Implementing Vietnamese Language Localization Using i18n GRASS GIS

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1 Introduction

At present, there are many GIS available, but most of them provide extensive support for English language users. This situation binds the users to use GIS in English and severely restricts development and use of GIS in other native languages. On the other hand, internationalization (i18n) is one of the methods to make the software created in a certain language adapted to support many languages. Generally, the number of software users will increase if appropriate multi-lingual support and services are provided, and this is not exception about GIS. Thus, i18n may be one of the most effective methods to popularize GIS to the non-English language users.

In recent years, i18n of GRASS GIS has been advancing. It enables to use GRASS GIS in not only English but also the other languages and to display various character strings on the graphical user interface (GUI) depending on a locale setting of user's computer, by using message files that have both original character strings written in English and character strings translated into the other language. The i18n version of GRASS can now be downloaded from the Web site [1]. In order to use it in the other languages, however, it is more necessary to apply i18n version to target language because internationalized software becomes useful only after localizing to the other languages. Localization of i18n version has also started, at present, Japanese version has been developed [2][3].

In this study, we localized i18n version of GRASS GIS to Vietnamese by creating message files that have the character strings translated into Vietnamese and by modifying contents of several related files. In this paper, the development of Vietnamese version is described. Thereby, the users can use Vietnamese version only by following a procedure shown here. At the same time, the users wishing to localize to the other languages can refer to methods described here.

2 Development Processes

Development process is roughly divided into following three steps.

(1) Setting up the computer environment.
(2) Create message files written in user's language.
(3) Set up fonts to be used in GRASS GIS.

All techniques in each step are very simple, and the details are as follows.

2.1 Set up computer environment

To develop Vietnamese version, it is necessary to prepare the computer which can use and display Vietnamese. Mandrake Linux 9.2 was selected as operating system for this work because it can specify Vietnamese as the default language of computer at the time of installation and it is comparatively easy to add or remove rpm libraries after installation. Furthermore, the version of tcl/tk included is 8.4, which is required to implement i18n compliant GUI tools.
Among the libraries required for i18n version, some libraries are not installed automatically. In the case of Mandrake9.2 distribution, *xterm* and fonts libraries were added. *Xterm* is required to operate GRASS graphic monitor, to run some GRASS commands from tcltkgrass that is one of the GUI tools of GRASS GIS and to display online helps of GRASS command. In original setting of i18n version, *mlterm* is used. However, since *mlterm* cannot display Vietnamese correctly, the i18n version has been appropriately modified to use *xterm* by default. At the same time, fonts library were added to display Vietnamese character strings on GUI and GRASS graphic monitor. Table 1 is the detail about added libraries.
It is also necessary for localization to set up the locale and character encoding by modifying contents of i18n file, which exists in a system configuration directory and specifies the language environment. The locale of Vietnam is only vi_VN. On the other hand, in Mandrake Linux 9.2, there are four available Vietnamese encodes: TCVN, TCVN-5712, UTF-8 and VISCII. In this case, UTF-8 was selected for character encoding. The example of comparison of i18n file is shown in Fig. 1.

2.2 Create message files

The i18n version uses message files for selected languages. Message files that were created in this study include the pair of character strings written in both English and Vietnamese. English parts are the same as original character strings displayed on GUI and Vietnamese parts are translations. This version displays Vietnamese character strings on GUI by converting English into Vietnamese through these files.

