Dynamic i18N/L10N Support in RSA® Authentication Manager 8.2 Service Pack 1

Version 2.8

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Dynamic i18n/L10n Support

1. Introduction

This document describes the current design and implementation of internationalization (i18n) and localization (L10n) support in the RSA® Authentication Manager 8.2 Service Pack 1 (SP1) release, and describes the procedure to extend language support for the Security Console, Operations Console, Self-Service Console, and the online help for these consoles.

1.1 Purpose

Explain the i18n/L10n design and implementation in the web-based consoles.

1.2 Scope

This document applies to RSA Authentication Manager 8.2 SP1.

1.3 Definitions, Acronyms, and Abbreviations

- **i18n** – Internationalization
- **L10n-** Localization
- **JAR file –** Java archive file used for combining many files into one.

2. I18n/L10n Support

In RSA Authentication Manager 8.2 SP1, the web-based consoles and the online help for these consoles support i18n. The current design and implementation allow the consoles to support all 145 languages and countries supported by the Java language.

2.1 Language Selection

The online Help, Operations Console, and Self-Service Console detect the default language to display based on the individual user's browser settings. If the product does not have translated files that match the default language specified in the user's browser settings, the default language displayed is English. For example, if the browser settings specify Spanish as the default language, but the product has not been localized for Spanish, the Operations Console, Self-Service Console, and online help will be displayed in English.

The logon page of the Security Console also detects the default language from the individual user's browser settings, but the internal Security Console pages do not use the browser settings for the default language.

The Security Console is the only console that allows the manual selection of a preferred language. In the Security Console, an administrator can specify a default language for all users of the Security Console. Administrators can also specify an individual preferred language for themselves, which overrides the default language that another administrator selected for all users. These manually selected languages do not apply to the Security Console logon page. The internal Security Console pages do not detect users' language preferences from their browser settings. Unless an administrator has set a global default language or manually selected an individual language preference, the Security Console defaults to English. For instructions on manually selecting a global or individual language preference for the Security Console, see "Configure the Language Preference for the Security Console" on page 8.

For all consoles and the online help, the displayed language is based on the provided resource bundle files in the Java class path. If no resource bundle exists for a specific language, the consoles cannot be displayed in that language, even if the specific language is selected as the default language. Instead, English will be displayed as the default language.

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2.2 Description of Resource Bundle Files

All strings displayed in the consoles have been extracted into property files, or resource bundle files. These files contain key-value pairs in the following format:

```
Key=Display string
```

The key remains the same across every translation of the bundle files. You replace the display string for each key with the translated text for the specified language.

NOTE: Certain display strings contain special characters such as single quotes ('). Reserve the special characters. Do not translate them into another language.

2.3 JAR Files with Property Files

The JAR file **am-i18n-resources-<ver>-full.jar** contains the complete set of resource bundle files. This file is located in **<install-dir>/utils/resources**.

The default location for **<install-dir>** is **/opt/rsa/am**.

A complete set of translated resource bundle files must exist for each supported language.

3. Adding a New Language to the Consoles

To add new language support into the product, you must complete the following tasks:

1. Prepare the Translated Resource Bundle Files
2. (Optional) Convert Localized Property Files into Escaped Unicode
3. Package New Resource Bundle Files into a JAR file
4. Deploy the Localized JAR into RSA Authentication Manager
5. Restart RSA Authentication Manager
6. Configure the Language Preference for the Security Console
7. Localize the Consoles on the Replica Instances and Web Tier (if needed)

3.1 Prepare the Translated Resource Bundle Files

Prepare the new resource bundle files as follows:

1. Extract the Files

Extract all files from **am-i18n-resources-<ver>-full.jar**.

RSA recommends extracting these files on the machine on which you plan to localize the properties file.

Retain the full directory structure in a temporary directory, such as <extracted-dir>.

