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Linguistic Guidelines for the Use of the Arabic Language in Internet Domains

Abstract

This document constitutes technical specifications for the use of Arabic in Internet domain names and provides linguistic guidelines for Arabic domain names. It addresses Arabic-specific linguistic issues pertaining to the use of Arabic language in domain names.

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1. Introduction

The Internet Engineering Task Force (IETF) issued in March 2003 a set of RFCs for Internationalized Domain Names (IDN) ([1], [2], and [3]), which were planned to become the de facto standard for all languages. In 2007 and 2008, the following working drafts were released that propose revisions to the IDNA protocol:

- o Internationalized Domain Names for Applications (IDNA):
Background, Explanation, and Rationale [5]

- o Internationalized Domain Names in Applications (IDNA): Protocol [6]
- o An updated IDNA criterion for right-to-left scripts [7]
- o The Unicode code points and IDNA [8]

These documents are known collectively as "IDNA2008".

This document constitutes a technical specification for the implementation of the IDN standards in the case of the Arabic language. It will allow the use of standard language tables to write domain names in Arabic characters. Therefore, it should be considered as a logical extension to the IDN standards. It thus presents guidelines for the proper use of Arabic characters with the IDN standards in an Arabic language context.

This document reflects the recommendations of the Arab Working Group on Arabic Domain Names (AWG-ADN), established by the League of Arab States (LAS), based on standardisation efforts of the United Nations Economic and Social Commission for Western Asia (UN-ESCWA) and on that group's document, "Guidelines for an Arabic Internet Domain Name" [9]. This document is also in full harmony with recent rigorous discussions that took place within the major language communities that use the Arabic script in their languages.

This document provides guidelines for the ways Arabic characters may be used for registering Internet domain names and how linguistic-specific issues should be handled. A few rules are recommended for application at the protocol level.

The key words "MUST", "REQUIRED", "SHOULD", "RECOMMENDED", and "MAY" in this document are to be interpreted as described in RFC 2119 [4].

Comments on this document are solicited and should be addressed to the working group's mailing list at ESCWA-ICTD@un.org and/or the author(s).

2. Arabic Language-Specific Issues

The main objective of the creation of Arabic domain names is to have a vehicle to increase Internet use amongst all strata of the Arabic-speaking communities.

Furthermore, a non-user-friendly domain name would further add to the ambiguity and the eccentricity of the Internet to the Arabic-speaking communities, thus contributing negatively to the spread of the

Internet and leading to further isolation of these communities at the global level.

Hence, there have been intensive efforts (especially those spearheaded by Dr. Al-Zoman and contributed to by UN-ESCWA and its Arabic Domain Names Task Force (ADN-TF)) to reach consensus on a multitude of linguistic issues with the following goals:

- o To define the accepted Arabic character set to be used for writing domain names in Arabic, which is the subject of this document.
- o To define the top-level domains of the Arabic domain name tree structure (i.e., Arabic gTLDs and ccTLDs). This goal will be handled in a separate document.

The first meeting of the AWG-ADN, held in Damascus from January-February 2005, gave special attention to the following:

- o Simplification of the domain names, whenever possible, to facilitate the interaction of the Arabic user with the Internet.
- o Adoption of solutions that do not lead to confusion either in reading or in writing, provided that this does not compromise the linguistic correctness of used words.
- o Mixing Arabic and non-Arabic letters in the domain name label is not acceptable.

2.1. Linguistic Issues

There are a number of linguistic issues that have been proposed with respect to the use of the Arabic language in domain names. This section will highlight some of them. This section is based on the papers of Dr. Al-Zoman ([10] and [11]) and on the report of the first meeting of AWG-ADN [12]. For details, the reader is encouraged to review these references.

2.1.1. Diacritics (Tashkeel) and Shadda

Tashkeel and Shadda are accent marks placed above or below Arabic letters to produce proper pronunciation. They are thus used to differentiate different meanings for different words with the same base characters.

Neither Tashkeel nor Shadda are permitted in zone files when registering domain names in the Arabic language, although they are permitted in the current edition of IDNA2008. They can be supported

or ignored, if necessary, in the user interface with local mappings and can be stripped before IDNA processing.

