፐ	፳	፳	6	ህ	ህ	6	ሐ	ሐ	ሐ	ሐ	ሐ	ሐ	6
	1206	1216	1226	1236	1246	1256	1266	1276	1286	1296	12A6	12B6		12C6	12D6	12E6	12F6	1306	1316	1326	1336	1346	1356	1366	1376		1386	1396		2D86	2D96	2DA6	2DB6	2DC6	2DD6	
7	ህ	ሐ	ሴ	ሴ	ቀ	ቐ	ቢ	ቲ	ኀ	ነ	አ	ኸ	7	ህ	ዐ	ዠ	ደ	ጀ	ጐ	ጠ	ጰ	ፀ	ፐ	፳	፳	7	ህ	ህ	7	ሐ	ሐ	ሐ	ሐ	ሐ	ሐ	7
	1207	1217	1227	1237	1247	1257	1267	1277	1287	1297	12A7	12B7		12C7	12D7	12E7	12F7	1307	1317	1327	1337	1347	1357	1367	1377		1387	1397		2D87	2D97	2DA7	2DB7	2DC7	2DD7	
8	ሀ	ሐ	ሴ	ሴ	ቀ	ቐ	ቢ	ቲ	ኀ	ነ	አ	ኸ	8	ሀ	ዐ	ዠ	ደ	ጀ	ጐ	ጠ	ጰ	ፀ	ፐ	፳	፳	8	ሀ	ሀ	8	ሐ	ሐ	ሐ	ሐ	ሐ	ሐ	8
	1208	1218	1228	1238	1248	1258	1268	1278	1288	1298	12A8	12B8		12C8	12D8	12E8	12F8	1308	1318	1328	1338	1348	1358	1368	1378		1388	1398		2D88	2D98	2DA8	2DB8	2DC8	2DD8	
9	ሀ	ሐ	ሴ	ሴ	ቀ	ቐ	ቢ	ቲ	ኀ	ነ	አ	ኸ	9	ሀ	ዐ	ዠ	ደ	ጀ	ጐ	ጠ	ጰ	ፀ	ፐ	፳	፳	9	ሀ	ሀ	9	ሐ	ሐ	ሐ	ሐ	ሐ	ሐ	9
	1209	1219	1229	1239	1249	1259	1269	1279	1289	1299	12A9	12B9		12C9	12D9	12E9	12F9	1309	1319	1329	1339	1349	1359	1369	1379		1389	1399		2D89	2D99	2DA9	2DB9	2DC9	2DD9	
A	ሀ	ሐ	ሴ	ሴ	ቀ	ቐ	ቢ	ቲ	ኀ	ነ	አ	ኸ	A	ሀ	ዐ	ዠ	ደ	ጀ	ጐ	ጠ	ጰ	ፀ	ፐ	፳	፳	A	ሀ	ሀ	A	ሐ	ሐ	ሐ	ሐ	ሐ	ሐ	A
	120A	121A	122A	123A	124A	125A	126A	127A	128A	129A	12AA	12BA		12CA	12DA	12EA	12FA	130A	131A	132A	133A	134A	135A	136A	137A		138A	139A		2D8A	2D9A	2DA	2DBA	2DCA	2DDA	
B	ሀ	ሐ	ሴ	ሴ	ቀ	ቐ	ቢ	ቲ	ኀ	ነ	አ	ኸ	B	ሀ	ዐ	ዠ	ደ	ጀ	ጐ	ጠ	ጰ	ፀ	ፐ	፳	፳	B	ሀ	ሀ	B	ሐ	ሐ	ሐ	ሐ	ሐ	ሐ	B
	120B	121B	122B	123B	124B	125B	126B	127B	128B	129B	12AB	12BB		12CB	12DB	12EB	12FB	130B	131B	132B	133B	134B	135B	136B	137B		138B	139B		2D8B	2D9B	2DAB	2DBB	2DCB	2DDB	
C	ሀ	ሐ	ሴ	ሴ	ቀ	ቐ	ቢ	ቲ	ኀ	ነ	አ	ኸ	C	ሀ	ዐ	ዠ	ደ	ጀ	ጐ	ጠ	ጰ	ፀ	ፐ	፳	፳	C	ሀ	ሀ	C	ሐ	ሐ	ሐ	ሐ	ሐ	ሐ	C
	120C	121C	122C	123C	124C	125C	126C	127C	128C	129C	12AC	12BC		12CC	12DC	12EC	12FC	130C	131C	132C	133C	134C	135C	136C	137C		138C	139C		2D8C	2D9C	2DAC	2DBC	2DCC	2DDC	
D	ሀ	ሐ	ሴ	ሴ	ቀ	ቐ	ቢ	ቲ	ኀ	ነ	አ	ኸ	D	ሀ	ዐ	ዠ	ደ	ጀ	ጐ	ጠ	ጰ	ፀ	ፐ	፳	፳	D	ሀ	ሀ	D	ሐ	ሐ	ሐ	ሐ	ሐ	ሐ	D
	120D	121D	122D	123D	124D	125D	126D	127D	128D	129D	12AD	12BD		12CD	12DD	12ED	12FD	130D	131D	132D	133D	134D	135D	136D	137D		138D	139D		2D8D	2D9D	2DAD	2DBD	2DCD	2DDD	
E	ሀ	ሐ	ሴ	ሴ	ቀ	ቐ	ቢ	ቲ	ኀ	ነ	አ	ኸ	E	ሀ	ዐ	ዠ	ደ	ጀ	ጐ	ጠ	ጰ	ፀ	ፐ	፳	፳	E	ሀ	ሀ	E	ሐ	ሐ	ሐ	ሐ	ሐ	ሐ	E
	120E	121E	122E	123E	124E	125E	126E	127E	128E	129E	12AE	12BE		12CE	12DE	12EE	12FE	130E	131E	132E	133E	134E	135E	136E	137E		138E	139E		2D8E	2D9E	2DAE	2DBE	2DCE	2DDE	
F	ሀ	ሐ	ሴ	ሴ	ቀ	ቐ	ቢ	ቲ	ኀ	ነ	አ	ኸ	F	ሀ	ዐ	ዠ	ደ	ጀ	ጐ	ጠ	ጰ	ፀ	ፐ	፳	፳	F	ሀ	ሀ	F	ሐ	ሐ	ሐ	ሐ	ሐ	ሐ	F
	120F	121F	122F	123F	124F	125F	126F	127F	128F	129F	12AF	12BF		12CF	12DF	12EF	12FF	130F	131F	132F	133F	134F	135F	136F	137F		138F	139F		2D8F	2D9F	2DAF	2DBF	2DCF	2DDF	