For example, if you create <extracted-dir> as bundleDir under **/home/rsaadmin**, you would do the following:

a. Copy the jar am-i18n-resources-<ver>-full.jar to the <extracted-dir>, bundleDir.
b. Change directory to bundleDir and run the following command:
   `/<jdk location>/bin/jar xvf am-i18n-resources-<ver>-full.jar`

2. Localize Each File

Translate all property files in **am-i18n-resource-<ver>-full.jar**, except for the following:

- **ConsoleIMSHtmlString.properties**
- **rebel.xml**
- **rsa-console.config.properties**
- **rsaconsole-stubcmd.properties**
- **All property files whose name contains _en or _en_US (Those files are languages packs for English or US English.)**

Edit each file by translating only the display string, which is the value part of the key-value pair. The key is the literal key that is coded in the JSP files and cannot be changed. Include and translate all strings in the resource bundle file. If a string is missing, the text will be displayed in English.

Example:
When translating a properties file for the key-value pair: `FIRST_NAME=First Name`

The key, `FIRST_NAME`, must always remain the same. The display string, `First Name`, is translated into the appropriate language, such as `Vornamen` for the German language.

3. Handle Special Characters

In order to display special characters used inside properties files, the appropriate handling is required:

- **Single Quotes:** Any use of single quotes (') must be preceeded by two backslashes (\\). If you need to use a single quote, make sure you use the format (\\').

  Incorrect format:
  MC.AddUserGroup.SelectOptions.hinttext.IdentityS=Le r\u00e9f\u00e9rentiel d'identit\u00e9 est le datastore dans lequel ce groupe d'utilisateurs est enregistr\u00e9.

  Correct format:
  MC.AddUserGroup.SelectOptions.hinttext.IdentityS=Le r\u00e9f\u00e9rentiel d\\'identit\u00e9 est le datastore dans lequel ce groupe d\\'utilisateurs est enregistr\u00e9.

- **Double Quotes:** Do not directly use double quotes (") inside a properties file. Instead, use the HTML code for the double quote entity: **"**

  Incorrect format:
  AM.AddTokenPolicy.hinttext.Theminimu.22=\u5728 SecurID PIN \u66f4\u6539\u4e4b\u95f4\u5141\u8bb8\u7684\u6700\u5c0f\u65f6\u95f4\u91cf\u3002\u9632\u6b62\u7528\u6237\u591a\u6b21\u66f4\u6539 SecurID PIN \u4ee5\u7ed5\u8fc7"\u9650\u5236\u91cd\u590d\u4f7f\u7528"\u8bbe\u7f6e\u3002

  Correct format:
  AM.AddTokenPolicy.hinttext.Theminimu.22=\u5728 SecurID PIN \u66f4\u6539\u4e4b\u95f4\u5141\u8bb8\u7684\u6700\u5c0f\u65f6\u95f4\u91cf\u3002\u9632\u6b62\u7528\u6237\u591a\u6b21\u66f4\u6539 SecurID PIN \u4ee5\u7ed5\u8fc7**"** \u9650\u5236\u91cd\u590d\u4f7f\u7528**"** \u8bbe\u7f6e\u3002

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4. Rename the Files

After you localize the property files, you must rename each file based on the language or language and country code.

> **Important:** Every supported language must have a default properties file with a filename based on the language code only.

- The <**language_code**> must be a valid ISO Language Code. These codes are the lowercase, two-letter codes defined by ISO-639. See "Appendix A: List of Java Supported Locales" for the language codes supported by the Java language.

- The <**country_code**> must be a valid ISO Country Code. These codes are the uppercase, two-letter codes defined by ISO-3166. See "Appendix A: List of Java Supported Locales" for the country codes supported by the Java language.

To differentiate between different versions of the same language spoken in different countries, in addition to the default language properties files, you must also add the properties files with both the language code and country code.

Example:
For example, when adding support for the French language to Authentication Manager, the property files must have the format of **<filename>_fr.properties** for default French language support.

Filenames for the French language would include:

ConsoleCommon_fr.properties
ManagementConsole_fr.properties
tagi18n_fr.properties
…
AM_ADMLOG_RESOURCE_BUNDLE_fr.properties
AM_SYSTEMLOG_RESOURCE_BUNDLE_fr.properties
…

To differentiate between versions of French spoken in different countries, the property files must have the format **<filename>_fr_COUNTRYCODE** for each country-specific version of French, such as **<filename>_fr_CA** for Canada and **<filename>_fr_FR** for France.