The following are their Unicode presentations:

U+064B ARABIC FATHATAN
U+064C ARABIC DAMMATAN
U+064D ARABIC KASRATAN
U+064E ARABIC FATHA
U+064F ARABIC DAMMA
U+0650 ARABIC KASRA
U+0651 ARABIC SHADDA
U+0652 ARABIC SUKUN

2.1.2. Kasheeda or Tatweel (Horizontal Character Size Extension)

Kasheeda (U+0640 ARABIC TATWEEL) must not be used in Arabic domain names and should be disallowed for Arabic language domain names. The Kasheeda is not a letter and does not have an effect on pronunciation. It is used to extend the horizontal length or change the shape of the preceding letter for graphical representation purposes in Arabic writing. Accordingly, it has no value for the writing of domain names. The same applies to all languages using the Arabic script. The authors recommend that it should be disallowed at the protocol level.

2.1.3. Character Folding

Character folding is the process where multiple letters (that may have some similarity with respect to their shapes) are folded into one shape. Examples of such Arabic characters include:

- o Folding Teh Marbuta (U+0629) and Heh (U+0647) at the end of a word
- o Folding different forms of Hamzah (U+0622, U+0623, U+0625, U+0627)
- o Folding Alef Maksura (U+0649) and Yeh (U+064A) at the end of a word
- o Folding Waw with Hamzah Above (U+0624) and Waw (U+0648)

With respect to the Arabic language, character folding is not acceptable because it changes the meaning of words and is against the principle of spelling rules. Replacing a character valid for use in domain names with another character also valid for use in domain names, which may have a similar shape, will give a different meaning. This will lead to only one word representing several words consisting

of all the combinations of folded characters. Hence, the other words will be masked by a single word [10].

Mis-spelling or handwriting errors do occur, leading to mixing different characters despite the fact that this is not the case in published and printed materials. One of the motivations of this effort is to preserve the language, particularly with the spread of the globalization movement. Within this context, character folding is working against this motivation since it is going to have a negative effect on the principle and ethics of the language. Technology should work to preserve the language and not to destroy it. Thus, character folding should not be allowed. The case of digits is treated in a separate section below.

2.2. Supported Character Set

A domain name to be written in Arabic must be composed of a sequence of the following UNICODE characters and the FULL STOP (u+002E) to separate the labels. These are based on UNICODE version 5.0. The tables below are constructed using an inclusion-based approach. Thus, characters that are not part of these tables are prohibited.

| Unicode | Character Name |
|---------|-------------------------------------|
| 0621 | ARABIC LETTER HAMZA |
| 0622 | ARABIC LETTER ALEF WITH MADDA ABOVE |
| 0623 | ARABIC LETTER ALEF WITH HAMZA ABOVE |
| 0624 | ARABIC LETTER WAW WITH HAMZA ABOVE |
| 0625 | ARABIC LETTER ALEF WITH HAMZA BELOW |
| 0626 | ARABIC LETTER YEH WITH HAMZA ABOVE |
| 0627 | ARABIC LETTER ALEF |
| 0628 | ARABIC LETTER BEH |
| 0629 | ARABIC LETTER TEH MARBUTA |
| 062A | ARABIC LETTER TEH |
| 062B | ARABIC LETTER THEH |
| 062C | ARABIC LETTER JEEM |
| 062D | ARABIC LETTER HAH |
| 062E | ARABIC LETTER KHAH |
| 062F | ARABIC LETTER DAL |
| 0630 | ARABIC LETTER THAL |
| 0631 | ARABIC LETTER REH |
| 0632 | ARABIC LETTER ZAIN |
| 0633 | ARABIC LETTER SEEN |
| 0634 | ARABIC LETTER SHEEN |
| 0635 | ARABIC LETTER SAD |
| 0636 | ARABIC LETTER DAD |
| 0637 | ARABIC LETTER TAH |