Table 1: Added libraries after installation

Library name	Explanation
unicode-ttfonts-1.0-1.noarch.rpm	True Type fonts correspond to Vietnamese
xterm-179-1mdk.i586.rpm	Terminal used for GRASS graphic monitor etc.

```
LANGUAGE=en_US:en
LC_ADDRESS=en_US
LC_COLLATE=en_US
LC_NAME=en_US
LC_NUMERIC=en_US
LC_MEASUREMENT=en_US
LC_TIME=en_US
LANG=en_US
LC_IDENTIFICATION=en_US
LC_MESSAGES=en_US
LC_CTYPE=en_US
LC_TELEPHONE=en_US
LC_MONETARY=en_US
LC_PAPER=en_US
SYSFONT=lat0-16
```

```
LANGUAGE=vi_VN.UTF-8:vi
LC_ADDRESS=vi_VN.UTF-8
LC_COLLATE=vi_VN.UTF-8
LC_NAME=vi_VN.UTF-8
LC_NUMERIC=vi_VN.UTF-8
LC_MEASUREMENT=vi_VN.UTF-8
LC_TIME=vi_VN.UTF-8
LANG=vi_VN.UTF-8
LC_IDENTIFICATION=vi_VN.UTF-8
LC_MESSAGES=vi_VN.UTF-8
LC_CTYPE=vi_VN.UTF-8
LC_TELEPHONE=vi_VN.UTF-8
LC_MONETARY=vi_VN.UTF-8
LC_PAPER=vi_VN.UTF-8
SYSFONT=tcvn8x16
```

Figure 1: Comparison of i18n file (left; English Setting, right; Vietnamese Setting)