Included in LGR



Excluded by GP



Excluded by MSR



Excluded by IDNA2008

Volunteers from Africa Needed for Latin Panel

- Need contribution from African community to ensure use of Latin script for African languages is supported in the LGR for TLDs
 - For example, Alphabet Nationale du Tchad (ANT) has many characters not supported by basic set [a...z]

A - LETTRES MINUSCULES

a ' b **ɓ** c ch d **ɗ** dh e

ɛ **ə** f g gb h **ɦ** i **ɨ** j

k kh kp l m mb mv n **ɲ** nd

ng nj **ɳ** o **ɔ** p q r rh s

sl t th u v vb w y **Ʒ** z zl



Get Involved!
Speak up for your language

How to get involved?

Volunteer

Volunteer for your script Generation Panel (GP)

To contribute expertise, contribute to the GP for your script. You can get involved by simply emailing your CV and a brief statement of interest to IDNProgram@icann.org

Review

Review work through public comments

Sign up for the IDN mailing list vip@icann.org (to sign up, visit <https://mm.icann.org/listinfo/vip>) and participated in the review of IDN work being done at ICANN through the public comments

Listen

Keep yourself updated

Attend regular IDN Program Update sessions at ICANN meetings and sign up on the IDN mailing list vip@icann.org to get updates on the IDN Program at ICANN

Engage with ICANN



Thank You and Questions

Reach us at: IDNProgram@icann.org

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