

# Private Use Names

Roy Arends' Individual Submission to the IETF

NOT AN ICANN ENDORSED PROPOSAL  
(I just happen to work there)

Tech Day @ ICANN 68

# Problem Statement

- There are no private top level domains in the DNS.
  - Such as “X-headers” MIME types (RFC2045)
  - Such as Address Allocation for Private Internets (RFC1918)
  - Such as “x-” subtag in private use language tags (RFC5646)
  - Such as private use ASNs (RFC6996)
  - Such as private use DNS RRTypes and DNS RCODES (RFC6895)

# Problem Statement

- A domain that you can use locally, for your own network
- A domain that doesn't collide with something that may exist in the root in the future.
- A domain that only has meaning locally
- A domain that everyone recognises as having only local meaning

# Who would use private names?

- ISPs who ship routers with “.home” or “.telus”
- Device makers who ship routers with “.dlink” or “.belkin”
- Software configured with “.openstacklocal” as default
- Technology companies that advice to configure “corp” and “internal”

This is squatting

# Current advice

## Use a name under your registered domain

- A problem as devices shipped with a registered domain are “phoning home”. privacy and legal nightmare.

## pick something easy to remember, not used elsewhere

- That is squatting

.INTERNAL (draft-wkumari-dnsop-internal)

.LOCAL (Microsoft Technet Article) RFC6762

- That doesn't do what you think it does

HOME.ARPA

- Specifically for the home networking control protocol

<b>Frequently used string</b>	<b>As of Nov 2019</b>	<b>Past 3 months</b>
HOME	2.784%	2.579%
LAN	1.194%	0.985%
DHCP	0.761%	0.674%
INTERNAL	0.652%	0.664%
LOCALDOMAIN	0.359%	0.415%
IP	0.314%	0.404%
CORP	0.235%	0.242%
DLINK	0.187%	0.159%
WLAN_AP	0.171%	0.097%
OPENSTACKLOCAL	0.146%	0.000%
DLINKROUTER	0.138%	0.155%
LAN1	0.121%	0.116%
GATEWAY	0.112%	0.083%

ITHI data

# Proposed Solution

- Choose a label **WITHOUT** a semantic meaning
  - Preferably short
  - internal  $\neq$  private  $\neq$  local  $\neq$  home.arpa
  - (Too Anglophonic)
- Choose a label that is defined as never to collide
  - Prevent collision with anything expected in the future
- Maybe a two-character ASCII domain

# RFC1591 Domain Name System Structure and Delegation

## 4. Rights to Names

### 2) Country Codes

The IANA is not in the business of deciding what is and what is not a country.

The selection of the ISO 3166 list as a basis for country code top-level domain names was made with the knowledge that ISO has a procedure for determining which entities should be and should not be on that list.



AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO	AP	AQ	AR	AS	AT	AU	AV	AW	AX	AY	AZ
BA	BB	BC	BD	BE	BF	BG	BH	BI	BJ	BK	BL	BM	BN	BO	BP	BQ	BR	BS	BT	BU	BV	BW	BX	BY	BZ
CA	CB	CC	CD	CE	CF	CG	CH	CI	CJ	CK	CL	CM	CN	CO	CP	CQ	CR	CS	CT	CU	CV	CW	CX	CY	CZ
DA	DB	DC	DD	DE	DF	DG	DH	DI	DJ	DK	DL	DM	DN	DO	DP	DQ	DR	DS	DT	DU	DV	DW	DX	DY	DZ
EA	EB	EC	ED	EE	EF	EG	EH	EI	EJ	EK	EL	EM	EN	EO	EP	EQ	ER	ES	ET	EU	EV	EW	EX	EY	EZ
FA	FB	FC	FD	FE	FF	FG	FH	FI	FJ	FK	FL	FM	FN	FO	FP	FQ	FR	FS	FT	FU	FV	FW	FX	FY	FZ
GA	GB	GC	GD	GE	GF	GG	GH	GI	GJ	GK	GL	GM	GN	GO	GP	GQ	GR	GS	GT	GU	GV	GW	GX	GY	GZ
HA	HB	HC	HD	HE	HF	HG	HH	HI	HJ	HK	HL	HM	HN	HO	HP	HQ	HR	HS	HT	HU	HV	HW	HX	HY	HZ
IA	IB	IC	ID	IE	IF	IG	IH	II	IJ	IK	IL	IM	IN	IO	IP	IQ	IR	IS	IT	IU	IV	IW	IX	IY	IZ
JA	JB	JC	JD	JE	JF	JG	JH	JI	JJ	JK	JL	JM	JN	JO	JP	JQ	JR	JS	JT	JU	JV	JW	JX	JY	JZ
KA	KB	KC	KD	KE	KF	KG	KH	KI	KJ	KK	KL	KM	KN	KO	KP	KQ	KR	KS	KT	KU	KV	KW	KX	KY	KZ
LA	LB	LC	LD	LE	LF	LG	LH	LI	LJ	LK	LL	LM	LN	LO	LP	LQ	LR	LS	LT	LU	LV	LW	LX	LY	LZ
MA	MB	MC	MD	ME	MF	MG	MH	MI	MJ	MK	ML	MM	MN	MO	MP	MQ	MR	MS	MT	MU	MV	MW	MX	MY	MZ
NA	NB	NC	ND	NE	NF	NG	NH	NI	NJ	NK	NL	NM	NN	NO	NP	NQ	NR	NS	NT	NU	NV	NW	NX	NY	NZ
OA	OB	OC	OD	OE	OF	OG	OH	OI	OJ	OK	OL	OM	ON	OO	OP	OQ	OR	OS	OT	OU	OV	OW	OX	OY	OZ
PA	PB	PC	PD	PE	PF	PG	PH	PI	PJ	PK	PL	PM	PN	PO	PP	PQ	PR	PS	PT	PU	PV	PW	PX	PY	PZ
QA	QB	QC	QD	QE	QF	QG	QH	QI	QJ	QK	QL	QM	QN	QO	QP	QQ	QR	QS	QT	QU	QV	QW	QX	QY	QZ
RA	RB	RC	RD	RE	RF	RG	RH	RI	RJ	RK	RL	RM	RN	RO	RP	RQ	RR	RS	RT	RU	RV	RW	RX	RY	RZ
SA	SB	SC	SD	SE	SF	SG	SH	SI	SJ	SK	SL	SM	SN	SO	SP	SQ	SR	SS	ST	SU	SV	SW	SX	SY	SZ
TA	TB	TC	TD	TE	TF	TG	TH	TI	TJ	TK	TL	TM	TN	TO	TP	TQ	TR	TS	TT	TU	TV	TW	TX	TY	TZ
UA	UB	UC	UD	UE	UF	UG	UH	UI	UJ	UK	UL	UM	UN	UO	UP	UQ	UR	US	UT	UU	UV	UW	UX	UY	UZ
VA	VB	VC	VD	VE	VF	VG	VH	VI	VJ	VK	VL	VM	VN	VO	VP	VQ	VR	VS	VT	VU	VV	VW	VX	VY	VZ
WA	WB	WC	WD	WE	WF	WG	WH	WI	WJ	WK	WL	WM	WN	WO	WP	WQ	WR	WS	WT	WU	WV	WW	WX	WY	WZ
XA	XB	XC	XD	XE	XF	XG	XH	XI	XJ	XK	XL	XM	XN	XO	XP	XQ	XR	XS	XT	XU	XV	XW	XX	XY	XZ
YA	YB	YC	YD	YE	YF	YG	YH	YI	YJ	YK	YL	YM	YN	YO	YP	YQ	YR	YS	YT	YU	YV	YW	YX	YY	YZ
ZA	ZB	ZC	ZD	ZE	ZF	ZG	ZH	ZI	ZJ	ZK	ZL	ZM	ZN	ZO	ZP	ZQ	ZR	ZS	ZT	ZU	ZV	ZW	ZX	ZY	ZZ

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ZA	ZB	ZC	ZD	ZE	ZF	ZG	ZH	ZI	ZJ	ZK	ZL	ZM	ZN	ZO	ZP	ZQ	ZR	ZS	ZT	ZU	ZV	ZW	ZX	ZY	ZZ

AB Un-assigned  
 AD Assigned  
 UK Exceptionally reserved  
 AN Transitionally reserved  
 EW Indeterminately reserved  
 ZZ User Assigned

AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO	AP	AQ	AR	AS	AT	AU	AV	AW	AX	AY	AZ
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XA	XB	XC	XD	XE	XF	XG	XH	XI	XJ	XK	XL	XM	XN	XO	XP	XQ	XR	XS	XT	XU	XV	XW	XX	XY	XZ
YA	YB	YC	YD	YE	YF	YG	YH	YI	YJ	YK	YL	YM	YN	YO	YP	YQ	YR	YS	YT	YU	YV	YW	YX	YY	YZ
ZA	ZB	ZC	ZD	ZE	ZF	ZG	ZH	ZI	ZJ	ZK	ZL	ZM	ZN	ZO	ZP	ZQ	ZR	ZS	ZT	ZU	ZV	ZW	ZX	ZY	ZZ