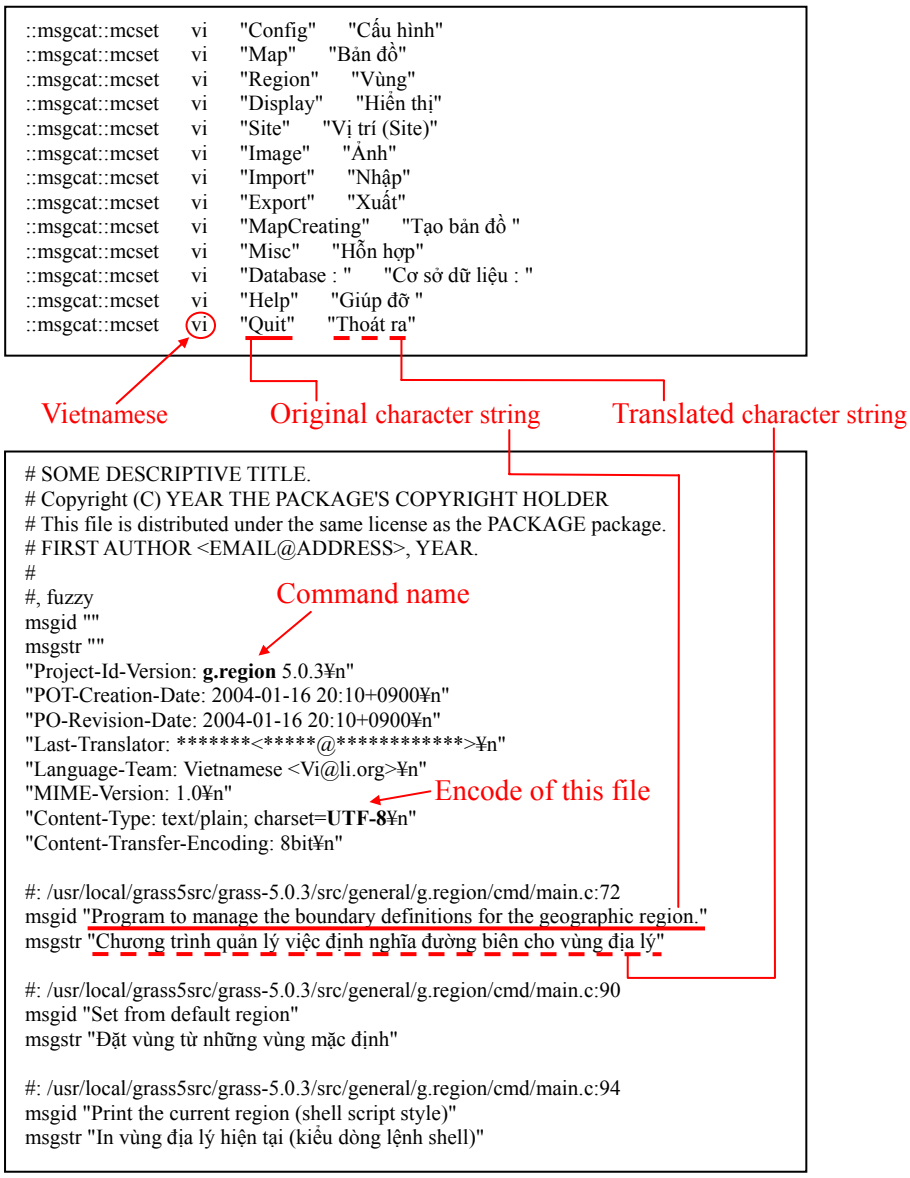

Figure 2: Message files (upper; vi.msg for tcltkgrass, lower; g.region.po)

All message files were written in UTF-8 and they are mainly divided into two kinds by their name. The detail about each message file is explained below, and the example of message files is shown in Fig. 2.

First one is vi.msg file. This file is used for tcltkgrass and two other functions, d.dm (display manager) command and visualization tool Nviz that are operated from tcltkgrass or command line. Each vi.msg file is created by translating en.msg file and saving it into the same directory. Another message file is po file which has the name “command name + .po” (e.g. d.text.po). There are about two hundred po files in current version and they are used for online helps of GRASS command. All of them are created from templates, pot file. These templates have English character strings only and they are in source package of i18n version. To enable online helps, following works are needed.

(1) Copy template (pot file) from source package as po file.
(2) Translate po file.
(3) Compile translated file and add it to a locale directory of binary package as mo file, whish has the name “command name + .mo” (e.g. d.text.mo).

List of created message files and their existing directory is shown in Table 2.

2.3 Set up of fonts

Default font used in i18n version is *Helvetica* but Vietnamese is not correctly displayed on GUI. For this reason, it was necessary to modify the file related to each GUI. There are five such files in Vietnamese version. Some of them originally have the lines that specify the default font for GUI, but some do not. Therefore, the former are modified to specify new default font and, in the later, two lines are added to specify the default font (Fig. 3). In this case, *Tahoma* font was selected as default among the fonts installed. The detail about changed files for localization is shown in Table 3. Furthermore, The flow chart of localization from binary package is shown in Fig. 4.

Table 2: List of message files

File name	Directory (/=grass5/)	Functions related to message file
command name + .po (mo)	/locale/vi/LC_MESSAGES	Online help of grass commands
vi.msg	/etc/nviz2.2-i18n/scripts /scripts /tcltkgrass-i18n/main	Nviz d.dm (Display Manager) tcltkgrass-i18n

```
option add *font -microsoft-tahoma-bold-r-normal-*-12-*-iso8859-1 widgetDefault
option add *Label*font -microsoft-tahoma-bold-r-normal-*-12-*-iso8859-1 widgetDefault
```

Figure 3: Added lines to specify the default font (in the case of d.dm-i18n file)