The corresponding filenames for the French language in Canada would be:

ConsoleCommon_fr_CA.properties
ManagementConsole_ fr_CA.properties
tagi18n_fr_CA.properties
…
AM_ADMLOG_RESOURCE_BUNDLE_fr_CA.properties
AM_SYSTEMLOG_RESOURCE_BUNDLE_fr_CA.properties
…

3.2 (Optional) Convert Localized Property Files into Escaped Unicode

This step is only required if you plan to localize for native encoding.

If the localized resource bundles use native-encoded characters, you must process them using the Java Escaped Unicode standard. Oracle provides a tool with the JDK called **native2ascii** that converts text from its native encoding into escaped Unicode.

To convert the localized property files:

1. Save the new property files using a known encoding (RSA recommends UTF-8).
2. Use **native2ascii** to convert the resource bundle files, making sure to specify its original encoding. For example, if the original encoding is UTF-8, you would use the following command:

```
native2ascii -encoding UTF8 <inputfile> <outputfile>
```

You must specify different filenames for `<inputfile>` and `<outputfile>`. **native2ascii** will not overwrite the input file.

Example:
In the following conversion:

```
native2ascii –encoding UTF8 ManagementConsole_zh.properties
ManagementConsole_zh.properties_new
```

native2ascii converts the Chinese native language property files into ASCII format. You must rename the generated output file **ManagementConsole_zh.properties_new** back to **ManagementConsole _zh.properties** in accordance with the naming standard.

3.3 Package New Resource Bundle Files into a JAR file

After you localize and process the bundle files, you must package the new resource bundle files into a separate JAR file. You must preserve the directory structure from the original resource JAR file.

To generate a JAR library on Windows containing a specific language resource bundle, do the following:

1. Remove the original JAR file from <**extracted-dir**> and create one large JAR file containing all the resource bundles.
2. Open a command prompt, and change the directory to <**extracted-dir**>.
3. Run the following command:

```
<jdk location>/bin/jar cvf am-i18n-resources-<ver>-
full_<language_code>_<country_code>.jar .
```

or without country code

```
<jdk location>/bin/jar cvf am-i18n-resources-<ver>-
         full_<language_code>.jar .
```

Example:

```
<jdk location>/bin/jar cvf am-i18n-resources-8.2.0.0.0-full_fr_CA.jar .
```

Note:

- You must have the JDK installed in order to execute this command on any machine other than the appliance. No additional JDK is required when executing this command on the appliance.
- The new JAR filename can have any name as long as it does not conflict with the existing AM JAR libraries.

3.4 Deploy the Localized JAR into RSA Authentication Manager

In order for the consoles to use these new properties files, you must place them into a specific location on the Authentication Manager. Place the new JAR file in the following location:

<AM_INSTALL_DIR>/appserver/jdk/jre/lib/ext

3.5 Restart RSA Authentication Manager

After the new Language Packs (in JAR) are deployed and installed on RSA Authentication Manager, you must restart the server. Restarting allows the server to recognize the new languages that were just installed. For instructions on how to restart the server, see the RSA Authentication Manager 8.2 Service Pack 1 Help on RSA Link: https://community.rsa.com/community/products/securid.

3.6 Configure the Language Preference for the Security Console

After the Security Console has been localized, administrators can select a default language either for themselves or for all users of the Security Console. Different administrators in the same deployment can display different languages in the Security Console if the resource bundle files exist for each language.

NOTE: These settings do not affect the Operations Console, the Self-Service Console, or logon screens. These consoles and logon screens detect and display the preferred language configured in the user's browser settings.

To select a preferred language for the Security Console for yourself, do the following:

1. Log on to the Security Console.
2. From the top right corner of the screen, select **My Preferences**.
3. From the **Language** drop-down menu, select the new language.
4. Click **Save**.
5. Log off the console, and log back on.
   When you log back on, the Security Console is displayed in the selected language.