| | |
|------|----------------------------|
| 0638 | ARABIC LETTER ZAH |
| 0639 | ARABIC LETTER AIN |
| 063A | ARABIC LETTER GHAIN |
| 0641 | ARABIC LETTER FEH |
| 0642 | ARABIC LETTER QAF |
| 0643 | ARABIC LETTER KAF |
| 0644 | ARABIC LETTER LAM |
| 0645 | ARABIC LETTER MEEM |
| 0646 | ARABIC LETTER NOON |
| 0647 | ARABIC LETTER HEH |
| 0648 | ARABIC LETTER WAW |
| 0649 | ARABIC LETTER ALEF MAKSURA |
| 064A | ARABIC LETTER YEH |
| 0660 | ARABIC-INDIC DIGIT ZERO |
| 0661 | ARABIC-INDIC DIGIT ONE |
| 0662 | ARABIC-INDIC DIGIT TWO |
| 0663 | ARABIC-INDIC DIGIT THREE |
| 0664 | ARABIC-INDIC DIGIT FOUR |
| 0665 | ARABIC-INDIC DIGIT FIVE |
| 0666 | ARABIC-INDIC DIGIT SIX |
| 0667 | ARABIC-INDIC DIGIT SEVEN |
| 0668 | ARABIC-INDIC DIGIT EIGHT |
| 0669 | ARABIC-INDIC DIGIT NINE |

Source: Supporting the Arabic Language in Domain Names [10]

Table 1: CHARACTERS FROM UNICODE ARABIC TABLE (0600-06FF)

| Unicode | Digit Name |
|---------|--------------|
| 0030 | DIGIT ZERO |
| 0031 | DIGIT ONE |
| 0032 | DIGIT TWO |
| 0033 | DIGIT THREE |
| 0034 | DIGIT FOUR |
| 0035 | DIGIT FIVE |
| 0036 | DIGIT SIX |
| 0037 | DIGIT SEVEN |
| 0038 | DIGIT EIGHT |
| 0039 | DIGIT NINE |
| 002D | HYPHEN-MINUS |

Source: Supporting the Arabic Language in Domain Names [10]

Table 2: CHARACTERS FROM UNICODE BASIC LATIN TABLE (0000-007F)

2.3. Arabic Linguistic Issues Affected by Technical Constraints

In this section, technical aspects of some linguistic issues are discussed.

2.3.1. Numerals

In the Arab countries, there are two sets of numerical digits used:

- o Set I: (0, 1, 2, 3, 4, 5, 6, 7, 8, 9) mostly used in the western part of the Arab world.
- o Set II: (u+0660, u+0661, u+0662, u+0663, u+0664, u+0665, u+0666, u+0667, u+0668, u+0669) mostly used in the eastern part of the Arab world.

Both sets may be supported in the user interface; however, the rule of numeral homogeneity must be observed. The rule specifies that digits from the Arabic-Indic set of numerals (u+0660 to u+0669) should not be allowed to mix with ASCII digits (u+0030 to u+0039) within the same Arabic domain name label. Thus, the appearance of a digit from one set prevents the use of any other digit from the other set.

2.3.2. The Space Character

The space character is strictly disallowed in domain names, as it is a control character. Instead, the hyphen (Al-sharta, i.e., u+02D) is proposed as a separator between Arabic words to avoid confusion that can take place if the words are typed without a separator.

It is acceptable to use the hyphen to separate between words within the same domain name label.

3. Summary and Conclusion

The proposed guidelines are in full accordance with the IETF IDN standards and take into account Arabic-language-specific issues within a compromise between grammatical rules of the Arabic language and ease of use of that language on the Internet.

In summary, the guidelines specify that, in Arabic domain names:

- o Accent marks (Tashkeel and Shadda) are not permitted.
- o Character folding is not permitted.

- o If a numeral from the Arabic-Indic or ASCII digit sets appears in a label, numeral homogeneity is required.
- o The hyphen must be used as a word separator instead of space.

4. Security Considerations

No particular security considerations could be identified regarding the use of Arabic characters in writing domain names. In particular, any potential visual confusion between different character strings is avoided using the guidelines proposed in this document.

5. Acknowledgments

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John Klensin and Harald Alvestrand reviewed the document and provided useful editorial and substantive support to enrich it.

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