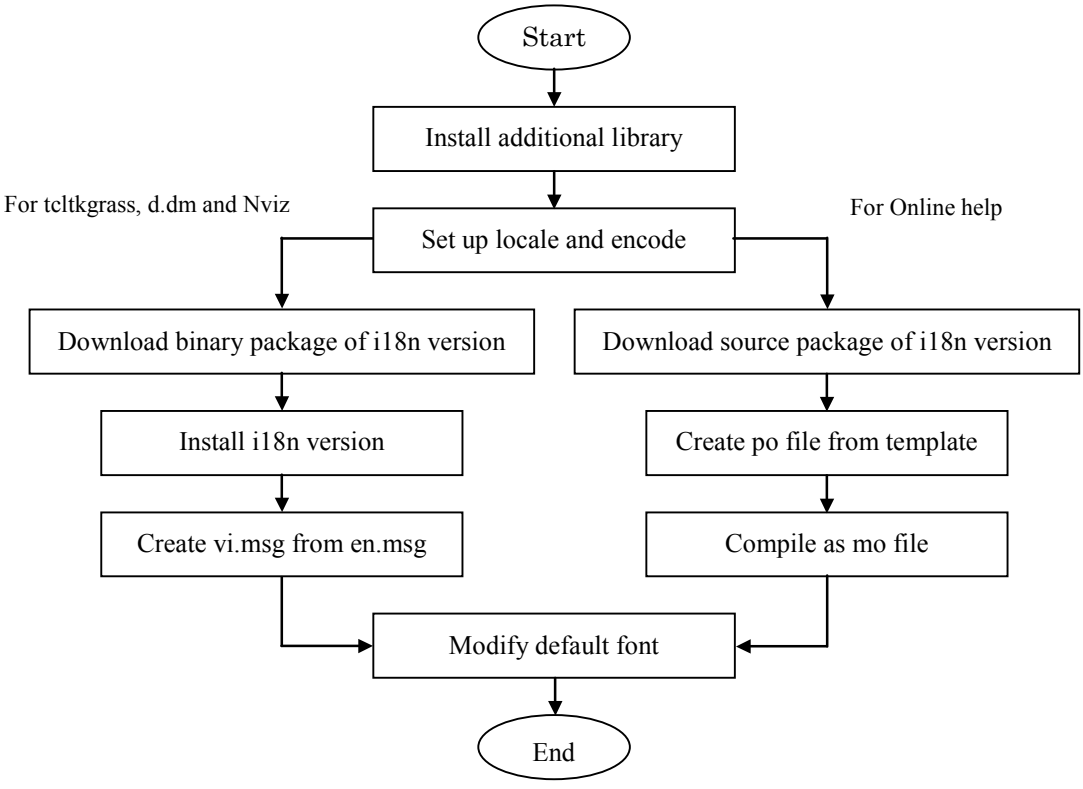

Figure 4: Flow chart of localization

Table 3: Changed files for localization

File name	Directory (/=grass5/)	Explanation
config.tcl	/etc/nviz2.2-i18n/scripts	Modify default font from *Helvetica* to *Tahoma*
d.dm-i18n	/scripts	Add two lines to specify default font
gis_set.tcl	/tcltkgrass-i18n/scripts	Add two lines to specify default font
gui.tcl	/tcltkgrass-i18n/main	Modify terminal setup from *mlterm* to *xterm* Add two lines to specify default font
tksys.tcl	/tcltkgrass-i18n/main	Modify default font from *Helvetica* to *Tahoma*