To select a default language for the Security Console for all administrators, do the following:

1. Log on to the Security Console.
2. Go to **Setup > System Settings**.
3. Under **Console & Session Settings**, select **Security Console Display Options**.
4. From the **Language** drop-down menu, select the default language for the Security Console.
5. Click **Save**.
6. Instruct administrators logged into the Security Console to log off and log back on for the default language to display.

If an administrator selects a language from **My Preferences**, this language will be displayed instead of the default language selected from the **Security Console Display Options**.

3.7 Localize the Consoles on the Replica Instances and Web Tier (if needed)

To localize the consoles and their logon pages on the replica instances and web tier instances in the deployment, do the following:

1. On each replica instance and web tier, place the localized JAR file created in Section 3.3 "Package New Resource Bundle Files into a JAR file" in the location specified in Section 3.4 "Deploy the Localized JAR into RSA Authentication Manager":
   <AM_INSTALL_DIR>/appserver/jdk/jre/lib/ext
2. Restart Authentication Manager, as described in Section 3.5, "Restart RSA Authentication Manager."

4. Localize the Online Help

The online help files contain images, icons, and HTML files. To localize these files, you must translate the displayed text for each file and place the localized files in the correct directories for the various languages.

4.1 Localize the Help Files

Locate the Help files. The default Help file locations in an installed RSA Authentication Manager 8.2 SP1 environment, whch has not been localized, are as follows:

- The combined Security Console and Operations Console Help files:

  <install-dir>/server/apps/rsa-help/security-operations-console-online-help/en_US

- The Self-Service Console Help files:

  <install-dir>/server/apps/rsa-help/selfservice-console-online-help/en_US

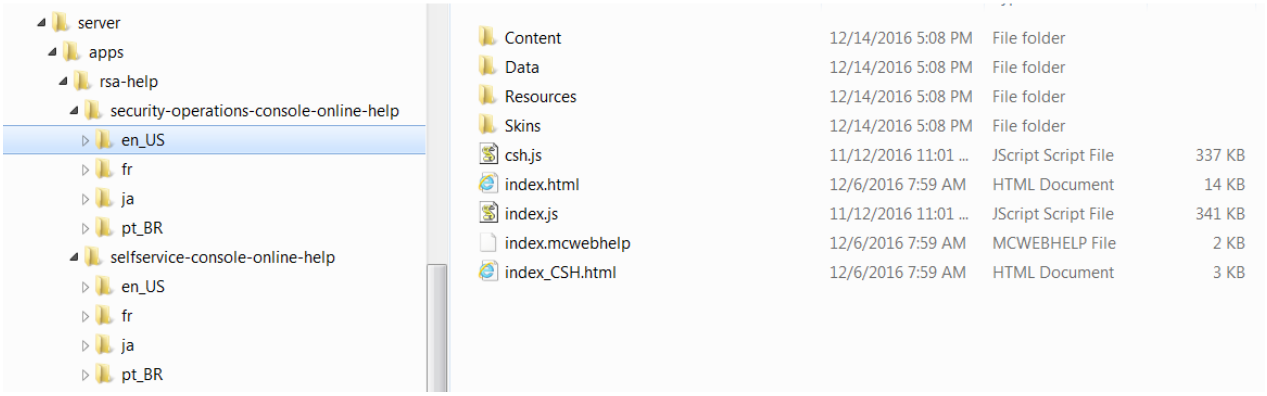
You must translate all existing HTML help files (all ***.htm**), and copy them to the appropriate folder. Do not change any filenames. Save the HTML files in UTF8 format.

Update the directory structure as follows:

```
security-operations-console-online-help/langCode_countryCode/
selfservice-console-online-help/langCode_countryCode/
```

For the Spanish language, use the language code (es) without the country code. For other supported languages, use the language code and the country code. For example, use pt/BR for Portuguese (Brazil).

The following illustration shows the English (United States), French, Japanese, and Portuguese (Brazil) folder structure.



4.2 Localize the Help Files on a Replica Instance or Web Tier (if needed)

After you complete the process described in Section 4.1, you must copy the localized help files into the appropriate directory structure on each replica instance and web-tier server.