User Assigned  
AA  
QM .. QZ  
XA .. XZ  
ZZ

<b>AA</b>	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO	AP	AQ	AR	AS	AT	AU	AV	AW	AX	AY	AZ
BA	BB	BC	BD	BE	BF	BG	BH	BI	BJ	BK	BL	BM	BN	BO	BP	BQ	BR	BS	BT	BU	BV	BW	BX	BY	BZ
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PA	PB	PC	PD	PE	PF	PG	PH	PI	PJ	PK	PL	PM	PN	PO	PP	PQ	PR	PS	PT	PU	PV	PW	PX	PY	PZ
QA	QB	QC	QD	QE	QF	QG	QH	QI	QJ	QK	QL	<b>QM</b>	<b>QN</b>	<b>QO</b>	<b>QP</b>	<b>QQ</b>	<b>QR</b>	<b>QS</b>	<b>QT</b>	<b>QU</b>	<b>QV</b>	<b>QW</b>	<b>QX</b>	<b>QY</b>	<b>QZ</b>
RA	RB	RC	RD	RE	RF	RG	RH	RI	RJ	RK	RL	RM	RN	RO	RP	RQ	RR	RS	RT	RU	RV	RW	RX	RY	RZ
SA	SB	SC	SD	SE	SF	SG	SH	SI	SJ	SK	SL	SM	SN	SO	SP	SQ	SR	SS	ST	SU	SV	SW	SX	SY	SZ
TA	TB	TC	TD	TE	TF	TG	TH	TI	TJ	TK	TL	TM	TN	TO	TP	TQ	TR	TS	TT	TU	TV	TW	TX	TY	TZ
UA	UB	UC	UD	UE	UF	UG	UH	UI	UJ	UK	UL	UM	UN	UO	UP	UQ	UR	US	UT	UU	UV	UW	UX	UY	UZ
VA	VB	VC	VD	VE	VF	VG	VH	VI	VJ	VK	VL	VM	VN	VO	VP	VQ	VR	VS	VT	VU	VV	VW	VX	VY	VZ
WA	WB	WC	WD	WE	WF	WG	WH	WI	WJ	WK	WL	WM	WN	WO	WP	WQ	WR	WS	WT	WU	WV	WW	WX	WY	WZ
<b>XA</b>	<b>XB</b>	<b>XC</b>	<b>XD</b>	<b>XE</b>	<b>XF</b>	<b>XG</b>	<b>XH</b>	<b>XI</b>	<b>XJ</b>	<b>XK</b>	<b>XL</b>	<b>XM</b>	<b>XN</b>	<b>XO</b>	<b>XP</b>	<b>XQ</b>	<b>XR</b>	<b>XS</b>	<b>XT</b>	<b>XU</b>	<b>XV</b>	<b>XW</b>	<b>XX</b>	<b>XY</b>	<b>XZ</b>
YA	YB	YC	YD	YE	YF	YG	YH	YI	YJ	YK	YL	YM	YN	YO	YP	YQ	YR	YS	YT	YU	YV	YW	YX	YY	YZ
ZA	ZB	ZC	ZD	ZE	ZF	ZG	ZH	ZI	ZJ	ZK	ZL	ZM	ZN	ZO	ZP	ZQ	ZR	ZS	ZT	ZU	ZV	ZW	ZX	ZY	<b>ZZ</b>

# What does ISO3166 say about this range?

## 5.2 Construction of the alpha-2 code

The ISO 3166 standard uses combinations in the range AB to QL, RA to WZ, and YA to ZY.

In addition exactly 42 alpha-2 code elements **are not used in the ISO 3166**, AA, QM to QZ, XA to XZ, ZZ.

## 8.1 Special Provisions

**Users sometimes need to extend or alter the use of country code elements for special purposes.** The following provisions give **guidance** for meeting such needs within the framework of this part of ISO 3166.

### 8.1.3 User assigned code element

If users need code elements to represent country names not included in this part of ISO 3166, the series of letters AA, QM to QZ, XA to XZ, and ZZ are available.

# What does ISO3166 say about this range?

- Stable since inception (1974)
- ISO/TC46/WG2 refers to ISO3166 Maintenance Agency (MA) for the assignment of two letter codes to country names
- ISO/TC46/WG2 referred User-Assigned two letter codes to **users** (not to the MA!)
  - ISO3166/MA has no authority over the User-Assigned codes

ISO/TC46/WG2 will cause an incredible amount of damage if User-Assigned codes are reassigned by to the MA for the purpose of mapping codes to country names.