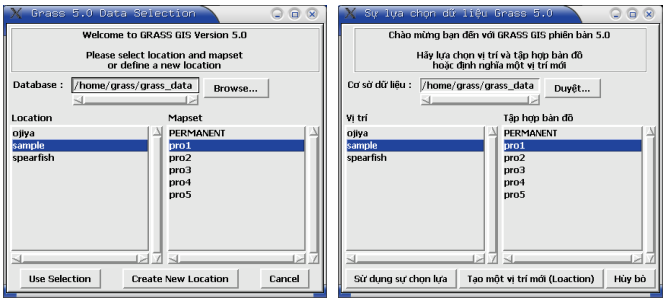

Figure 5: Set up screen of database

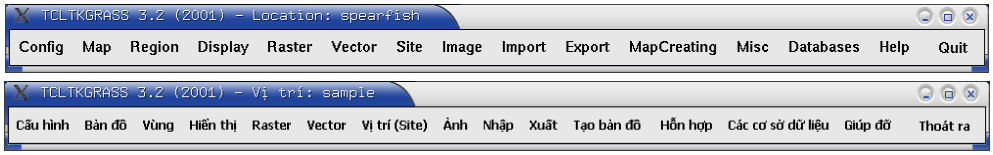

Figure 6: Menu bar of tcltkgrass

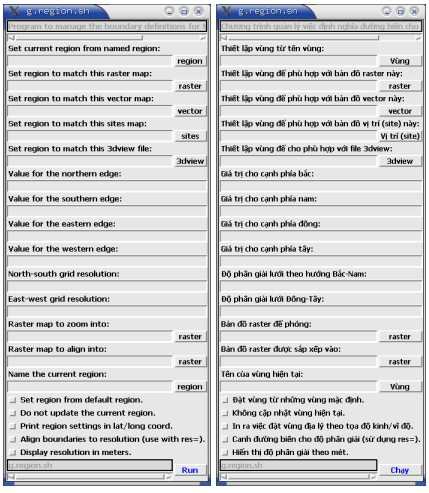

Figure 7: Command dialog

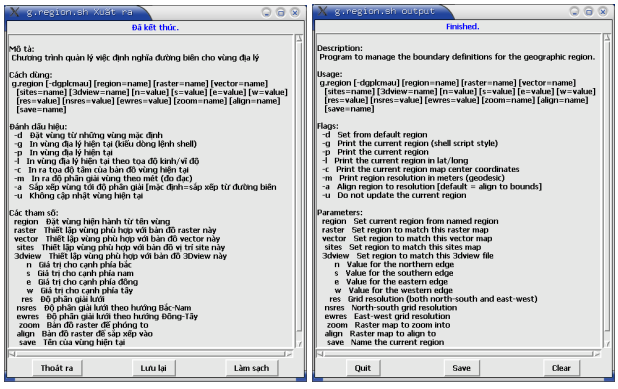

Figure 8: Online help dialog

3 Vietnamese Version of GRASS GIS

According to the development process, the Vietnamese version of GRASS has been implemented. The comparison of English and Vietnamese GUI about the set up screen of database, menu bar of tcltkgrass, command dialog, online help and top screen of Nviz are shown in Fig. 5 - Fig. 9, respectively. In Figure 10, the example of Vietnamese character strings on GRASS graphic monitor is shown.

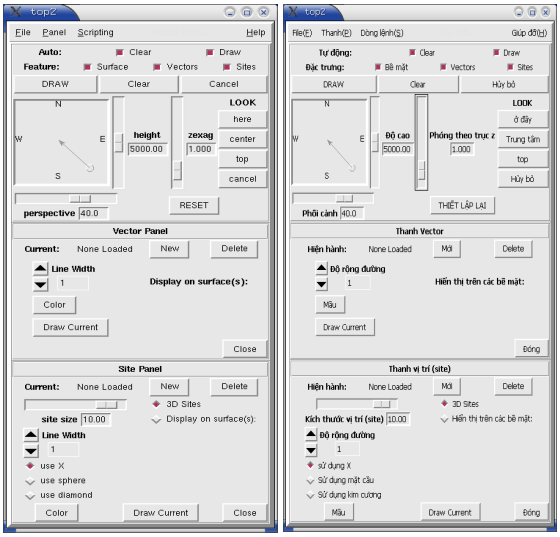

Figure 9: Top screen of Nviz

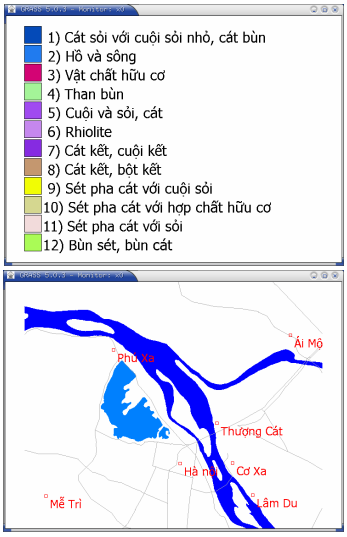

Figure10: The example of displaying Vietnamese character strings (upper; legend, lower; label)

4 Conclusion

Original GRASS GIS does no support Vietnamese although several other language versions have already been developed. In this study, i18n version of GRASS GIS has been localized to Vietnamese by creating message files for Vietnamese and by modifying some files of i18n version. Furthermore, in order to apply these techniques to develop other languages version, development process that is divided into three steps has been described in detail. The authors hope that availability of GRASS-i18n and the Vietnamese language support described in this paper would enable localization to the other languages and expand the user base for GRASS.

Acknowledgement

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References

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