4.3 Restart RSA Authentication Manager

Restart RSA Authentication Manager on every instance or web tier where the Language Pack files were deployed. For instructions on how to restart the server, see the RSA Authentication Manager 8.2 Service Pack 1 Help on RSA Link: https://community.rsa.com/community/products/securid.

Appendix A: List of Java Supported Locales

The table below lists all 145 Java supported locales with language code, country code, and display name. Language and country codes are case-sensitive. For the Spanish language, the RSA Authentication Manager 8.2 Language Pack files use the language code (es) without the country code. For other supported languages, use the language code and the country code. For example, use pt/BR for Portuguese (Brazil).

Language Code	Country Code	Display Name
en		English
en	US	English (United States)
ar		Arabic
ar	AE	Arabic (United Arab Emirates)
ar	BH	Arabic (Bahrain)
ar	DZ	Arabic (Algeria)
ar	EG	Arabic (Egypt)
ar	IQ	Arabic (Iraq)
ar	JO	Arabic (Jordan)
ar	KW	Arabic (Kuwait)
ar	LB	Arabic (Lebanon)
ar	LY	Arabic (Libya)
ar	MA	Arabic (Morocco)
ar	OM	Arabic (Oman)
ar	QA	Arabic (Qatar)
ar	SA	Arabic (Saudi Arabia)
ar	SD	Arabic (Sudan)
ar	SY	Arabic (Syria)
ar	TN	Arabic (Tunisia)
ar	YE	Arabic (Yemen)
be		Byelorussian
be	BY	Byelorussian (Belarus)
bg		Bulgarian
bg	BG	Bulgarian (Bulgaria)
ca		Catalan
ca	ES	Catalan (Spain)
ca	ES	Catalan (Spain,Euro)
cs		Czech
cs	CZ	Czech (Czech Republic)
da		Danish
da	DK	Danish (Denmark)
de		German
de	AT	German (Austria)
de	AT	German (Austria,Euro)
de	CH	German (Switzerland)
de	DE	German (Germany)
de	DE	German (Germany,Euro)
de	LU	German (Luxembourg)
de	LU	German (Luxembourg,Euro)
el		Greek
el	GR	Greek (Greece)
en	AU	English (Australia)
en	CA	English (Canada)
en	GB	English (United Kingdom)

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en	IE	English (Ireland)
en	IE	English (Ireland,Euro)
en	NZ	English (New Zealand)
en	ZA	English (South Africa)
es		Spanish
es	AR	Spanish (Argentina)
es	BO	Spanish (Bolivia)
es	CL	Spanish (Chile)
es	CO	Spanish (Colombia)
es	CR	Spanish (Costa Rica)
es	DO	Spanish (Dominican Republic)
es	EC	Spanish (Ecuador)
es	ES	Spanish (Spain)
es	ES	Spanish (Spain,Euro)
es	GT	Spanish (Guatemala)
es	HN	Spanish (Honduras)
es	MX	Spanish (Mexico)
es	NI	Spanish (Nicaragua)
es	PA	Spanish (Panama)
es	PE	Spanish (Peru)
es	PR	Spanish (Puerto Rico)
es	PY	Spanish (Paraguay)
es	SV	Spanish (El Salvador)
es	UY	Spanish (Uruguay)
es	VE	Spanish (Venezuela)
et		Estonian
et	EE	Estonian (Estonia)
fi		Finnish
fi	FI	Finnish (Finland)
fi	FI	Finnish (Finland,Euro)
fr		French
fr	BE	French (Belgium)
fr	BE	French (Belgium,Euro)
fr	CA	French (Canada)
fr	CH	French (Switzerland)
fr	FR	French (France)
fr	FR	French (France,Euro)
fr	LU	French (Luxembourg)
fr	LU	French (Luxembourg,Euro)
hr		Croatian
hr	HR	Croatian (Croatia)
hu		Hungarian
hu	HU	Hungarian (Hungary)
is		Icelandic
is	IS	Icelandic (Iceland)
it		Italian
it	CH	Italian (Switzerland)
it	IT	Italian (Italy)
it	IT	Italian (Italy,Euro)
iw		Hebrew
iw	IL	Hebrew (Israel)
ja		Japanese
ja	JP	Japanese (Japan)