*This would be an astonishingly bad idea.*

# What does IETF RFCs say about this range?

- RFC1591, (pre ICANN) IANA (Jon Postel): "IANA is not in the business of deciding what is and what is not a country.", refers to ISO3166 list for country codes
- RFC3071, (post-natal ICANN) Klensin reflects that aligning IANA ccTLD assignments with ISO3166/MA assignments is a Good Thing.

IANA violates the principles set out in RFC1591 and RFC3071 if ISO3166 User-Assigned codes are assigned as country codes by IANA.

*This would be an astonishingly bad idea.*

# How are User Assigned Codes used elsewhere?

## ISO 3901 International Standard Recording Code

Reserves “ZZ” for direct registrants independent of any country.

## ISO 4217 Codes for the representation of currencies

Reserves the “XA” .. “XZ” range for transactions and precious metals, as they are country independent.

## ISO 6166 International securities identification numbering system

Reserves "XS" for securities cleared through Euroclear/Clearstream.



# How are User Assigned Codes used elsewhere?

ICAO International Civil Aviation Organization

Reserves “ZZ” for UN travel documents.

IATA International Air Transport Association

Reserves “XK” for Kosovo and “XU” for Russia TC3

WIPO World Intellectual Property Organization

Reserves 5 User Assigned code elements to identify regional agencies and patent offices, and allocated “XX” for “Unknown states, other entities or organizations”.

# How are User Assigned Codes used elsewhere?

UN/LOCODE United Nations Code for Trade and Transport Locations  
Reserves "XZ" for international waters

## WORLDBANK

Reserves "XC" for the Euro Area. "XU" for "North America" area, and many other X\* codes are used.

INTERPOL Destination Agency Identifier (DAI)  
Reserves "ZZ/ALL" for transactions distributed by interpol.

CABforum Certificate Authority and Browser Forum  
Reserves "XX" to signify a location not covered by ISO3166-1.

# How are User Assigned Codes used elsewhere?

UNICODE Common Locale Data Repository (CLDR) version 36 (latest)

- QO countries in Oceania that do not have a subcontinent.
- QU deprecated: the canonicalized form is EU
- XA special code indicating derived testing locale with English + added accents and lengthened
- XB special code indicating derived testing locale with forced RTL English
- XK industry practice
- ZZ used in APIs or as replacement for invalid code

# How are User Assigned Codes used elsewhere?

## RFC5646 BCP47: Tags for Identifying Languages

contains a section and examples dedicated to Private Use Sub-tags.

“For example, the region subtags 'AA', 'ZZ', and those in the ranges 'QM'-'QZ' and 'XA'-'XZ' (derived from the ISO 3166-1 private use codes) **can be used** to form a language tag. A tag such as "zh-Hans-XQ" conveys a great deal of public, interchangeable information about the language material”

sq-XK	Albanian (Kosovo))	shqip (Kosovë)
sr-Cyrl-XK	Serbian (Cyrillic, Kosovo)	српски (ћирилица, Косово)
sr-Latn-XK	Serbian (Latin, Kosovo)	srpski (latinica, Kosovo)

# How are User Assigned Codes used elsewhere?

## RFC5890: Internationalized Domain Names for Applications

How was “XN—” chosen? \*

Protocol:

The following steps will be used to select the two-character code:

The code will be selected from among a subset of the entries on the ISO 3166-1, clause 8.1.3 User-assigned alpha-2 code elements: AA, QM to QZ, XA to XZ, and ZZ. The selection is limited to these codes because of the following:

The use of ISO 3166-1 user-assigned elements removes the possibility that the code will duplicate a present or future ccTLD code.

\* <https://psg.com/~randy/lists/iesg/2003/msg01081.html>

# In Conclusion, ISO3166-1 Alpha 2 UA codes

- are used as intended in various standards
- will never be ISO assigned or reserved
- may never be delegated as country codes
- are collision free
- have no semantic meaning

# Many codes, many uses

- There are 42 codes in the ISO-3166-1 Alpha 2 User-Assigned range
- Codes can (theoretically) be assigned for different uses
- If this was done 10 years ago, we may have
  - ... .ZZ for private use names
  - ... .XH for homenet names
  - ... .XM for mDNS names
  - ... .XO for onion names
  - ... .XL for local names

Painting the bike shed\*, I'm using

**.ZZ**

For private use names (at home)



# Next steps

- Discussions happening everywhere, but mainly on the DNSOP WG mailing list
  - Continue to work on draft-arends-private-use-tld
- IFF the WG adopts the internet draft
  - Engage with IESG, IAB, IANA and ICANN communities to develop a path of least surprise (but that is already happening here)

# Thank you