ko		Korean
ko	KR	Korean (South Korea)
lt		Lithuanian
lt	LT	Lithuanian (Lithuania)
lv		Latvian (Lettish)
lv	LV	Latvian (Lettish) (Latvia)
mk		Macedonian
mk	MK	Macedonian (Macedonia)
nl		Dutch
nl	BE	Dutch (Belgium)
nl	BE	Dutch (Belgium,Euro)
nl	NL	Dutch (Netherlands)
nl	NL	Dutch (Netherlands,Euro)
no		Norwegian
no	NO	Norwegian (Norway)
no	NO	Norwegian (Norway,Nynorsk)
pl		Polish
pl	PL	Polish (Poland)
pt		Portuguese
pt	BR	Portuguese (Brazil)
pt	PT	Portuguese (Portugal)
pt	PT	Portuguese (Portugal,Euro)
ro		Romanian
ro	RO	Romanian (Romania)
ru		Russian
ru	RU	Russian (Russia)
sh		Serbo-Croatian
sh	YU	Serbo-Croatian (Yugoslavia)
sk		Slovak
sk	SK	Slovak (Slovakia)
sl		Slovenian
sl	SI	Slovenian (Slovenia)
sq		Albanian
sq	AL	Albanian (Albania)
sr		Serbian
sr	YU	Serbian (Yugoslavia)
sv		Swedish
sv	SE	Swedish (Sweden)
th		Thai
th	TH	Thai (Thailand)
tr		Turkish
tr	TR	Turkish (Turkey)
uk		Ukrainian
uk	UA	Ukrainian (Ukraine)
zh		Chinese
zh	CN	Chinese (China)
zh	HK	Chinese (Hong Kong)
zh	TW	Chinese (Taiwan)

Appendix B: List of Common HTML Entities

Entity Name	ISO Code	Code Result	HTML Entity Code	Code Result	Entity Name	ISO Code	Code Result	HTML Entity Code	Code Result
space			(n/a)	(n/a)	**Capital A acute**	Á	Á	Á	Á
double quotes	"	"	"	"	**Capital A circumflex**	Â	Â	Â	Â
ampersand	&	&	&	&	**Capital A tilde**	Ã	Ã	Ã	Ã
less-than	<	<	<	<	**Capital A umlaut**	Ä	Ä	Ä	Ä
greater-than	>	>	>	>	**Capital A ring**	Å	Å	Å	Å
vertical bar			|	(n/a)	(n/a)	**Capital A-E ligature**	Æ	Æ	Æ	Æ
function	ƒ	*ƒ*	(n/a)	(n/a)	**Capital C cedilla**	Ç	Ç	Ç	Ç
double comma	„	„	(n/a)	(n/a)	**Capital E grave**	È	È	È	È
elipses	…	…	(n/a)	(n/a)	**Capital E acute**	É	É	É	É
dagger	†	†	(n/a)	(n/a)	**Capital E circumflex**	Ê	Ê	Ê	Ê
double dagger	‡	‡	(n/a)	(n/a)	**Capital E umlaut**	Ë	Ë	Ë	Ë
circumflex	ˆ	ˆ	(n/a)	(n/a)	**Capital I grave**	Ì	Ì	Ì	Ì
percentage	‰	‰	(n/a)	(n/a)	**Capital I acute**	Í	Í	Í	Í
Capital S hot check	Š	Š	(n/a)	(n/a)	**Capital I circumflex**	Î	Î	Î	Î
opening quimet	‹	‹	(n/a)	(n/a)	**Capital I umlaut**	Ï	Ï	Ï	Ï
Capital O-E ligature	Œ	Œ	Œ	Œ	**Capital ETH *Icelandic***	Ð	Ð	Ð	Ð
(n/a)		•	(n/a)	(n/a)	**Capital N tilde**	Ñ	Ñ	Ñ	Ñ
open single quote	‘	‘	(n/a)	(n/a)	**Upercase O grave**	Ò	Ò	Ò	Ò
close single quote	’	’	(n/a)	(n/a)	**Capital O acute**	Ó	Ó	Ó	Ó

open double quotes	“	“	(n/a)	(n/a)
close double quotes	”	”	(n/a)	(n/a)
bullet	•	•	•	•
en dash	–	–	(n/a)	(n/a)
em dash	—	—	(n/a)	(n/a)
tilde	˜	˜	˜	˜
trade mark	™	™	™	™
small s hot check	š	š	(n/a)	(n/a)
closing quimet	›	›	(n/a)	(n/a)
small o-e ligature	œ	œ	œ	œ
Capital Y umlat	Ÿ	Ÿ	Ÿ	Ÿ
non-breaking space				
inverted exclamation	¡	¡	¡	¡
cent	¢	¢	¢	¢
pound sterling	£	£	£	£
currency	¤	¤	¤	¤
yen	¥	¥	¥	¥
broken bar	¦	¦	&brkbar;	&brkbar;
section	§	§	§	§
umlaut (diaeresis)	¨	¨	¨	¨
copyright	©	©	©	©
feminine ordinal	ª	ª	ª	ª
left angle quote (guillemotleft)	«	«	«	«

Capital O circumflex	Ô	Ô	Û	Û
Capital O tilde	Õ	Õ	Õ	Õ
Capital O umlaut	Ö	Ö	Ö	Ö
multiplication	×	×	×	×
Capital O slash	Ø	Ø	Ø	Ø
Capital U grave	Ù	Ù	Ù	Ù
Capital U acute	Ú	Ú	Ã	Ã
Capital U circumflex	Û	Û	Ã	Ã
Capital U umlaut	Ü	Ü	Ü	Ü
Capital Y acute	Ý	Ý	Ý	Ý
Capital Thorn *Icelandic*	Þ	Þ	Þ	Þ
small sharp s *German*	ß	ß	ß	ß
small a grave	à	à	à	à
small a acute	á	á	á	á
small a circumflex	â	â	â	â
small a tilde	ã	ã	ã	ã
small a umlaut	ä	ä	ä	ä
small a ring	å	å	å	å
small a-e ligature	æ	æ	æ	æ
small c cedilla	ç	ç	ç	ç
small e grave	è	è	è	è
small e acute	é	é	é	é
small e circumflex	ê	ê	ê	ê

not sign	¬	¬	¬	¬	**small e umlaut**	ë	ë	ë	ë
soft hyphen					**small i grave**	ì	ì	ì	ì
registered	®	®	®	®	**small i acute**	í	í	í	í
macron	¯	¯	&hibar;	&hibar;	**small i circumflex**	î	î	î	î
degree	°	°	°	°	**small i umlaut**	ï	ï	ï	ï
plus-minus	±	±	±	±	**small eth *Icelandic***	ð	ð	ð	ð
superscript 2	²	²	²	²	**small n tilde**	ñ	ñ	ñ	ñ
superscript 3	³	³	³	³	**small o grave**	ò	ò	ò	ò
acute accent	´	´	´	´	**small o acute**	ó	ó	ó	ó
micro	µ	µ	µ	µ	**small o circumflex**	ô	ô	ô	ô
pilcrow	¶	¶	¶	¶	**small o tilde**	õ	õ	õ	õ
middle dot	·	·	·	·	**small o umlaut**	ö	ö	ö	ö
cedilla	¸	¸	¸	¸	**division**	÷	÷	÷	÷
superscript 1	¹	¹	¹	¹	**small o slash**	ø	ø	ø	ø
masculine ordinal	º	º	º	º	**small u grave**	ù	ù	ù	ù
right angle quote (guillemotright)	»	»	»	»	**small u acute**	ú	ú	ú	ú
one quarter	¼	¼	¼	¼	**small u circumflex**	û	û	û	û
one half	½	½	½	½	**small u umlaut**	ü	ü	ü	ü
three quarters	¾	¾	¾	¾	**small y acute**	ý	ý	ý	ý
inverted question mark	¿	¿	¿	¿	**small thorn *Icelandic***	þ	þ	þ	þ
Capital A grave	À	À	À	À	**small y umlaut**	ÿ	ÿ	ÿ	ÿ